MPA Morrison Park Advisors

Analysis of Potential Policy Incentives to Support Resilient Towers In Toronto

Report prepared by Morrison Park Advisors
With the assistance of Sussex Strategy Group
For
City of Toronto Chief Resilience Officer

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Executive Summary

The City of Toronto is home to thousands of residential apartment buildings of all shapes and sizes. More than 800 of them are at least 35 years old, between 8 and 40 stories tall, and owned by private sector, for-profit landlords. These buildings are home to more than 375,000 Torontonians, approximately 13.5% of the population. Despite their for-profit nature, many of these apartments are among the most affordable dwellings in the City, for which there is no easy substitute.

Given their age, these buildings are deteriorating. Notwithstanding having an expected useful life of more than 100 years, buildings which are between 34 and 68 years old face mounting pressures. Moreover, these buildings were built in an era when standards and practices were much less concerned than now with energy use and environmental performance.

Many of these buildings are reasonably well-maintained given the constraints under which they operate. Owners have been making investments to ensure that buildings remain safe, quality housing. However, not all buildings have been managed in the same way, and a segment of this building population may be at higher risk because of a lower level of ongoing investment. Moreover, even better-maintained buildings represent opportunities for significant improvement, which could bring them up to high standards of energy efficiency, resilience in the face of environmental and social pressure, and livability. However, such investments have not occurred.

This Report is provided to the City of Toronto Chief Resilience Officer, and is a financial and policy analysis of the challenges with and options to address the need for Resilient Towers. Available information on the target population of buildings was gathered and analyzed, building owners were consulted, and financial modeling and policy analysis were undertaken to determine how the City of Toronto might respond to this developing challenge.

Towers have been a focus for attention in Toronto for more than a decade, and the City has devoted substantial resources over the years to better communicate with, understand and support building owners. The Tower and Neighbourhood Revitalization Unit has been an ongoing investment to address this need, and has led many initiatives aimed at encouraging and facilitating investment in and improvement of buildings and their communities. There has been success, with many buildings being improved through modest retrofit projects in the last ten years. However, “Deep” retrofits, which fundamentally change the operating standard of buildings and bring them to a level where they could continue to serve the City for the remainder of their expected useful lives, have not been undertaken. Financial modeling indicates that “Deep” retrofits simply are not economic for building owners under current conditions, but that feasible changes to several policies could bring them into reach.

Improving Towers will undoubtedly have costs: for governments in the form of grants, or delayed or foregone revenues; for tenants potentially in the form of modestly higher rents; and for building owners in the form of risks associated with all construction projects and long-term investments. However, NOT making investments also has costs, which are not very well documented or understood, but which should be considered and taken into account. Moreover, investments will also result in real, tangible benefits, including dramatically reduced energy and water use, reduced greenhouse gas emissions, improved resilience in the face of increasing environmental challenges like heat waves and floods, better living conditions, and continued use of important building assets that are located throughout the city on critical transportation routes. The balance of these costs and benefits suggests that continued pursuit of Resilient Towers initiatives is warranted.

It is recommended that the City consider the following initiatives if it chooses to pursue the goal of achieving Resilient Towers in Toronto:

1. The City of Toronto should engage with the Government of Canada, with the support of stakeholders in the sector, to advocate that qualifying Resilient Towers "Deep" retrofit projects be granted CCA Class 43.2 treatment, or the equivalent, as soon as practically possible.

2. The City of Toronto should engage with the Government of Canada. the Government of Ontario and interested stakeholders with respect to the availability and allocation of grant monies that would be targeted to Resilient Towers "Deep" retrofit projects, in concert with changes to CCA rates.

3. The City of Toronto should consider amending its Development Charges By-law to support Resilient Towers "Deep" retrofit projects through associated discounts to new construction projects, therefore incentivizing both retrofits and the construction of new rental apartment buildings.

4. In order to support all of these options, the City of Toronto should consider taking a leading role in defining, with the support and involvement of stakeholders, a robust and technically-based definition of "Deep" retrofits that may then be utilized in relevant supportive policies.

5. The City of Toronto should expand its collection of data on the condition of rental buildings and the identity and characteristics of building owners, in order to improve the basis for continued policy development.

6. Through its existing departments and agencies, the City should increase engagement with building owners, to better understand decision-making processes and the sources of differences in building investments over time.

7. In the context of ongoing development of bylaws pertaining to buildings in the city, the City should consider whether steps can be taken to require the equivalent of "Light" retrofits in buildings that have not undertaken them, or to otherwise enforce a minimum standard of efficiency, resilience and comfort for rental buildings.

8. The City of Toronto should consider entering into discussions with the Province of Ontario with respect to potential revisions to the Building Code that would require buildings in the target class to meet minimum standards for efficiency, resilience and comfort.

1. Purpose and Preparation of the Report

The City of Toronto is home to hundreds of residential rental apartment towers which house a substantial portion of the city's population. Most of these buildings were built more than three decades ago, in a very different time from the perspective of economics, building design requirements and environmental concerns. As these buildings have aged, it has become apparent that upgrades may be required in order to maintain their viability as places to live in a healthy, comfortable and environmentally responsible manner. However, the economics of upgrading these buildings may be challenging, particularly from the perspective of the private sector owners that own and operate most of them.

The City of Toronto has been concerned about and addressing this issue for over a decade, beginning with the Mayor's Tower Renewal Initiative, and continuing through the formation of the Tower and Neighbourhood Revitalization Unit. Substantial effort has been devoted to understanding the nature of the challenges faced by older rental apartment buildings, engaging with building owners and other stakeholders in the community, running pilot programs to support renewal and revitalization projects, and developing a base of knowledge and experience that can be built upon to help the sector move forward.

Despite the considerable effort and leadership of the City of Toronto, the deterioration of a significant portion of the city's rental building stock continues, and it has become apparent that additional initiatives are required to meet continuing challenges. The City of Toronto Chief Resilience Officer identified the residential apartment sector as a priority area of concern, and deemed the associated issues as a worthwhile area of study. Morrison Park Advisors was retained to provide financial, policy and analysis support. The primary components of the work included:

- Gather and analyze available information on the population of rental apartment buildings in Toronto;
- Gather information from building owners and industry representatives about the economics of private sector rental apartment buildings and possible upgrades to those buildings from a resilience and environmental perspective;
- Analyze possible policy options to support upgrades to the buildings;
- Develop a financial model to test which policy supports, at what level, might be sufficient to incent otherwise unlikely building upgrades by private sector owners;
- Report on the work undertaken, including recommendations arising from the analysis.

In order to supplement our expertise, which is primarily financial and analytical in nature, Morrison Park Advisors retained the services of Sussex Strategy Group as a sub-contractor on the engagement, to provide expertise and knowledge on policy options and the intricacies of pursuing policy change at multiple levels of government.

2. Rental Apartment Towers in Toronto

The RentSafeTo program enforces City of Toronto Bylaws concerning rental apartments. As part of this program, all owners of rental apartment buildings of three stories or more, and with at least 10 rental suites, must register their buildings and comply with requirements. As of 2017, over 3400 different buildings were registered with the program, comprising more than 300,000 suites. A significant fraction of the population of the City of Toronto lives in these rental accommodations.

The Canada Mortgage and Housing Corporation (CMHC) also maintains statistics on the total number of rental accommodations in Toronto, as well as on vacancy rates, average rents and other relevant indicators of the health of the rental market. The most recently available report (October 2018) states that the City of Toronto had rental accommodations available in two forms:[1]

- Rental apartments in purpose-built rental buildings with at least 3 suites: 264,832 suites;
- Rental units in condominium buildings: 101,705 suites.

It is notable that CMHC statistics do not agree with the RentSafeTo registry with respect to the number of apartment suites available in rental buildings (264,832 vs. 300,000+), however for a variety of reasons having to do with the collection method of information in both sources, discrepancies are not surprising. Regardless, both sources of information are consistent on the order of magnitude of the population of available rental suites.

A second critical observation is the size, and growth, of the market for rental units in condominium buildings vs. purpose-built apartments. Comparison of two CMHC Reports five years apart (October 2013 and October 2018) provides useful insight into recent trends.

Table 1: Toronto Rental Accommodation - Suites

Type	2013	2018	% Change
Rental Apartments	260,391	264,832	1.7%
Rental Units in Condominiums	60,825	101,725	67.2%
Total Suites Available	321,216	366,557	14.1%
Rental Apartments as % of Total	81%	72%	- 9%

This Report does not address any issues related to rental units in condominiums. However, to the extent that comments in the Report reflect on the "market" for rental accommodation, it should be noted that:

- The total market for rental accommodation is now significantly larger than the population of purpose-built rental apartment suites, and
- Most of the growth in that total market is occurring in the condominium sector.

According to the 2016 Census, there were a total of 1,179,057 occupied dwellings in Toronto at that time. If in 2016 there were approximately 350,000 rental units (between apartments and condominiums), then rental units would

[1]Canada Mortgage and Housing Corporation, *Rental Market Report: Greater Toronto Area*, 2018.

have comprised 30%+ of all housing in Toronto (actual proportion varies depending on whether RentSafeTo or CMHC counts for purpose-built rental units are used, but CMHC data must be used for condominiums in either case). Rental housing, in all of its various forms, is a very significant part of the housing stock of the city, and must be a priority for ongoing policy development.

Breaking Down the Apartment Sector

The total pool of rental apartment buildings can be broken down into a variety of categories, based on different characteristics. Most relevant for this report are size (measured in floors), date of construction, and ownership type.

Size

Size defined as number of floors is relevant because it is an indicator of the type of construction used to erect the building (which affects zoning, permitting, cost of construction, etc.). Four categories are relevant:

- 3 to 4 floors: typically referred to as "walk-ups", usually without elevators, and generally constructed in a manner similar to houses (often "stick-built" or "framed"); in Toronto, the oldest such registered rental building dates back to 1809, with almost a quarter of them built before 1950;
- 5 to 7 floors: a transitional category, which sometimes might fall into the "walk-up" category, but sometimes may be perceived as "buildings", with elevators and "reinforced concrete slab" or "steel frame" construction; in Toronto, the oldest such registered rental building dates back to 1805, but most are modern, with less than 2% of such buildings built before 1950;
- 8 to 11 floors: typically referred to as "buildings", and often included in the definition of "high-rise" or "tower", construction at this level generally requires the use of reinforced concrete and steel frames. All buildings in this category have elevators, and in Toronto date back to 1938, though virtually all were built after 1950; and
- 12+ floors: "high-rise" buildings or "towers", in Toronto dating back to 1950.

In this Report, the emphasis is on the 12+ floor category, traditionally understood as "high-rise" or "towers". This is the largest segment as measured by total rental suites available in Toronto, also has a relatively concentrated ownership, and broad consistency in terms of both building economics and construction. However, the 8 to 11 floor category is also relevant, and will be noted in the Report.[2]

Date of Construction

As already noted, rental apartment buildings in Toronto date back to the 1800s, but the vast majority were built in the 1900s, and most after 1950 (measured by total suites available).

A key dividing line is 1985: the vast majority of rental apartment buildings in all categories were constructed before this year, with very limited construction afterwards. The 1960s and 1970s in particular experienced massive growth in rental apartment construction, which all came to a grinding halt in the early 1980s. A variety of tax policy changes, the imposition of rent control laws, and market dynamics appear to be at the heart of this abrupt change, but in any

[2] Note that Statistics Canada defines "high-rise" as any building with 5 or more stories, rather than 8 or more. However, The Tower Renewal Partnership, a not-for-profit entity that has conducted substantial research into tower-related issues in Canada, has catalogued buildings across Canada on the basis of an 8+ floor definition of "towers".

case pre-existing research on rental towers has focused on buildings constructed between 1946 and 1984 across Canada.[3]

Every building constructed in 1984 or earlier is already at least 34 years old. Typically, concrete slab apartment towers have an engineered lifespan of 100 years or more, but all of the buildings relevant to this Report can be thought of as having entered "middle age", at a minimum. The oldest 12+ story rental apartment building in Toronto, constructed in 1950, is now 68 years old, and well over half way through its engineered lifespan.

From the perspective of resilience and environmental performance, all of these buildings were constructed in a different era, with different standards. Buildings that have not been substantially retrofitted over time are likely to be suffering from degrading systems, relatively high energy and water consumption, and relatively high emission of GHGs, as compared to more modern buildings.[4]

Ownership Type

Three principal categories are relevant:

- Toronto Community Housing: the City of Toronto's public housing provider, which is the largest landlord in the City of Toronto by far, and the largest in Canada as measured by both suites and tenants
- Social Housing: comprising all types of not-for-profit housing other than Toronto Community Housing, including co-operatives, charitable trusts and institutions, and other entities
- Private, for-profit housing: all rental housing managed on a for-profit basis by or on behalf of private sector owners

In this Report, the Toronto Community Housing and Social Housing segments will not be addressed. The primary focus here is on the economics of private sector owners, and the policy options that may drive such owners to invest in their buildings. Public sector and social housing providers face a completely different economic landscape, principally concerning direct government funding support for capital expenditures, which is outside the scope of this Report.

The private sector, for-profit category can then be subdivided based on a number of different variables that may be relevant to policy options. These include:

- Taxation: building owners may be subject to income tax on their rental earnings (most typically), or may benefit from tax-deferred status (e.g., pension funds), where income may be sheltered from taxation for some period of time
- Source of capital: some owners may raise equity capital in the public financial markets (e.g., publicly-traded Real Estate Investment Trusts, or REITs), or raise capital through private transactions (e.g., private equity funds, insurance companies or other large capital pools, or family wealth)
- Size of portfolio: some owners may own a single building, while others may own large portfolios; this distinction is relevant because it may imply (but not necessarily define) the ability to: raise capital, manage

[3] See in particular the work of the Tower Renewal Partnership, available at their website: www.towerrenewal.com
[4] For a more detailed discussion of the original built standards of Toronto towers, as well as life cycle aging and upgrade requirements, please see *Tower Renewal Guidelines*, by Ted Kesik and Ivan Saleff, University of Toronto, 2009. This document was a critical resource for the Mayor's Tower Renewal Program.

buildings internally vs. making use of third-party property managers, keep abreast of the latest industry trends and opportunities, undertake sophisticated tax strategies, etc.

- Ownership time horizon: some owners have a medium-term ownership time horizon (e.g., private equity funds with a limited 10-year life), while others may be "permanent" owners of buildings (e.g., family trusts)

The relevance of these characteristics will be discussed further in the consideration of policy options.

Building Population Counts

The table below summarizes the information collected by RentSafeTo in 2017, according to the categories described above.

Table 2: Toronto Rental Buildings

Floors	Ownership	Construction Date	Building Count	%	Total Suites	%
3 to 4	All	All	1,681		49,511	16.0
5 to 7	TCH	All	77		7,980	2.6
	Social Housing	All	70		5,663	1.8
	Private Sector	All	490		34,320	11.1
8 to 11	TCH	All	55		8,948	2.9
	Social Housing	All	52		6,788	2.2
	Private Sector	1938 to 1984	237	6.9	24,846	8.0
		1985+	23		2,940	1.0
12+	TCH	All	111		27,322	8.8
	Social Housing	All	30		5,257	1.7
	Private Sector	1950 to 1984	589	17.1	127,177	41.2
		1985+	31		8,144	2.6
Total			3,446	100	308,896	100

The focus for this Report is a total of 826 target buildings, comprising more than 150,000 rental suites. They are all owned by the private sector, built before 1985, and are at least 8 floors tall. 589 of these buildings are 12 floors or taller, while 237 are between 8 and 11 floors. These 826 buildings comprise almost 50% of all purpose-built rental suites in the City of Toronto.

Statistics Canada indicates that as of the last Census in 2016 an average of 1.8 Canadians lived in every suite in a building of 5 stories or more. However, in Toronto, and particularly in purpose-built rental apartments of an older vintage, it is likely that average occupancy per suite is significantly higher than the average for all buildings (all buildings would include condominiums and purpose-built rentals constructed after 1985). If average occupancy in the buildings targeted by this Report were 2.5 persons per suite, then the 152,000 target suites for this Report would house more than 375,000 Torontonians, or approximately 13.5% of the population.

Target Buildings and Housing Affordability

Rental apartment buildings owned by the private sector are businesses, the purpose of which is to generate income for owners. They are also investment assets, which gain and lose value over time depending on a variety of market conditions (including both the rental market and also the market for land within the city), as well as being affected by tax policies and other government rules and regulations (such as safety standards, labour standards, environmental requirements, etc.). However, these buildings are also, critically, housing for the population of the city, and are in particular a significant part of the pool of lower-cost housing available to people in Toronto. A small pool of housing units are less expensive than these rental apartments (primarily TCH buildings and Social Housing units), but all other types of housing will cost more (including condominiums, row houses and single family homes).

The following information, from the most recent CMHC Rental Market Report for Toronto, highlights how much cheaper rental apartments are than condominiums.

Table 3: Average Rental Prices (monthly)

		Bachelor	1 Bedroom	2 Bedrooms	3 Bedrooms	Weighted Average
Apartments	Pre 1960	$967	$1,151	$1,363	$1,645	$1,218
	1960 to 1974	$1,124	$1,279	$1,496	$1,672	$1,396
	1975 to 1989	$1,214	$1,366	$1,505	$1,562	$1,430
	1990 to 2004	NA	$1,643	$1,768	NA	$1,658
	2005+	$1,541	$1,790	$2,396	$2,239	$1,958
	Weighted Average	$1,089	$1,270	$1,492	$1,664	$1,372
Condominiums	All	$1,520	$1,966	$2,522	$3,137	NA

Source: CMHC Rental Market Report, Greater Toronto Area, 2018

The target group of buildings for this Report were all built before 1985. To take two-bedroom apartments as an example, average rents for building age classes up to that vintage range between $1,363 and $1,505 per month. This compares to condominiums which have average rents of $2,522 per month, or approximately 65% to 85% more.

From a public policy perspective, it is imperative to maintain the stock of buildings that provide Torontonians with lower cost housing options. If these older buildings were to exit the market, for any reason, then nothing other than substantially more expensive housing options would be available. Since the growth of housing stock has primarily been in the form of condominiums, then growth in stock cannot be expected to provide a solution to loss of low-cost housing.

The Affordability Impact of Investing in Buildings

While older buildings are demonstrably lower cost for renters than are new buildings and condominiums, it should be recognized that making substantial investments in private sector buildings is likely to lead to an increase in rental prices. This arises from simple math: private sector owners will only invest if they will recoup their investments. Future cash flows can only come from higher rents or lower expenses, and almost certainly a combination of both. To the extent that investments can reduce costs, it means that increases in rents can be minimized, but it is unlikely that cost reduction can exclusively support investments (there are only so many costs that can be reduced!).

At the same time, government support for investments, whether grants, tax changes or other forms of subsidy, would alleviate the upward pressure on rents that would result from investments by private sector owners. From a public policy perspective, supporting investments in lower cost buildings to maintain their viability is an alternative to building new low cost housing – and support for existing low cost housing is likely much cheaper than constructing new. Tower Resilience issues should be considered in this broader context about housing affordability and options.

3. Improving the Resilience of Rental Apartment Towers: Measures and Economics

Rental buildings are businesses, and the primary "equipment" used in the business is the building itself (along with all of its fixtures and components). Upgrading buildings requires investment, and investment capital is precious. Investments will only be made if they are required to keep a business operating, or if the investment will increase the returns from the business sufficiently to compensate the owner for the incremental investment capital. "Required" investments in a legal sense are typically obvious, such as those needed to satisfy government licenses, codes or standards (e.g., fire safety or electrical safety standards). Beyond requirements, every owner must judge whether future earnings will be sufficient to justify any incremental investment.

Rental buildings earn revenues in the form of rents, and have expenses related to property taxes, utilities, building management and general maintenance. The operating income that results from these cash flows is then used to pay income tax, return of and return on capital (both debt and equity).

A new investment in a building will be made if the net cash flows from the building in the future are expected to improve sufficiently compared to the "no-investment" case. This means that either rental revenue must be expected to increase, or expenses must decline, or some combination of both.[5]

However, rental apartment buildings in Ontario are subject to rent control laws, so opportunities to increase rental revenue are relatively limited. Under existing laws, increases to tenant rents are only allowed up to the limit of prescribed guidelines set by the Landlord and Tenant Board. Typically, annual rent increase guidelines are closely related to Ontario inflation (as measured by the Ontario Consumer Price Index). Landlords can increase rents by more than the guideline only in two cases:

- A tenant is vacating a suite, in which case the suite may be offered for rent to a new tenant at whatever price the market will bear at the time of rental;[6] or
- A landlord applies for an "above guideline" rent increase (often referred to as "AGI") applicable to existing tenants, which is only allowed under very specific circumstances, and which are strictly limited.

Since the opportunity to increase revenues is limited, investments into rental apartment buildings often only make sense if costs are reduced as a result, therefore generating additional cash flows. The larger the investment, the greater the operating expense reduction must be in order to achieve reasonable returns, when coupled with whatever

[5] Note that if a building is deteriorating and an owner does not invest in maintenance and upkeep, tenants might vacate the building if they are able to find alternate arrangements, and the building revenue in the "no investment" case might be forecast to decline in absolute terms. In such a case, investment in the building might only keep revenue flat, but still be better than the alternative. However, if the rental market is very tight, and people have few alternatives, they might not practically be able to vacate even a deteriorating building.

[6] Note that vacancy rates and turnover rates have a complicated relationship with building revenues over time. In a low vacancy environment, it should be expected that building owners would be able to aggressively increase the rental price for any vacant unit offered to prospective new tenants. However, the result of lower vacancy throughout a market means that fewer tenants are likely to consider moving, and so a building's total revenue will continue to grow by the rent controlled rate (since tenant turnover is a small percentage of the total building). In a softer market, where vacancy rates are higher, building owners will have more opportunities to "reprice" their rental units, but the soft market will prevent them from aggressively increasing prices…

limited amount of revenue increase is possible. If costs cannot be reduced sufficiently, then the investment simply will not be made by a private sector owner.

The net result of these financial circumstances is that it is very difficult to financially justify substantial investments into existing rental buildings. Major building components, which are inherently expensive to replace, are simply allowed to age, while adoption of newer technologies and building features are only pursued if there is an immediate impact on the costs of building operation.

Nevertheless, building upgrades would be significantly beneficial for tenants, in terms of quality of life and resilience of the buildings, and could also dramatically improve building energy and environmental performance. Solving this puzzle is the purpose of this Report.

Example Buildings for Analysis Purposes

The 800+ buildings that are the primary target of this Report form a spectrum of building circumstances: some are more up-to-date with recently replaced equipment, others have all original equipment dating back 40 years or more; some benefit from higher average rental revenue, while others are at the lower end of the scale; some are in more desirable parts of the city, others may be further away from transportation routes and neighbourhood attractions. Notwithstanding the range that is evident with even modest scrutiny and comparison, it is quickly apparent that none of these buildings meet modern standards for building performance, comfort and efficiency.

None of these buildings have envelopes that are insulated enough or air-tight enough to maximize energy performance. Few have installed the latest and most efficient pumps and motors, the best available windows and doors, or the most up-to-date safety systems. Few of these buildings have any cooling systems in place to manage summertime heat waves that may become increasingly common in a world suffering climate change. Some buildings are further ahead than others because of recent investments, but all could be usefully improved, if the economics could be made to work.

Despite the fact that in reality, each of the buildings in the target group is no doubt unique, for the purposes of analysis some simplification is required. Only a few archetypal buildings can be analyzed, in order to stand in for all others in the range. Given the available data, three “example” building were defined, hinged primarily on the nature and age of heating equipment.

Table 4: Heating Equipment Data – Buildings with 12+ Floors, Constructed Pre-1985

Type	Age of Heating Equipment				
	Original (pre-1985)	Intermediate (1985-2006)	Recent (Post-2006)	No Info	*Total*
Electric	56	5	7		68
Gas-fired	137	137	235	1	510
No Info				11	11
Total	193	142	242	12	589

Gas-fired Building with Original Heating Equipment

As of 2017, 137 buildings in Toronto from the target group of 12+ floor buildings were reported to have gas-fired boilers or forced air furnaces that were original to the construction of the building – in other words, heating equipment

that was anywhere from 34 to 68 years old. Twenty-one of these buildings also reported having single-paned windows, forty reported having original elevators, and only twenty-three reported any form of cooling within the building. Based on examples from within this category, historically available data and industry information, a "Low Performance" example building was defined with characteristics described in the table below.

Table 5: Low Performance Building

Floors	18
Units	214
Occupancy Rate	97% (208 units)
Age of Building	1972
General Description	Concrete slab building, brick curtain walls, "Tower in the Park" design, typical of 1970s Toronto
HVAC	Hot water boiler, no air conditioning, relatively minimal insulation throughout
Lighting, appliances and other electricals	Not upgraded to LEDs, typical appliances, minimal upgrades in general
Revenues	$2.5 million rental revenue ($1000/month gross), plus $125,000 in other revenue (laundry, etc.)
Utilities expenses (electricity, water, waste, gas)	$560,000
Property taxes (estimate based on 2018 mill rate)	$385,000
All other expenses	$630,000
NOI	$1,050,000
Assumed neighbourhood	Central Etobicoke (e.g., old Ward 3)

Gas-fired Building with Recently Replaced Heating Equipment

As of 2017, 235 buildings in Toronto from the target group of 12+ floor buildings reported having replaced their gas-fired heating system within the last ten years. Many of these buildings also have had other upgrades installed, including new windows and balcony doors, efficient lighting systems, new appliances and so on. Based on examples from within this category, historically available data and industry information, a "Higher Performance" example building was defined with characteristics described in the table below.

It is important to realize that before the investments made during the past 10 years, buildings in this category were in all likelihood similar to buildings in the "Low Performance" category. Structurally the buildings are similar, with similar ranges of size, age and construction features. In both categories, these buildings are spread throughout the City. Given the investments made in the past ten years, the buildings are now more efficient, using less electricity, gas, and water than they did before. Also, given investments in lighting, windows, balconies, appliances and so on, these buildings are likely more attractive than they used to be, and would command higher rents in the marketplace (which only affects suites when tenants depart and units turn over). To the extent that any of these expenditures were supported by AGIs, all tenants would have seen increases in rents imposed after the upgrade work was completed. These changes are reflected in the assumptions below.

The difference in average rents between Low Performance and High Performance example buildings is approximately $500 per month, and this difference should be noted and kept in mind, as it will ultimately be relevant to policy options and choices. The Low Performance building has average rents which are below average (according to CMHC) for buildings in this age class, while the High Performance building has average rents which are above

average for this age class of building, in the City of Toronto. This difference in the example buildings was chosen deliberately in order to allow for analysis that applies to a range of buildings in the city.

Table 6: Higher Performance Building

Floors	18
Units	214
Occupancy Rate	99% (212 units)
Age of Building	1972
General Description	Concrete slab building, brick curtain walls, on a major street with access to transit
HVAC	New, high-efficiency hot water boiler, no air conditioning, relatively minimal insulation throughout
Lighting, appliances and other electricals	Upgraded to LED lights in all common areas, recent appliances, new elevators/motors, low-flow faucets/aerators/shower heads and low-flow toilets installed throughout the building, high efficiency laundry machines, etc.
Revenues	$3.8 million rental revenue ($1500/month gross), plus $190,000 in other revenue (laundry, etc.)
Utilities expenses (electricity, water, waste, gas)	$419,000
Property taxes (estimate based on 2018 mill rate)	$750,000
All other expenses	$550,000
NOI	$2,250,000
Assumed neighbourhood	Downtown Toronto (e.g., old Ward 27)

Electrically Heated Building with Original Equipment

As of 2017, 56 buildings in Toronto from the target group were reported to have electric heating systems that were original to the construction of the building – in other words, electric baseboard heating equipment that was anywhere from 34 to 68 years old. It should also be noted that 11 more buildings did not provide any information about their heating systems, but anecdotal evidence suggests that several of these buildings also fall into this category. Unfortunately, some buildings in this category have recently been newsworthy (such as the building located at 650 Parliament Street), because of failures in the building which have caused safety concerns and significant disruption to tenant lives.

Not enough information about the design and costs associated with these buildings was available to construct a financial example around which to conduct detailed analysis. Moreover, the upgrade path for these buildings is somewhat unique, because the design of the heating system is integrated into the building construction, and would require a very different technological solution from an upgrade perspective.

This group of buildings will be addressed further below, in a separate section.

Upgrade Paths for Gas-heated Buildings

In conjunction with the Tower Renewal Partnership[7], a series of building upgrade paths were defined and costed, so further analysis of example buildings could be undertaken. TRP defined the following five scenarios:

- "Light" Energy Retrofit: equipment replacements and upgrades that all immediately reduce building utility costs, and are generally believed to have simple payback times shorter than five years
- "Medium" Energy Retrofit: all equipment replacements and upgrades that reduce building utility costs, not including re-cladding of the building and other "Deep" retrofit features
- "Deep" Energy Retrofit: all equipment replacements and upgrades which reduce building utility costs and bring building performance up to leading standards, resulting in a top-performing, highly resilient building
- "Resilience Only" Retrofit: equipment replacements and upgrades which improve the ability of a building to withstand stresses such as heatwaves, equipment failures, etc., whether or not these improvements affect utility costs
- "State of Good Repair" Retrofit: equipment replacements and upgrades, as well as basic building maintenance, required to bring a poorly maintained building up to minimum standards for good repair

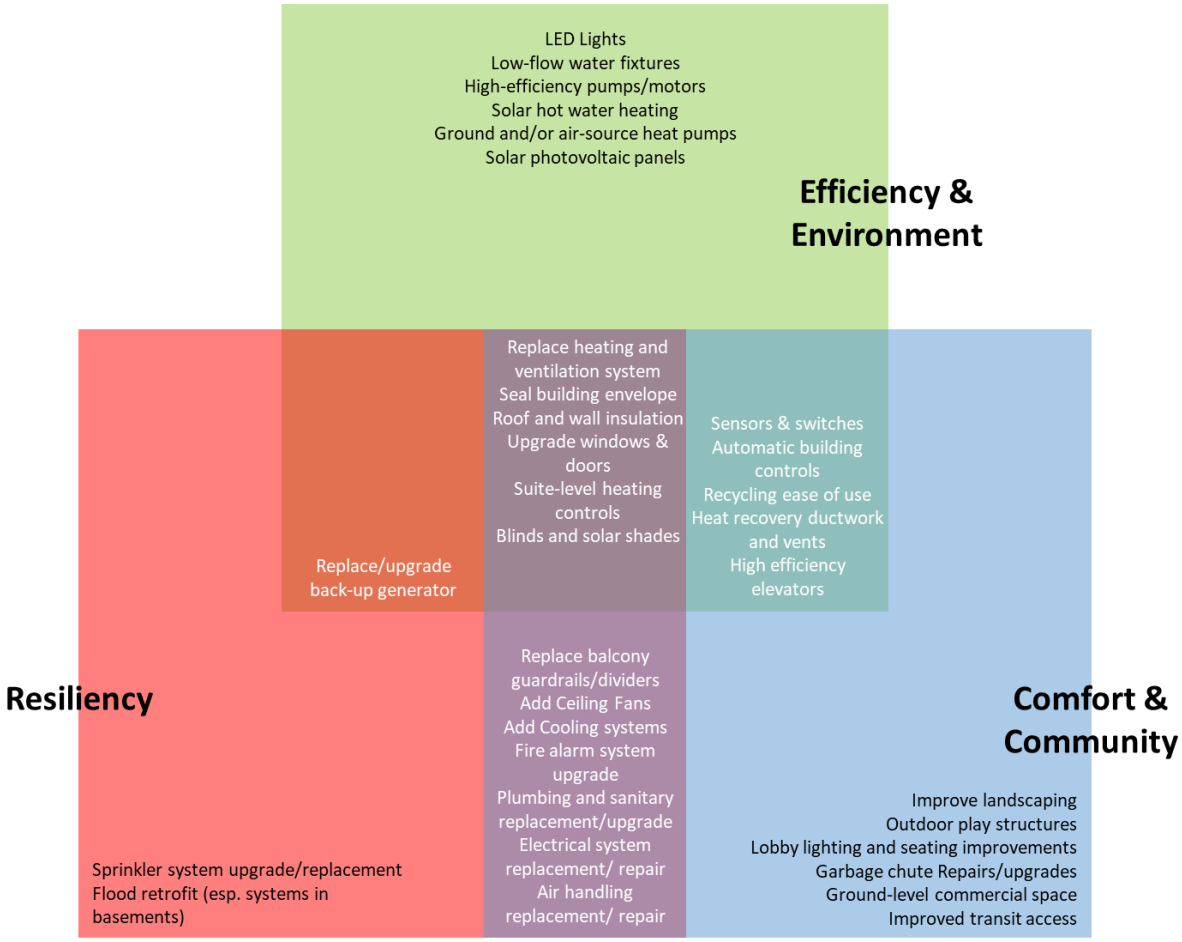
Each of these paths was costed, at 2018 prices, based on an assumed large Toronto tower, roughly similar to the Lower Performance and Higher Performance example buildings described above. Adjustments were made to TRP information provided to take into account differences between the TRP example building, and the building examples modeled for this Report.

Retrofits: Comfort, Resiliency, Efficiency & Environmental Benefits

All building retrofits improve the state of a building. However, individual retrofit measures may have varying impacts on tenant comfort, the economic efficiency of a building, its environmental emissions and impacts, and its resiliency in the face of stressful conditions such as heat waves, power loss, floods or violent storms. Substantial retrofits, which will include a variety of specific measures, will almost always contribute to all of these categories of benefits, and the "bigger" a retrofit the more likely this is true.

[7] The Tower Renewal Partnership is a not-for-profit initiative which works through research, advocacy and demonstration to transform postwar towers and their surrounding neighbourhoods into more sustainable, resilient and healthy places, fully integrated into their growing cities. Over the past decade, the TRP has undertaken substantial research invaluable to the understanding of challenges and opportunities related to the retrofit of towers in Canada. For more information, visit their website at www.towerrenewal.com

Graphic 1: Retrofit Measures



The upgrade paths defined by the Tower Renewal Partnership combine various measures from the chart above in different combinations. Some of the paths put more of an emphasis on one box or another, while the “Deep” retrofit is the most comprehensive overall, covering measures in most areas of the chart.

There are no universal definitions for packages of retrofit measures – which is one of the significant challenges to policy development – but it should be apparent that almost any package of measures will deliver multiple benefits.

One critical issue is that only measures which are captured in the Efficiency & Environment box can typically have a strong impact on building costs (and not always even then). Measures which are exclusively in the Resiliency or Comfort boxes might make living in a building more desirable (and hence improve revenue potential over time, since new tenants should be willing to pay more to be in a better building), or reduce the risk of losses over the long term (which could potentially affect building insurance costs to some small degree and can certainly affect the risk of catastrophic losses), but seldom have an immediate impact on cash flows. Retrofit packages that are light on Efficiency measures but heavy on Resiliency and Comfort measures are often very difficult to finance, and may never break even economically.

The first three TRP upgrade paths ("Light", "Medium" and "Deep") mentioned in the previous section are comparatively heavy on efficiency measures, but also include many measures which also improve Resiliency and Comfort. These upgrade paths were modeled in detail in the preparation of this Report.

The "Resilience Only" and "State of Good Repair" upgrade paths are comparatively light in Efficiency measures, but heavy on Resilience and Comfort measures, as the names would imply. The economics of these upgrade paths, as measured by impact on building cash flows, are significantly worse than the first three. Given that substantial policy change is required to achieve the economic viability of the first three paths, addressing these other less economic paths would require even more policy support. In the interests of brevity, these additional paths were not modeled in detail.[8]

Not All Retrofits Are Created Equal

The emphasis in this Report is on getting to "Deep" retrofits. These have the greatest impact on reducing the use of utilities (natural gas, electricity, water, waste), the greatest impact in terms of reducing environmental emissions (greenhouse gases, grey and black water, etc.), and significant benefits with respect to building resiliency and tenant comfort. "Light" and "Medium" retrofits have, by definition, less of these beneficial impacts, but would nonetheless be steps in the right direction. They have been examined in a spirit of understanding what might be within the art of the possible, and how this could intersect with the ultimately desirable.

It is worth reiterating here, however, that what has been defined as a "Deep" retrofit is merely meant to be representative of what might be included in such a package of measures. There is no formal or "official" definition of a "Deep" retrofit, and such a thing would most certainly be required to support any newly developed legal or regulatory policy.

Application to Example Buildings

To take into account the differences between the Lower Performance and Higher Performance buildings described above, it was assumed that a Higher Performance building was approximately equivalent to a Lower Performance building which had already completed a "Light" Energy Retrofit plus some of the features of a "Medium" Energy Retrofit, as described by TRP. Therefore, a modified version of the "Deep" Energy Retrofit was defined in order to estimate its financial impact on a Higher Performance building.

It should be noted that costing of each of the paths takes into account all currently available incentives, discounts and government policies. For example, a variety of incentives to support the purchase and installation of higher efficiency equipment have recently been offered by natural gas utilities, the Independent Electricity System Operator, and Toronto Hydro, though the availability of these incentives can change at any time.

[8] Note, however, that some "state of good repair" retrofit measures might be required prior to completing an efficiency-focused retrofit on a building. A poorly maintained building cannot necessarily move directly to an efficiency retrofit, because some basic systems may first need to be repaired. This would usually be factored into the total retrofit cost, and affects the business case for the overall investment.

Table 7: Low Performance Building Utility Savings

	Low Performance Building	+ Light Retrofit	+ Medium Retrofit	+ Deep Retrofit
Electricity (KWh)	1,540,800	1,232,640	1,078,560	1,078,560
Water (m^3)	47,080	32,956	32,956	32,956
Natural Gas (m^3)	574,654	459,723	367,779	114,931
GHGs(tonnes)	1,273	1017	819	292
Retrofit Cost	-	$3 M $14 K/suite	$14 M $65 K/suite	$19 M $88 K/suite

Credit: Tower Renewal Partnership and ERA Architects

Table 8: High Performance Building Utility Savings

	High Performance Building	+ Deep Retrofit
Electricity (KWh)	1,155,600	1,040,040
Water (m^3)	29,960	29,960
Natural Gas (m^3)	344,793	103,438
GHGs(tonnes)	773	265
Retrofit Cost	-	$10 M $46 K/suite

Additional details on these retrofit paths are provided in the Appendices of this Report.

Financial Analysis

A 20-year financial model was prepared to analyze the outcomes of pursuing the various upgrade paths for each of the example buildings.

In every case, the model calculates a "status quo" scenario where no upgrades are pursued, and the building continues to operate for two more decades based on its current performance. Annual maintenance expenditures in this status quo scenario are relatively minimal, consumption of utilities is expected to be relatively stable (though utility prices are generally assumed to be rising modestly), and most revenues and expenses rise with expected inflation rates.

Note that this "status quo" assumption is NOT necessarily sustainable in the real world, because the continued aging of buildings which are already 34 to 68 years old may require substantially more than minimal maintenance investment in order to remain viable, *at some point in the future*. This is not an issue which can be fully addressed in this report, as it depends very much on the circumstances of particular buildings, applicable building standards and codes, and assumptions about the future of the rental market and rent control laws. However, it is safe to assume that continued minimization of maintenance investment is one possible business strategy for building owners in an environment where strict rent control applies to their buildings, and vacancy/turnover rates are relatively low.

Building owners are assumed to have either owned the building since its construction, or to have purchased it immediately prior to the beginning of the model period. This assumption strongly affects the tax position and

assumed debt burden of the building. Since all buildings being studied are assumed to be constructed prior to 1985, an original owner will have owned the building for at least 34 years. In this case, it is assumed that very little "undepreciated capital cost" remains in the building for tax purposes (the construction cost of the building in original nominal dollars would have been tax depreciated at 4% or 5% per year, depending on the year of construction, with little tax shield remaining today). At the same time, it is assumed that such buildings have relatively little mortgage debt outstanding [note that owners could of course add mortgage debt to a building at any time, but this is a question of capital strategy for the owner, rather than an assumed necessity for the building]. On the other hand, if a building was recently purchased at its full market price, then there is a much higher probability that a substantial mortgage is outstanding on the building. In addition, most of the full purchase price of the building would be included in the undepreciated capital cost of the building, therefore resulting in substantial tax shield for operating income flowing from the building.

The varying nature of building owners was reflected in the model based on the various outputs calculated:

- 10 vs. 20-year return on investment: the model calculates the return on investment for an owner for both 10 years and 20 years after model commencement. This calculation assumes investment at full market value at the outset, cash flows over time, and monetization of the building at its estimated market value at conclusion. Some owners will prefer a 10-year time horizon, since they contemplate selling buildings from time to time, while others a 20-year (or even longer) time horizon, since they contemplate retaining assets in their portfolio, potentially in perpetuity. Performance differences between these two time horizons are typically related to tax issues, given that underlying cash flows are related more to inflation and forecast growth in utility prices than any other variable. In most cases tax effects are fully absorbed within about 20 years, so continuing the model beyond 20 years is unnecessary.
- Pre-tax unlevered return on investment vs. After-tax unlevered return on investment vs. After-tax levered return on investment: Different owner types are assumed to prefer different capital structures, hence return on investment is calculated in various ways.
    - Pre-tax unlevered returns apply to tax-deferred owners such as a pension funds, who at the same time may prefer to invest in projects without third party mortgage debt. Since they supply both debt and equity to the project, their focus is on the combined return, and they will structure the flavour of capital provided to a building in a way that suits them.
    - After-tax unlevered returns apply to owners who are taxable, but who can supply both debt and equity to a building in whatever amount is deemed preferable at the time (this would include, for example, insurance companies and other very large capital pools that typically deploy both debt and equity capital). Again, they would consider total returns to capital, and then allocate debt and equity to a building according to their preference.
    - After-tax levered returns represent the typical metric for most private sector building owners. In order to maximize returns to equity, it is assumed that such building owners will make use of the maximum amount of available mortgage debt to finance any building upgrades, generally up to 100% of the construction cost. In fact, the model assumes that building owners have the financial flexibility to take on 100% of the upgrade construction cost in the form of mortgage debt, without violating any financial covenants or degrading their credit quality. It should be noted that if a building owner has already maximized the mortgage debt available for a building, then it would not be possible to finance 100% of upgrades through additional mortgage debt: the building owner would have to contribute their own equity capital in addition to any new mortgage debt for the project. As greater amounts of owner equity are assumed to be invested in the project, the returns

would trend closer to the After-tax unlevered returns calculated above.

Where building owners do choose to make investments in their buildings, they are assumed to seek "above-guideline rent increases" wherever possible unless they are specifically prohibited from doing so. Under Ontario law, rent increases for existing tenants are only allowed at the rate set by the Landlord and Tenant Board each year (these increases are generally in keeping with inflation). However, in three cases building owners may apply for increases above guidelines (Above Guideline Increases, or "AGIs"):

- Where there is an extraordinary increase in property taxes greater than 150% of the allowed annual increase in rents: for example, assume that the allowed increase in rents is 2% in a given year, but for whatever reason a property owner is required to pay a 10% increase in property taxes; since the property taxes have gone up by more than 150% of the rent guideline increase (i.e., 2% x 150% = 3%) the additional 10% - 3% = 7% of the property tax increase will generally be allowed to be passed on to tenants in the form of an above guideline rent increase;
- Where there is an increase in security services costs for a building (or where security services will be offered for the first time, and are being added to the operating costs of the building); and
- Where a capital investment is required to maintain the state of good repair of the building or to improve its energy efficiency – beyond normal annual "maintenance" expenditures – an increase of 3% per year in rents may be allowed on top of the guideline rent increase for up to three years. This amounts to a potential 10% total increase in rents above the guideline rent increase (which would not be fully implemented until the third year after the investment was made). Capital investment is carefully defined in the legislation, and the rules for calculating the allowable increase are also spelled out. In most cases, replacement and upgrade of equipment included in the various upgrade paths defined above would definitely qualify for above-guideline rent increases, for example including replacements of boilers, windows, doors, elevator motors, etc.

These rules relating to above-guideline rent increases play an important role in the planning and maintenance of buildings, as landlords are strongly incented to do work which qualifies for AGIs, and only to the point that the costs may be recouped through rent increases (i.e., very expensive investments, which would require more than a 10% rent increase above guideline, often would be uneconomic). An example may clarify how AGIs affect potential retrofit economics:

- Assume a building in the Low Performance class with $2.4 million of gross rent per year (200 units * $1000/month)
- Assume an allowed rental price increase of 2%/year, based on rent control guidelines
- Assume that a retrofit project is being considered which has a useful life of 20 years (e.g., a boiler, cooling system or roof replacement). The useful life of the equipment is important, because AGIs only apply to the period matching the expected useful life of the equipment in question (then the rent level must be reduced by the amount of the AGI, unless the equipment is replaced again, in which case a new AGI is calculated)
- Three years of 3% rent increases over and above 2% inflation each year results in a cumulative increase in rents of 9.6% from the beginning level of $1000/month, meaning that rents rise by $96.42/month because of the AGI (rent at the end of the 3rd year would be $1158, but $96 of this increase would be from the AGI, and $62 would be from the allowed inflation-based annual rent increase; after the 3rd year, rents only go up by 2% per year)
- Assume that an interest rate of 5% is allowed by regulation in the calculation of AGIs

- The total required expenditure that would be necessary to justify this AGI for this building would be approximately $2.8 million.
- In other words, a building owner could undertake an eligible retrofit that costs up to $2.8 million today, knowing that this amount could be recouped from all tenants through an above guideline rent increase; but any retrofit costing more than that amount would have to be justified on the basis of cost reductions or increases in revenue that do not depend on existing, rent-controlled tenants

Occasionally, where governments or utilities are providing subsidies for various types of building upgrades (e.g., for high efficiency windows or boilers), the subsidy agreement may specifically prohibit a building owner from seeking above guideline rent increases. In these cases, building owners would need to determine whether they would be financially better off accepting the subsidy, or seeking the AGI instead.

Model Outputs Under Current Policy Conditions

All scenarios were compared to the financial results of the status quo. If investment returns in an upgrade scenario are at least equal to or up to 10% above the status quo scenario,[9] then the option is considered "marginal" (denoted by ≈). If the investment returns are below the status quo scenario, then they are considered unacceptable, while if they are more than 10% above the status quo, they are considered desirable.

Table 9: Results Including Above-Guideline Rent Increases

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	M	M	M	D	Tax impacts explain the difference between 10 and 20-year results
Lower Performance + Medium Retrofit	x	x	x	x	
Lower Performance + Deep Retrofit	x	x	x	X	
Higher Performance + Deep Retrofit	x	x	x	x	

While the financial benefits of pursuing Light upgrades are marginal, they are not negative. All other deeper retrofits are uneconomic for building owners under assumed conditions.

This outcome is notable, as it is consistent with the experience of the last 10 years, when many building owners have actively upgraded their buildings by installing new boilers, replacing light fixtures, replacing faucets and other water devices, etc. It is also notable, but not obvious from the above table, that unlevered returns are barely marginal, while

[9] I.e., if the output of the Status Quo scenario is a 7% return on equity, then the investment scenario would have to return between 7% and 7.7% to be considered "marginal", and greater than 7.7% to be considered desirable.

levered returns are closer to the fully positive threshold in the longer-term (in the shorter term returns are definitely positive, given tax impacts). This suggests that owners with access to low cost debt who are not already over-burdened with mortgages as part of their capital strategy are more likely to pursue these light upgrades. Moreover, since more than $2 million of the retrofit cost could be recouped from tenants through an AGI, cost reductions only need to assist in the financing of the remainder of the total capital cost of the retrofit.

Table 10: Results NOT including Above-Guideline Rent Increases

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	x	x	M	D	Tax impacts explain the difference between 10 and 20-year results
Lower Performance + Medium Retrofit	x	x	x	x	
Lower Performance + Deep Retrofit	x	x	x	x	
Higher Performance + Deep Retrofit	x	x	x	x	

When above-guideline rent increases are removed from the calculation then returns become negative for unlevered owners, and more marginal for owners willing to maximize their leverage. The increase in rents that is assumed with AGIs is an important economic element of the financial calculation.

Overall, these modeling results confirm that “Medium” or “Deep” retrofits are simply not economically viable under current conditions. This is not a surprising outcome, given the complete absence of Deep retrofits undertaken in Toronto.

This financial analysis of the Status Quo suggests that building owners may continue to selectively make modest upgrades to their buildings, on a case-by-case basis, and often with the support of above-guideline rent increases. However, this scenario does not address the overall aging of the building stock, nor the need to significantly enhance the energy and environmental performance of the total population of buildings.

A critical outstanding question from this analysis is why a quarter of the buildings in the class (137 out of 510 gas-fired buildings) still have original equipment, when “Light” upgrades appear to be financially viable under current conditions? Some clues are inherent in the assumptions behind the model, which may be considerations:

- Upgrades are only marginally advantageous, so owners with other opportunities to deploy their capital, time and effort may prefer to focus elsewhere as long as their buildings operate “well enough”;
- Buildings that are already heavily mortgaged would likely require equity investment in addition to a construction loan, which definitely harms the financial case for a retrofit project, so undercapitalized owners may be more common among owners of unimproved buildings;

- The process to seek an above-guideline rent increase is reportedly labour-intensive and somewhat uncertain, which may dissuade some owners from taking that route, and without AGIs the financial case deteriorates;
- Even "Light" retrofit projects are complicated, and often entail seeking a variety of existing subsidies and supports related to lighting, heating and water use, and some owners may not have the capacity to pursue these options (without which marginal projects can simply become uneconomic).

Despite these potential explanations, the prevalence of buildings operating with original equipment for this vintage of building should be a concern, and could become an even more significant problem over time.

While the intent of the Report was primarily to focus on how to support Deep retrofits in Toronto, this somewhat surprising finding related to unimproved buildings suggests that:

A. more scrutiny of the condition of older rental buildings may be required;
B. more research should be undertaken into why certain owners have not undertaken "Light" retrofits (or similar) in their buildings;
C. in the context of ongoing development of bylaws pertaining to buildings in the city, consideration might be given as to whether steps can be taken to ***require*** the equivalent of "Light" retrofits in buildings that have not undertaken them.

This last point may be controversial, and certainly should be subject to further scrutiny and analysis, but it is nevertheless an important issue to be raised. If building owners are not investing in their buildings despite the economic viability of doing so, perhaps for reasons having nothing to do with building economics, then is there a legitimate cause for public intervention on behalf of the tenants that are affected?

4. Policy Options to Improve the Economics of Retrofit Measures

A long list of policy options that might support building retrofits was assembled in consultation with the City of Toronto Chief Resilience Officer and a Working Group of City of Toronto representatives and stakeholders that consisted of:

- Tower and Neighbourhood Revitalization Unit
- Toronto Building and Municipal Licencing and Standards
- TransformTO
- Financial Planning
- The Atmospheric Fund
- The Tower Renewal Partnership

The ideas were ultimately grouped into seven buckets: grants, loans, planning issues, taxation, energy costs, scoring & benchmarking, and regulation.

The project team considered the level of government that has the authority to take the policy action, the mechanism or vehicle to facilitate the change and the specific implementation that would be required for the instrument.

The cost to governments of making each policy change was evaluated, in terms of impacts on both government revenues and expenses. Total impact on government was graded either “No net new costs” (green), “Some net new costs” (yellow) or “Significant net new costs” (red).

The feasibility of gaining the political support necessary for implementation of each policy was graded on the basis of its perceived familiarity to governments, and based on the perceived difficulty of overcoming the practical hurdles related to implementation (for example whether participation of multiple government departments or offices might be required, as opposed to a single department, and whether multiple governments might be required to cooperate). Grades assigned were “Common & Easy” (green), “Some Innovation Required” (yellow) or “New & Novel” (red).

The results of this work are summarized in the table on the next page. A full description of each option and the considerations relating to it are provided in the appendices.

In addition, industry stakeholders and building owners were consulted to obtain their feedback on these options, and to understand their perceptions of how different policy options might affect them and the management of their buildings.

Ultimately, all of this analysis and consultation was used to eliminate most of the policy options from practical consideration, leaving only a short list which was subject to further financial analysis.

Table 11: Policy Options Considered

Incentive Type	Level	Mechanism	Implementation Instrument	Cost to Gov't	Feasibility	Stakeholder Interest
Grants	FED	Housing Repair and Renewal Stream of the National Housing Co-Investment Fund	Program rules overseen by CMHC	C	C	S
	FED	Development of new funding streams	Budget 2019 or Budget 2020	N	C	C
	PROV	Ontario Emissions Reduction Fund	Program rules to be designed by MECP	N	S	C
Loans	PROV	Infrastructure Ontario Loan Program	Municipal Act of Ontario	S	N	S
Planning issues	MUN	Expedited permits and approvals	City of Toronto Official Plan & Design Guidelines; Permitting process rules	C	S	C
	MUN	Infill and development charge discount	City of Toronto Act; by-laws	S	C	C
	PROV	Limited above guideline rent increases	Residential Tenancies Act; Rent Increase Guidelines	C	S	S
Taxation	PROV / MUN	MPAC re-assessment holiday	Assessment Act; City of Toronto Act	S	S	S
	MUN	Municipal property tax rate exceptions	City of Toronto Act; by-laws	C	N	N
	FED	Change CCA rate for retrofit expenditures	Canadian Income Tax Regulations; Budget 2019 or Budget 2020	S	C	C
Energy Costs	FED / PROV	Providing a floor price on energy to guarantee value of efficiency investments	Natural Resources Canada energy efficiency programming; IESO contract	S	N	N
Scoring and Bench-marking	FED / PROV	Develop standards for building performance	Documented standards and guidelines	C	C	S
Regulation	PROV	Mandate minimum building performance	Ontario Building Code	C	S	N

Shortlisting Policy Changes

The best policy changes to pursue are those that are reasonably feasible and would have a material impact on the decision-making of private sector tower owners. From the policy options presented in the table above – those being just a subset of the universe of policy options that might be imagined – a short list of the most promising policy options has emerged.

The following policy options are of greatest interest:

1. Grants,
2. Accelerated CCA rates, and
3. Preferential treatment with respect to municipal development fees and charges (as well as permits and approvals).

In each of these cases changes are feasible, and stakeholders are supportive. Costs to government are real, and subject to quantification depending on the level of support offered (which will be discussed below). Governments themselves will determine whether the costs associated with the policy changes are worthwhile, but achieving improvements in Towers requires some change in the economics of the proposed upgrade paths.

These policy options are not mutually exclusive and are in many ways complimentary. The purpose of the Resilient Towers initiative is to help ensure that tower improvement investments happen, which will only occur if private sector building owners can achieve a positive return on investment. Depending on the scope of the changes made, grants, CCA rates and reductions to municipal fees & charges could close financial gaps and make business cases work.

A fourth option, which is of an entirely different nature, is to consider increasing the minimum standards required of buildings through regulation, either provincially or municipally (if feasible). This would not improve building owner business cases, but rather make the business case irrelevant to the question of whether improvements to Towers happen. However, given the fierce opposition expected from building owners to this type of change, a crucial question is whether a new and higher minimum standard for buildings would impose hardship on building owners: if meeting a new and higher standard results in a building that would have better financial performance than a lower standard building, then the source and validity of building owner opposition to a higher standard should be questioned.

5. Financial Evaluation of Potential Policy Options

From a financial perspective, the three policy options suggested above actually collapse into two. Reductions in municipal permits and approvals costs are, from a financial perspective, identical to grants, in that they reduce the net capital cost of a proposed project. Whether this is done through contribution to the purchase of a new piece of equipment – as is typical for government grants in aid of efficiency retrofits – or through the reduction of a charge that would otherwise be payable, as would be the case for permits, the financial impact is the same. The *source* of the financial benefit will be different, and so will the associated economic impacts on the city and the rental markets, but considered solely from the perspective of a building owner the impact of the benefit would be the same.

Capital Cost Allowance

The financial model was structured so as to be able to assess the impact of adopting higher CCA rates for Resilient Towers projects. In the current policy environment (*before* the November 2018 announcement by the Minister of Finance of temporary changes to CCA rates), most upgrades to buildings attract a CCA rate of 4% per year.[10] This approximates the estimated 25 to 40-year life of many major building components, and is broadly consistent with the straight line depreciation that is the norm in IFRS and USGAAP accounting.

Accelerated capital cost allowances are often used to promote investment in goods which have public value, and which are deemed to be worthy of government support in the form of delayed income taxation (the effect of using higher CCA rates is to reduce taxes in the early years of the life of an asset, while increasing it in later years – from a private sector perspective, this is a significant advantage, because of the cost of capital).

A case in point is CCA Class 43.2, which (prior to the November 2018 announcement) was set at 50% per year for qualifying goods, most of which are associated with renewable energy production. Renewable energy projects have a public value beyond their private value because they emit few if any GHGs, and help to displace the production of electricity through fossil fuels.

Including the cost of building retrofit projects in CCA Class 43.2 would be a recognition that making buildings efficient also dramatically reduces GHGs, as well as delivering a wide variety of other social benefits.

[10] Note that with the announcement in November, all CCA rates are tripled in the first year, assuming a capital expenditure occurs before 2024. For investments between 2024 and 2027, CCA rates will be doubled in the first year, and the incentive is scheduled to be eliminated in 2028. At the same time, a few special rate classes, such as class 43.2 for renewable energy equipment, are allowed to fully depreciate costs in the year of expenditure.

Table 12: Results of Applying CCA Class 43.2, Including Above-Guideline Rent Increases

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	M	M	D	VD	Tax changes do not affect pre-tax cash flows
Lower Performance + Medium Retrofit	x	x	x	D	
Lower Performance + Deep Retrofit	x	x	x	D	
Higher Performance + Deep Retrofit	x	x	M	D	

As expected, the acceleration of capital cost allowances has a strong impact on the first ten years of returns for building owners who can take advantage of the full tax benefits available to them. Notably, this means that they must have the financial flexibility available to finance the project with debt, AND have sufficient real estate income to take full and immediate advantage of the tax benefits available. If either of these cases does not hold, then the incentive is insufficient to encourage change.

Table 13: Results of Applying CCA Class 43.2, Without Above-Guideline Rent Increases

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	x	M	M	D	Tax changes do not affect pre-tax cash flows
Lower Performance + Medium Retrofit	x	x	x	D	
Lower Performance + Deep Retrofit	x	x	x	D	
Higher Performance + Deep Retrofit	x	x	M	D	

Without the AGI, no retrofit makes sense for the non-taxable building owner (because this owner is unaffected by the tax policy change), and all of the other returns become thinner.

Grants

Grants, from the perspective of a building owner, are a reduction in the net cost of a project. Regardless of how it is financed or taxed, a project that costs less while still delivering the same future benefits will always be superior to the alternative.

The financial model was used to determine what level of grant would be required alone, or in combination with AGI and CCA changes to incent building owners to undertake projects.

Table 14: Results of 30% Grant, Without Above-Guideline Rent Increases

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	M	M	M	D	
Lower Performance + Medium Retrofit	x	x	M	D	Grant level is still not sufficient for unlevered projects.
Lower Performance + Deep Retrofit	x	X	M	D	
Higher Performance + Deep Retrofit		x	M	D	

A 30% grant, which in all cases would be a very substantial amount of the capital cost of the project, would be sufficient to incent upgrades to Towers for many owners, even in the absence of tax changes or AGIs. However, access to low cost debt would still be required for all projects more significant than a “Light” retrofit.

Table 15: Results of 15% Grant, With Above-Guideline Rent Increases AND Class 43.2 CCA

Retrofit Scenario	Pre-tax Unlevered 20-year	After-tax Unlevered 20-year	After-tax Levered 20-year	After-tax Levered 10-year	Comments
Lower Performance + Light Retrofit	M	M	M	D	
Lower Performance + Medium Retrofit	X	X	M	D	Grant level is still not sufficient for unlevered projects.
Lower Performance + Deep Retrofit	X	X	M	D	
Higher Performance + Deep Retrofit	X	M	M	D	The combination of grant, tax change and increased rent is marginally superior to a 30% grant

If grants are reduced from 30% to 15%, and instead CCA rates are simultaneously increased to Class 43.2 and AGIs are allowed, then a similar outcome results. The level of total support to the building owner is roughly similar in both cases under the assumptions of the model, but the impact on governments and tenants will be different. The inference here is that support for Resilience projects can come in a variety of forms, and the benefits and costs will be measured in terms of the provider of the benefit, not the project or building owner, who is largely indifferent to the sources of the support.

Applicability to Building Owners

Cash grants can benefit any building owner, but discounts on development charges and permits are only applicable to owners interested in developing new buildings, and tax changes are only relevant to owners that otherwise pay substantial income taxes. How does the population of Toronto building owners relate to these options?

Based on RentSafeTo data, the ownership of the 589 buildings that are 12 floors or taller and built before 1985 was examined to better understand the potential applicability of these different policy mechanisms. Unfortunately, more than 200 of these buildings were reported to be owned by numbered (e.g., 12345 Ontario Ltd.) or building-named entities (e.g., “ABC Street Apartments Inc.”, or “15 ABC Avenue Inc.”). No useful intelligence can be gained from these owner names.

Of the buildings that had less anonymous names, only one pension fund owner was identified, and two insurance company owners. The vast majority of buildings appeared to be owned by for-profit enterprises consisting of real estate investment trusts, private equity funds, family offices, construction companies, investment holding companies, and others. Several owners were specifically identified as family trusts, while a few examples of charitable foundation owners were found. These latter, along with the pension fund owner, suggests that there will be a very small minority for whom tax changes will not be relevant incentives, but these owners are the exception rather than the rule.

Approximately 200 buildings in this class are owned by owners who own at least three or more buildings within this class (and may own additional buildings in other classes in Toronto, as well as elsewhere in Canada). This suggests larger pools of capital, with relatively high degrees of financial sophistication, and potentially the ability to take advantage of any tax opportunity that results from policy change. However, it should be noted that a majority of all buildings with identifiable owners could not be associated with a portfolio (however, they may be part of a portfolio of buildings in other classes in Toronto, or from outside of Toronto). Buildings that are not in a portfolio would still benefit from tax opportunities, but may not be able to benefit to the same extent.

Even this cursory analysis demonstrates that tax changes in the form of CCA rates will likely impact a very significant majority of building owners. However, while construction companies, known building developers and active asset managers were identified in the list of owners, the applicability among building owners of policy changes relating to municipal development charges and permits will be less widespread. While there is substantial ongoing building construction activity in Toronto, there is no way, based on the available data, to ascertain the extent of the relationship between existing building owners and those parties interested in new building development. It can only be assumed that creating an incentive that relates new building construction with retrofits will have a positive impact on both.

Additional communication with building owners may be advisable in order to gather more better data relating to ownership characteristics and the applicability and suitability of future policy changes. However, given the prevalence

of anonymous ownership entities and the use of management companies as contact points and screening mechanisms for owners, careful thought and creativity will be required to determine how best to improve the quality of data gathered.

Impact on Government of Policy Support Choices

A change in policy in favour of Resilient Towers would have multiple effects on governments, but calculating those effects requires consideration of a large number of variables and many, many assumptions.

Magnitude of Exposure

There are 826 private sector-owned rental apartment buildings in Toronto that have between 8 and 43 floors (also ranging from 28 to 587 suites), and were built between 1938 and 1984. Depending on the design, construction and current state of each building, a "Deep" retrofit as defined for this Report could cost anywhere from $40,000 to upwards of $100,000 per suite. Based on this population of buildings, retrofits in Toronto alone represent a potential investment of anywhere between $6 Billion and $15 Billion.

Assuming a mid-point required retrofit investment of $10 Billion, a 30% grant policy represents a government expenditure of $3 Billion if every building in the city were retrofitted. Bearing in mind that this amount represents only buildings in Toronto, and the rest of Canada may have another 2000 buildings with the same characteristics, a national 30% grant program would represent *in the extreme* potentially $10 billion or more of budgetary expenditure. Obviously, a 15% grant policy represents half of the potential impact of a 30% grant policy, which is nevertheless a substantial sum.

If instead a change in CCA class were pursued, governments would not be expending budgetary funds, but instead foregoing revenues, at least temporarily (because a higher CCA rate would lower taxes payable in the early years following a retrofit project, but they would be recouped in later years). Assuming a retrofit project would only go ahead if the tax benefit were granted, then the income tax stream from the Status Quo would be compared to the income tax stream that results post-retrofit. The calculation of impact is complicated, however, because of a number of uncertainties:

- In the Status Quo, how much income tax would be payable in each year (a building's capital strategy matters in this, since debt interest is tax deductible but equity returns are not), and what would happen to that income tax stream over time as the building ages without substantial investment? Should the building be assumed to cease to function at a certain point, hence ending the income tax stream entirely, or should it be assumed that investment would be required to keep the business operating, and if so, when and with what income tax impact?
- How many years of future income tax should be compared in the calculation? Certainty in the assumptions implicit in the calculations degrades over time…
- Will it be assumed that building owners always take advantage of the opportunity to seek AGIs, hence increasing revenues and income tax?
- Assuming a high CCA rate were granted to retrofit projects, such as 50%, should it be assumed that the tax shield be applied only to shelter the building's own income (in which case the building may operate without paying any income tax for a number of years), or should it be assumed that the owner of the building also

owns other buildings, allowing for the tax shield to be applied across the portfolio, and hence shield more income immediately but for a shorter period of time in total?[11]

- When calculating the value of a change in tax policy, what discount rate, if any, should be used to calculate the value of the change, to government? A change in revenues in one year is not the same as a change in revenue in a future year, because of the operation of inflation and the cost of money.

A range of possible answers to each of these questions results in a substantial range in the possible impacts of a change in tax policy to support Resilient Towers. Additional work is required to delve into these and other questions to understand better the potential impact on the grant provider.

In the case of a discount to a municipal fee or charge related to development, a different calculation is required:

- First, should it be assumed that in the Status Quo development of a new building would proceed, even without the incentive? In other words, if the discount is applied to a Resilient Towers project because an owner has agreed to both build a new building and undertake a retrofit, should it be assumed that the developer would have proceeded with the new building regardless? If yes, then the change in policy is actually a loss of expected permit fees, but if not, then offering the incentive is in fact not a loss, because no permit feeds would have been received absent the policy.
- Second, while development charges are meant to compensate the City for costs associated with providing services to new buildings, buildings also pay property taxes to the City, and to what extent should those future property taxes – which may never occur in the Status Quo case – be considered an offset to the costs of the incentive offered?

Finally, behind each of these considerations of specific effects of policy choices on government, is the question of the value of the economic activity spurred by retrofit projects that actually get underway. Construction projects – and retrofits are not unique in this way – are a combination of materials and labour. Labour pays income taxes, while materials attract sales taxes. Any support provided to Resilient Towers will be repaid, in part, by the automatic taxation embedded in the new economic activity that is spurred by the policy change.

Timing

While the cost of policy incentives for retrofits may result in a large cost to government if all eligible buildings are assumed to participate together, what will be the realistic adoption of the incentives? Will every building participate eventually, or will some simply exit the market at some point in the future? When the policy change is implemented, will there be a rush of participants in the program, falling off in the future, or will there be only a few buildings upgraded in early years while more building owners are encouraged to participate each year over time? Will an annual limit on building retrofits will be required at any point?

Value of Project Benefits

As mentioned above, a Deep retrofit project represents substantial economic activity, which delivers benefits to governments in the form of higher income, sales and property taxes over time. However, a retrofit will also reduce electricity, water and gas consumption, and these three in turn represent savings, either to government directly if the

[11] As noted above, a substantial number of Toronto buildings are owned as part of portfolios, which suggests that a significant number of owners, but possibly not more than half, may have the opportunity to immediately take advantage of tax opportunities.

government is involved in the particular commodity market, or indirectly if the reduction in the consumption of these supplies reduces pressure on governments to act.

In addition, the projects described above will all result in reductions in GHG emissions. For "Deep" retrofits to gas-heated buildings, the change can be anywhere from 2.5 to 5 tonnes per suite per year. Given that components in the project will last anywhere from 25 to 40 years, these annual savings should be totalled over time to calculate the full benefit of the project.

As discussed above, contributing to Deep retrofits should also be understood as an investment in housing affordability, since most of the buildings in the target groups comprise lower-cost forms of housing in Toronto. Allowing the continued deterioration of this building stock, leading eventually to the loss of these buildings, would significantly increase the requirement for new types of lower cost housing. Investing in existing buildings would avoid this outcome.

Beyond the calculable benefits are those more difficult to quantify, but no less real. For example, substantially upgrading a building will make it much more resilient in the face of a heat wave in summer: an insulated building will be slower to heat up, and will be much cheaper to keep cool, even if tenants must themselves buy and use portable room air conditioners for relief. With the increasing prevalence of heat waves in the summer, failure to act on this need may lead to higher incidence of health issues caused by heat effects, with unknown public costs. A building where all lighting has been replaced and upgraded will also be safer, and less likely to suffer emergency services calls for ambulance, fire and police.

Deep retrofits are comprehensive, multifaceted projects that affect buildings in multiple ways, so it should be no surprise that the benefits of the projects are just as varied and complex. However, while the costs of Deep retrofits are easily defined in dollars and cents, a mere listing of the range of benefits demonstrates that fairly quantifying both sides of the ledger may be challenging.

6. Recommendations

The challenges identified by the Resilient Towers project in the City of Toronto are real and growing: a significant portion of the city's population lives in aging rental apartment towers that are far below current standards for building design and performance. Nevertheless, this group of buildings provides critical lower cost housing to hundreds of thousands of residents who may not be able to afford alternatives. Investments that will improve the performance, resilience and comfort of those buildings are required, and will likely increase in urgency with every year that passes.

Relatively minor upgrades to buildings appear to be currently economically feasible given existing policies, programs and supports, and many buildings have pursued similar projects over the past ten years. However, more than a quarter of target buildings in the city have not undertaken even this level of investment, and instances of concern have arisen from among that population. This suggests that there are at least two different problems that must be addressed, potentially with different solutions:

- Deep retrofits are simply not economically viable in the current economic and policy environment, and several policy levers could be pursued, as described above, to improve the business case for interested building owners
- Minimum levels of performance, which have already been achieved by many buildings from within the target population, may ultimately require enforcement in some way, to ensure that buildings do not suffer failure in the future, either catastrophically or through slow degradation over time

Based on our understanding and analysis of the issues, as described in this Report, we would offer the following recommendations with respect to support for Deep retrofits:

1. The City of Toronto should engage with the Government of Canada, with the support of stakeholders in the sector, to advocate that qualifying Resilient Towers "Deep" retrofit projects be granted CCA Class 43.2 treatment, or the equivalent, as soon as practically possible.

2. The City of Toronto should engage with the Government of Canada. the Government of Ontario and interested stakeholders with respect to the availability and allocation of grant monies that would be targeted to Resilient Towers "Deep" retrofit projects, in concert with changes to CCA rates.

3. The City of Toronto should consider amending its Development Charges By-law to support Resilient Towers "Deep" retrofit projects through associated discounts to new construction projects, therefore incentivizing both retrofits and the construction of new rental apartment buildings.

4. In order to support all of these options, the City of Toronto should consider taking a leading role in defining, with the support and involvement of stakeholders, a robust and technically-based definition of "Deep" retrofits that may then be utilized in relevant supportive policies.

With respect to minimum standards for rental buildings, we would offer the following recommendations:

5. The City of Toronto should expand its collection of data on the condition of rental buildings and the identity and characteristics of building owners, in order to improve the basis for continued policy development.

6. Through its existing departments and agencies, the City should increase engagement with building owners, to better understand decision-making processes and the sources of differences in building investments over time.

7. In the context of ongoing development of bylaws pertaining to buildings in the city, the City should consider whether steps can be taken to require the equivalent of "Light" retrofits in buildings that have not undertaken them, or to otherwise enforce a minimum standard of efficiency, resilience and comfort for rental buildings.

8. The City of Toronto should consider entering into discussions with the Province of Ontario with respect to potential revisions to the Building Code that would require buildings in the target class to meet minimum standards for efficiency, resilience and comfort.

Appendices

Appendix A: Electrically-Heated Buildings

Electrically-heated buildings in Toronto that date back to the 1960s and 1970s face particular challenges and opportunities that are different from the much larger group of gas-fired buildings. Recent "in-the-news" failures of electrical systems in electrically-heated buildings have demonstrated that this class of building represents an important policy challenge for the City of Toronto. Given that there are more than 60 rental apartment buildings over 12 floors tall in the city which fall into this category, it is an issue which merits further attention.

Typically, these buildings were constructed with electric baseboard resistance heaters throughout the building. This means that there is no ducting or piping system which circulates air or water throughout the building for heating purposes, limiting available options for upgrading or converting heating systems. Typically, only two options are feasible when existing equipment has reached the end of its useful life: replace existing electric baseboard heaters (and wiring, if necessary) with newer versions, or replace/supplement existing baseboard heaters with air source heat pumps (typically ductless mini-split systems on a unit-by-unit basis). The latter solution is more capital intensive, however would significantly reduce electricity consumption (because heat pumps are more efficient than resistance heaters), and hence operating cost. A third alternative, retrofitting a building-wide air or water circulation system with a new central heat source, is typically not financially feasible.

Replacement of resistance heaters with heat pumps can be more or less expensive, depending on a wide range of building characteristics and desired outcomes, and limited available information made it impractical to attempt general conclusions as part of this Report.

The Atmospheric Fund has undertaken substantial work examining the particular challenges of electrically-heated residential buildings, and has several publications available on its website (www.taf.ca) which address and explore this issue in more detail.

Beyond heating systems, these buildings face many of the same issues as all other buildings of the same age: lack of insulation, original windows, doors, lighting and motors that are less efficient than modern equipment, degrading systems based on age of the building, etc. Deep retrofit solutions for electrically-heated buildings are in many ways similar to those for natural gas-heated buildings, save and except that replacing the existing heating system is typically more expensive than replacing a central boiler.

From the perspective of governments concerned about GHG emissions, electrically-heated buildings actually have a positive feature, in that they emit GHGs at a far lower rate than gas-heated buildings. However, this also means that making policy changes to support the upgrading of older electrically-heated buildings does not deliver substantial GHG benefits: reducing electricity consumption in Ontario has only marginal impact on GHG emissions, because of the very low GHG intensity of our electricity grid. However, one benefit of heat pump systems is that they can provide cooling as well as heating, which directly addresses a major building resiliency concern.

Electrically-heated buildings require additional study to understand the extent of policy changes that would be sufficient to incent significant building upgrades. The economics of these buildings are different from gas-heated buildings, and grants, tax changes or other policy changes at levels specifically designed for gas-heated buildings may not be appropriate for electrically-heated buildings.

Appendix B: Rental Apartment Towers Supplementary Data

Age, Floors, Units

RentSafeTO data shows that the "average" building in the target groups (built between 1946 and 1984) are the following (all figures rounded):

Group	Year Constructed	Floors	Suites per Floor	Total Suites
12+ stories	1968	18	12	214
8 to 11 stories	1965	9	12	106
5 to 7 stories	1962	6	12	72

The target buildings are extremely consistent in terms of average units per floor, and the data appear to suggest that over time typical buildings were simply built taller (rather than wider). There may be distinctions in terms of the square feet per unit in the different sizes of buildings, or in the number of bedrooms per unit, but the available data is not sufficiently granular to examine this issue (CMHC data on number of bedrooms is broken down either by age or size of building, but not by both age and size of building).

The consistency in footprint has implications for retrofits: buildings of a similar size footprint have a similar size of roof, regardless of the number of floors, for example, and would also have a similar size of lobby and other first floor common areas. This means that taller buildings are likely to be more "efficient" from this perspective.

Despite the similarities in averages, there is considerable range within each category:

Group	Year Constructed	Floors	Units per Floor	Total Units
12+ stories	1950 to 1984	12 to 43	4 to 40	46 to 587
8 to 11 stories	1952 to 1984	8 to 11	3 to 38	28 to 331
5 to 7 stories	1950 to 1982	5 to 7	2 to 70	10 to 416

There is no doubt that there are many different shapes and sizes of buildings from this era - some are long and low, while others are tall and narrow, etc. – but the "average" building appears to be relatively tall and narrow in all three categories.

HVAC, Windows and Doors, Other Physical Characteristics

Available data indicates that the overwhelming majority of buildings are heated using natural gas. Most have double-paned windows, virtually all have balconies, in buildings with 8+ floors underground parking is ubiquitous, etc. However, not all buildings are the same.

Heating System in Buildings Built 1946 to 1984

	Height		
	5 to 7	**8 to 11**	**12+**
Hot Water	383	203	469
Electric	13	10	68
Forced Air Gas	29	14	41

Age of Heating System

	Height		
	5 to 7	8 to 11	**12+**
34 years or more	108	61	192
10 to 33 years	167	92	215
Less than 10	150	74	171

As can be seen in the above table, about a third of the buildings in each category have had their heating systems replaced in the last 10 years. Between a quarter and a third in each category still have original heating equipment, and the balance of the buildings had their systems replaced between 10 and 30 years ago (which means they might be candidates for replacement again in the medium term). Note that in the case of buildings with electric heating systems, most of them are original. For example, in buildings with at least 12 floors, more than 60 buildings with electric heat would be included in the 192 buildings still using original heating systems. The balance of the 132 buildings with original heating systems would be a mix of forced air gas and hot water boilers.

From the perspective of retrofitting, buildings which replaced their heating equipment within the last ten years are likely to have already completed many energy efficiency upgrades, given the number of programs available to support such upgrades in the past decade (common area lights, high efficiency boilers, high efficiency fan motors, etc.). This circumstance makes it less likely that the timing is right for a more comprehensive retrofit project, at least for a number of years.

At the other extreme, buildings which have electric heat require an extremely invasive and expensive process to upgrade and replace systems, which also may be difficult to justify commercially. Replacing a distributed system that depends on resistance heaters in every room with a central system that depends on piping hot water or hot air from a central heating unit is a fundamental change in design, and might almost be considered a “rebuilding” rather than a “retrofitting” of the building. There may be alternatives, such as heat pumps installed in each suite, but even these changes might represent unattainable levels of expense.

Very few of the buildings have cooling systems, as seen in the table below. However, it does appear that taller buildings are actually better in this regard, as more than 10% have central air, and a fifth have some form of cooling available. From a resiliency perspective, the availabity of cooling will become more critical in a future with increasingly frequent and dangerous heat waves.

Building Cooling Systems

	Height		
	5 to 7	**8 to 11**	**12+**
Central Air	5	8	71
Individual Suite	15	16	38
None	405	203	469

Anecdotal evidence collected from building owners as part of this project suggests that at least some owners are replacing and upgrading the windows and doors in their buildings, typically after 40 to 50 years of building operation.

In the case of some of the oldest buildings in the target age group (1946 to 1984), windows and doors were actually replaced in the 1990s, and are now already 20 years old. However, it is not clear how representative this sample of information actually is. Participating building owners may be among those who have made greater than average investments in their buildings.

Whether windows and doors have been recently replaced is critical to the potential for building envelope retrofits including cladding: such projects may work best when an integrated approach is taken to windows, doors and exterior insulation. Buildings where parts of the exterior system have been replaced recently may not be good candidates for envelope retrofits, at least in the near term.

Rents

CMHC and Statistics Canada have data on prices for rental apartments in Toronto (with breakdowns of zones within Toronto, as well as data for surrounding areas in the GTA). Data is relatively plentiful for the past five years (including contrasts between purpose-built rentals, and condominium rentals), but more limited data goes back more than 20 years. These statistics provide survey-based data on actual rent levels as reported to CMHC.

Average Rents in the City of Toronto – October 2018

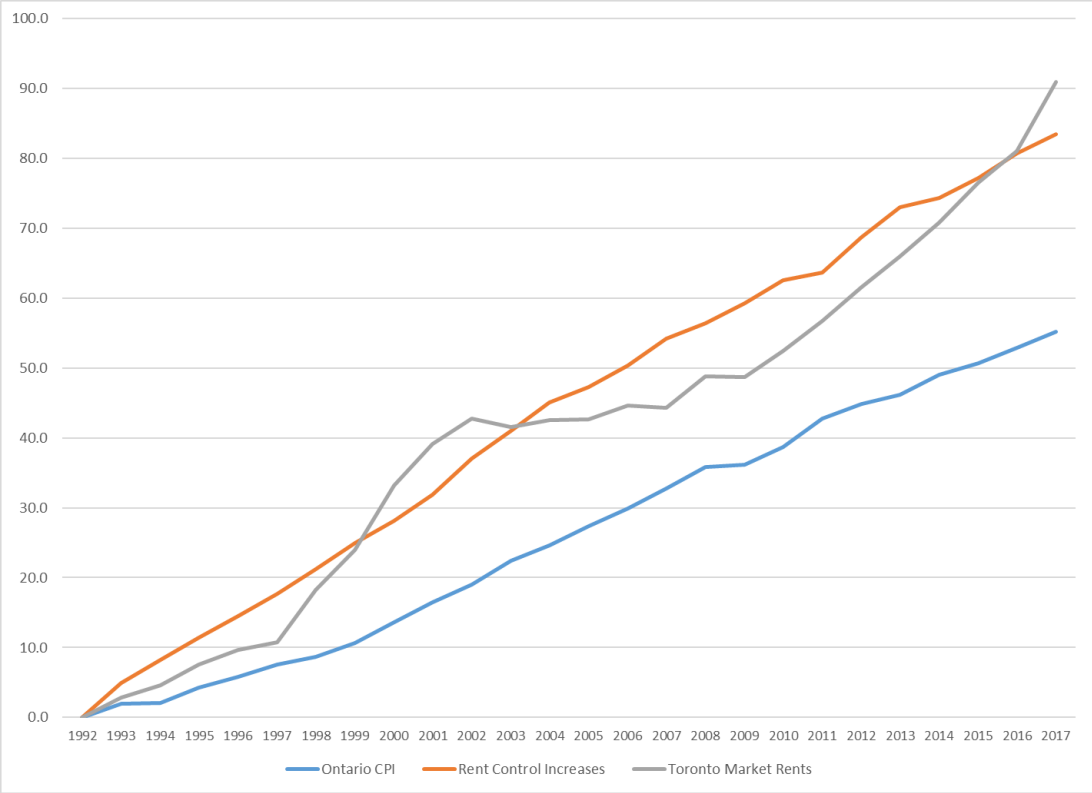
		Bachelor	1 Bedroom	2 Bedrooms	3 Bedrooms	Weighted Average
Apartments	Pre 1960	$967	$1,151	$1,363	$1,645	$1,218
	1960 to 1974	$1,124	$1,279	$1,496	$1,672	$1,396
	1975 to 1989	$1,214	$1,366	$1,505	$1,562	$1,430
	1990 to 2004	NA	$1,643	$1,768	NA	$1,658
	2005+	$1,541	$1,790	$2,396	$2,239	$1,958
	Weighted Average	$1,089	$1,270	$1,492	$1,664	$1,372
Condominiums	All	$1,520	$1,966	$2,522	$3,137	NA

Source: CMHC, Rental Market Report, Fall 2018

Ontario's rent control system requires that landlords limit rent increases for existing tenants based on prescribed guidelines, which themselves are based on inflation. When a suite is vacated by a tenant, the landlord may reprice the rent to whatever level the market will bear. In times of rapidly increasing rents due to low vacancy rates (for example, the last few years) this means that tenants who remain in their suites will be paying rents that are progressively less than the cost of comparable, recently vacated suites. However, over the past 25 years there have been periods of time where market rents have not been increasing, and hence rent control guidelines have not necessarily been a significant constraint on landlords.

Growth in Toronto Rents vs. Inflation

(normalized to 1992)



Over the 25 years from 1992 to 2017, Ontario's Consumer Price Index rose by 55% (an average growth of 1.78% per year). Over the same time period, rent control guidelines have allowed for a maximum rent increase (for a tenant who has been in the same suite for 25 years, and had a guideline increase imposed on them every year) of 83% (an average growth rate of 2.46% per year). The average rent for suites in the City of Toronto (based on all sizes and ages of suites and buildings) has risen by 91% (an average of 2.64% per year). This suggests that very broadly speaking, the market price for purpose-built rental suites, including those that tenants turned over, has not been out of sync with rent control guidelines (though approximately 1% per year ahead of general province-wide inflation).

However, there are obviously significant differences in these curves. Average rents went through periods when they increased significantly, and periods when they were flat (average rents in Toronto actually declined marginally in 2003, 2007 and 2009, but increased by more than 5% in 1998, 2000 and 2017, and no doubt will again in 2018). Also, just because rent control guidelines allow for increases every year, it does not mean that rents actually do rise by those amounts. In poor economic years, when vacancies rise, landlords may choose not to increase rents by guideline amounts for fear of losing tenants. However, the reciprocal is not true in good economic years, because rents can only be increased above guidelines upon tenant turnover (and in very tight vacancy markets, tenant turnover rates fall dramatically, as they have over the past few years).

It should also be noted that rents in Toronto have been significantly affected by the development of the condominium rental market. Per CMHC, Toronto now boasts approximately 260,000 purpose-built rental suites in buildings of at least 3 suites, and 102,000 condominium rental suites (out of a total population of 288,000 condominium suites in the

City of Toronto). Until recently, rental of condominium suites was not captured by rent controls, and hence these were always “market-priced”, regardless of whether tenants remained in the suites from year to year or not. The average rents for condominium suites are substantially higher than similarly-sized purpose-built rental suites, with spreads against rental buildings consistent across the City regardless of location. [Note, however, that if condominium rents are compared only to the newest classes of purpose-built rentals, then the spread narrows substantially. The difference in average rents is significantly affected by the relative difference in the age of the typical apartment vs. the typical condominium.]

Regardless of the subtleties, however, it is clear that the market price for rental apartments is at its current level only because an enormous part of the demand for rental accommodation has been met through the rental of condominium units. Moreover, the average rent for suites in older buildings is substantially less than the rent for suites in newer buildings, whether those newer buildings are in the form of purpose-built rental buildings, or condominiums.

Target buildings for the Resilient Towers project were built in 1984 and before, hence the average rent for suites in these buildings across Toronto is less than $1400 per month, per CMHC. This accords with the information that we have received from building owners that have shared data with us. Obviously, this represents the center of a range that will extend well above and below this level, depending on location, age and style of the building, size of suites, level of finish and state of good repair, etc.

In addition to rent, most buildings have a small amount of additional revenue that derives from laundry machines, parking (in some cases but not others), and commercial rents (if the building happens to host any non-residential tenants, such as a daycare, community centre, convenience store, or other service). In the case of buildings for which we have been provided information, however, these sources of revenue typically amount to not more than 5% of rental revenue.

Appendix C: Financial Model Design and Assumptions

Economic and Financial Assumptions

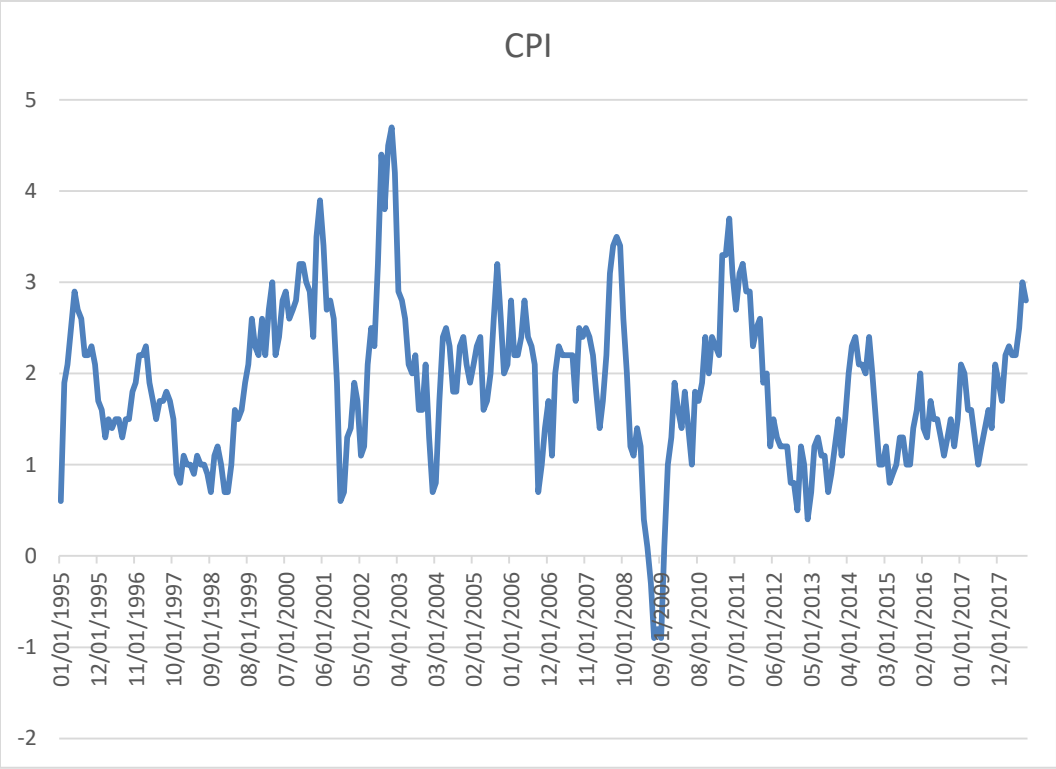
Inflation

Inflation affects the future prices for all cost items that are not associated with a specific forward price assumption. This would include, for example, labour costs, general supply costs, administrative and legal services, etc.

The chart below shows the monthly consumer price index dating back to 1995. As can be seen, Canada-wide inflation has ranged between 1% and 3% for the entire period, with a notable exception during the financial crisis in 2008-09. Not coincidentally, this range has been the target range for the Bank of Canada throughout the entire period.

2018 is in the high end of the range, and is expected to be approximately 2.5% on an annual basis. The average of current forecasts announced by banks and other forecasters available on Bloomberg are for 2.1% in 2019, and 2% in 2020.

Given the need to use a long-term model to assess retrofit issues, a 2% average future CPI inflation was used, in line with the experience of the past 25 years.



Interest Rates

All interest rates in Canada are derived from, and are related to Bank of Canada policies and securities. Short-term cost of money is governed by the Bank's "Target for the Overnight Rate". More relevant is the pricing of Treasury Bills and Government of Canada bonds. The former are available for 1, 2, 3, 6, 9 and 12 month terms, while the latter for 2, 3, 5, 7, 10 and 30-year terms.

In the commercial sector, interest rates are typically understood in terms of a spread above the relevant government cost of money for the term being considered: in other words, the interest rate for a five-year debt arrangement is typically expressed as X% more than the current rate for 5-year Canada Bonds.

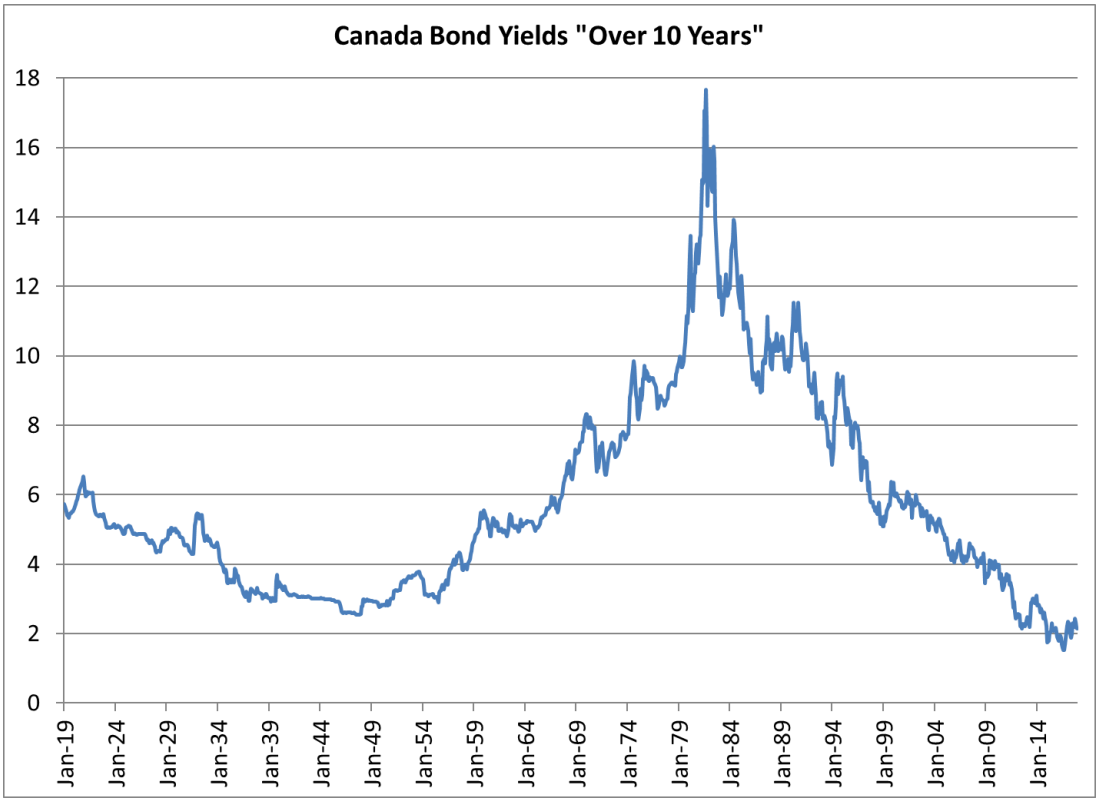
Private sector mortgages for rental apartment buildings are typically available for 5, 7 or 10 year terms. Longer terms are sometimes possible for new buildings, but are uncommon. Construction financing is often provided with the commercial mortgage as a package, with interest costs during construction either carried by existing building revenues, or capitalized in the mortgage (the alternative is separate construction financing, which is then taken out by a mortgage at the completion of construction).

Given the longer-term nature of retrofit projects being considered, it is appropriate to focus on 10-year commercial mortgages, which means considering the future path of the 10-year Canada bond yield, as well as typical spreads for commercial mortgages above that.

The Canada 10-yr bond yield has been at historic lows for the past 5 years (as have all interest rates in the OECD, basically since the financial crisis). However, interest rates have recently been rising, and this trend is expected to continue. Bank and economic forecasters typically only offer forecasts for interest rates for one or two years into the future. The average of publicly available information for the next two years for the Canada 10-year bond is 2.7% in 2019, rising to 3% in 2020. Recent annual average rates are provided below for comparison:

Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
CAD 10Y Yield (%)	2.947	3.8211	3.2379	2.0594	1.8796	2.8295	1.8691	1.5338	1.8288	2.0712

One difficulty when considering tower retrofit projects, however, is that in order to see retrofits of a substantial part of the existing building stock, many years of ongoing retrofits will be required. This means that a forecast for rates is required not only for the coming two years, but also for five to ten years from now. Unfortunately, there is no historical "average" to rely on that might suit this purpose. Interest rates have followed very long term trends with short and medium-term fluctuations. Are the last five years of historically low rates the bottom of a long downward trend, which will now be followed by a long period of rising rates, or will rates sit in a trough for many years to come? There is no way to know.



Note: this chart depicts bond yields for the longest available time series in Canada (nearly 100 years of data). It represents the average monthly yield on Canada Bonds that are longer than 10 years, typically with an average maturity in the 15 to 20-year range. It is provided to demonstrate the absolute uncertainty of forecasting interest rates into even the medium term future.

For the purposes of tower retrofit modeling, mortgage rates are assumed to be consistent with the forecasted Canada 10-year bond rate in 2020, as per the current average of bank economists. However, the model will also be tested against underlying 10-year rates of 4%, 5%, and 6%, all of which are well within the range of what was experienced from 1920 to 1970, and again from 2000 to 2010. The period from 1970 to 2000, when rates peaked at historically unseen levels, was not considered relevant to the analysis.

Spread for Mortgages

Private sector mortgages are not provided at the Canada Bond rates, as noted above, but instead are set at a higher level, with the spread between the Canada Bond rate and each particular mortgage dependent on the characteristics and risks associated with the particular building being financed. These transactions are all private, and given the range of buildings and owners (each with their own credit characteristics), it is impossible to generalize with any reliability.

Some data for mortgage-backed securities is available for the past five years, which generally shows that portfolios of high quality 10-year commercial mortgages have traded at approximately 1.5% above the yield of Canada 10-year bonds. This would imply, for example a mortgage rate of 4.5% when Canada Bonds are trading at 3%. Lacking any better indicator at this point in time, this spread was assumed.

Mortgages for residential rental buildings are considered commercial mortgages, but are in a special class because they are eligible for CMHC mortgage insurance (non-residential commercial buildings are not eligible for this insurance). CMHC insurance is important, because one of its two impacts is to allow for a typical 0.75% reduction in the interest rate that would otherwise be applicable to a given mortgage (the other impact is that mortgage insurance allows for a higher loan-to-value on the building, as will be discussed below). As a result, instead of 10-year rental building mortgages being priced at Canada bonds plus approximately 1.5%, they may be priced at Canada Bonds plus 0.75%.

Loan-to-value and Loan-to-construction cost

Commercial mortgages are generally available in amounts ranging up to 60% to 75% of the appraised value of commercial buildings. The characteristics and risks associated with the property and owner will play a significant role in determining the exact amount available (in addition to the interest rate that will be applicable to the mortgage).

If a mortgage is being secured for a building that is to be retrofitted, the appraised value of the building will depend on assumptions about the future success of the retrofit, and the stability of the income that will be generated from the property. Estimating future income that will result from a project is inherently risky, and as a result, lenders may be unwilling to provide credit up to the maximum 75% of the "as-built" (i.e., assumed post-retrofit) value of the building. Alternatively, they may take a strongly skeptical position with respect to estimating the post-retrofit cash flow of the building, and therefore lower the "as-built" appraised value (which would result in the same limitations on lending).

If, prior to the retrofit, the building in question was already subject to a mortgage, then the additional credit that would be available from calculating an "as-built" value for the building may not be sufficient to finance the construction project. In other words, the loans available may be less than the construction cost, which means a building owner would need other cash resources to finance construction of the retrofit. Obviously, if a building is relatively debt-free prior to the retrofit, this problem would not apply.

As noted in the section above, CMHC provides mortgage insurance to owners of rental buildings. In exchange for a fee, typically of 4.5% of the insured mortgage amount, and an application fee of $150/rental unit, CMHC will support mortgages up to 85% loan-to-value, and will also typically result in an interest rate reduction of 0.75%. In addition to fees, however, CMHC also places a number of restrictions on the credit quality of borrowers. While the higher loan-to-value and lower interest rate makes CMHC-insured mortgages attractive, despite the fees, the credit quality restrictions may pose challenges for the owners of certain buildings that would otherwise be attractive from a retrofit perspective.

Commodity Costs

Water

Water charges are entirely within the control of the City of Toronto and, helpfully, the City updates its 10-year plan for water services annually.

For more than a decade, water charges have been rising at 5% per year, in order to help the City manage the massive backlog in the "state of good repair" of its water infrastructure. Capital spending has risen dramatically, at the same time as water consumption has essentially flattened out. This trend is expected to continue. However,

instead of rising at 5% per year as they have over the past decade, rates in the future are expected to rise at 3% per year.

Toronto water bills its customers exclusively through usage charges, without a fixed charge component. For commercial customers, the 2018 rates are:

- $3.8036 per m^3 for the first 5000 m^3 per month
- $2.6623 per m^3 for all additional water consumption per month

The typical residential customer is expected to use approximately 260 m^3 per year, on average. An alternative estimate is that a family of four uses approximately 0.8 m^3 of water per day, but since apartment units have less than four people per unit on average, a lesser amount should be assumed. Use of water-saving devices is not universal, so it should be assumed that the averages quoted above are not reflective of the optimum usage scenario (also, residential customers can be assumed to include the large population of homeowners, who will use water for grass and gardening purposes, which will not be applicable to apartment dwellers).

Waste

The City of Toronto's budget for waste collection and management plans for an overall increase in rates of 3% per year for the next three years. However, for the specific class of multi-residential customers, rates are rising only by 1% per year.

The longer term capital plan for City waste disposal shows an eventual flattening of costs as capital backlogs are cleared (similar to water, in many respects). As a result, it may be reasonable to expect that rate increases may fall back to the rate of inflation at some point. However, given that multi-residential rates are already increasing at less than the rate of inflation (presumably to correct an imbalance in rates with other classes), it is unlikely that multi-residential rate increases will be less than 1%. As a result, a 1% annual increase was assumed in the model going forward.

For 2018, multi-residential rates are:

- Base rate of $213.24 per suite, for the first 1.917 uncompacted cubic yards of waste
- $14.80 per uncompacted cubic yard of waste thereafter

A typical Toronto resident produces approximately 720 kg of uncompacted waste per year, which translates into approximately 2.5 uncompacted cubic yards. There is little data available as to whether this average also applies to multi-residential buildings.

Electricity

Electricity prices are within the control of the Province of Ontario, not the City. Over the past 20 years, electricity prices have increased dramatically, but were reduced through policy measures over the past two years. The new government elected in 2018 has committed to reducing prices further, before allowing them to increase again in the future.

Given the current government's commitment to low prices, electricity prices may fall approximately 10% from 2018 to 2019 for residential customers (per the election commitment). It is likely that prices will be artificially restrained from growing for the next several years, before inevitably rising again. The current policy of delaying some of the costs of electricity into the future cannot be sustained for more than the planned five years. After that point (approximately 2022 and beyond), it should be expected that rates will increase steadily for a decade.

Electricity prices contain four parts: commodity (the actual electricity consumed), transmission (the high voltage grid of wires across the province), distribution (the low voltage grid within the City), and other charges (regulatory overhead and market charges). In addition, HST is paid on electricity charges. To the extent that carbon taxes ever apply to electricity in the future, these costs would be buried in the commodity price, since only a small fraction of electricity in Ontario is produced using fossil fuel sources of energy, and these generating facilities would be required to pay any applicable carbon tax.

Over the past decade, commodity charges have risen rapidly, in many years by approximately 5%. However, commodity charges have been the subject of government policy over the past few years to control costs, and hence have actually come down since their peak in 2016. These costs may be reduced again in 2019. Commodity costs are typically priced on a consumption basis, either on a simple per kwh basis, or through per kwh hour charges that vary by time of day. In the case of multi-residential buildings, the charges are on a block basis. Prices should stay relatively flat through 2022, whereupon they should be expected to begin rising again, likely at a rate of at least inflation plus one or two percent.

Transmission charges are typically charged through a fixed monthly charge, plus a per kwh charge. These rates have been rising fairly steadily at the rate of inflation over the past 15 years, and should be expected to continue to do so.

Distribution charges were traditionally charged through a fixed monthly charge plus a per kwh charge, however, a policy decision from a few years ago is being implemented which is converting all distribution charges to fixed charges. Distribution costs have been rising faster than inflation for more than a decade, and should be expected to continue to do so, likely at inflation plus one percent.

Other charges include special fees for regulatory overhead, and traditionally included charges to support programs to make electricity more affordable in high cost serving areas, such as Northern Ontario. However, recent policy decisions by the government have removed responsibility for these costs from ratepayers and transferred them to taxpayers. As a result, other charges may be reduced somewhat in 2019. In addition, it is unlikely that these charges will grow at all over the coming years.

Sub-metering (or "suite metering")

Multi-residential buildings are unique from the perspective of electricity charges, because most buildings have a single meter at the entry point of electricity. This is considered a "bulk meter", and Toronto Hydro typically sends a single bill to an apartment building. However, in many buildings apartment suites are "sub-metered", which means that the electricity used within each apartment (for lights, electronics, oven, refrigerator, etc.) is separately tracked, and the cost of that electricity is charged directly to the tenant through a monthly bill. While the building consumes electricity for common areas (such as lobby and hallway lights, running the HVAC system, garage ventilation, etc.), and this cost must still be included in overall building expenses, the portion of the electricity bill that can be charged directly to tenants through sub-metering does not form part of building costs.

When sub-meters are first introduced to a building, the building manager is required to make a one-time adjustment to rents in order to reflect the fact that building costs will fall by the amount of the electricity that is charged directly to tenants. Tenants that use an above average amount of electricity will see their costs rise as compared to their rent savings, while those who use less than the average amount of electricity will see their overall costs of rent and electricity reduced. In general, the theory is that requiring tenants to pay for their electricity directly is an encouragement towards energy saving, and hence total electricity consumption in the building should fall.

One complication that arises from the use of sub-meters is the incentive, or lack thereof, for in-suite electricity savings based on equipment provided by the building owner. For example, stoves, refrigerators, dishwashers and overhead lights are typically included in a rental. If the electricity associated with these appliances and fixtures is paid for directly by tenants, then landlords have little incentive to spend any extra costs associated with higher efficiency. For example, older lights in a suite might be made more efficient by replacement with LEDs, but since the electricity cost of the older lights is not borne by the building, there is no incentive to replace them. In this circumstance, the capital cost of the equipment is a building cost, while the operating cost belongs to the tenant. The incentive created by this split is unfortunate. Several government grant programs have been designed specifically to overcome this disincentive.

Current Electricity Costs

Commodity: bulk-metered multi-residential buildings are charged on the basis of tiered pricing. For the winter of 2018-19, the building pays 7.7 cents/kwh for the first (1000 kwh * the number of units in the building) per month, plus 8.9 cents/kwh for additional power. Note that in summer (May through October) the threshold between the tiers is reduced to 600 kwh. These charges may fall approximately 10% in 2019, then stay flat until 2022, then begin rising by approximately 3% per year (or more).

Transmission and Distribution: bulk-metered residential buildings pay approximately $50 per month in a fixed service charge, plus an amount based on the peak consumption of the building during the month measured in kw (note that this is a capacity charge measuring instantaneous consumption, not an energy charge measured in kwh). In 2018 this amounts to $4.60 per peak kw per month for transmission, and $6.63 for distribution. In 2019 the distribution figure will jump to approximately $8.00 because certain one-time discounts will expire. Both transmission and distribution together should be assumed to increase by approximately 3% per year on an ongoing basis.

Regulatory: All customers are charged $0.25 per month, plus $0.0036 for every kwh consumed. This should be expected to rise by inflation over time.

Natural Gas

Natural gas is a competitively priced commodity, the price of which is largely driven by market forces rather than governments. However, the delivery of natural gas through pipeline systems is a regulated business under government control.

The price of natural gas has fluctuated dramatically over the past 25 years. Traditionally, the fuel was considered a “waste product” of the oil business, and hence until the late 1990s was relatively cheap. The construction of many natural gas-fired electricity generation plants during the 1990s caused supplies to tighten up, and drove the price up significantly into the early 2000s. The development of hydraulic fracturing and directional drilling technology, however, dramatically increased the supply of the fuel, while lowering its price of extraction, such that prices plummeted in 2008, and have remained low ever since (the benchmark price for gas, “Henry Hub”, was below

USD$4.00 per MMBTU from November 2014 to November 2018, and has been below $6.00 since December 2008 except for one month in 2009). While in much of the rest of the world the price of gas is tied to the price of oil (one barrel of oil has approximately the same amount of energy as 6 MMBTU of gas, so the price of gas was often set at 1/6th of the price of oil), in North America the price of gas is set by market supply and demand.

In Ontario, gas is imported either from Western Canada or the Appalachian area of the United States. In either case, the commodity price is set by the North American market, and then transmission pipeline costs are required to get the gas to Ontario. Then, Enbridge, the local gas distributor, delivers gas to consumers. The bill is broken into those three parts: commodity, transmission and distribution.

Commodity: while prices for gas fluctuate daily on the market, the average annual price for natural gas in Canada (Alberta market) has been between CAD$2.00 and $2.50 per GJ for the last five years, with prices somewhat higher in the winter but lower in the summer. Natural gas is traded through "futures" contracts, and while these are only an indication of prices in the future (essentially "bets"), they show prices not increasing past $3.00 per GJ for up to the next 10 years.

Transmission: current costs are approximately $1.33 per GJ. This cost should be rising by approximately inflation.

Distribution: Enbridge charges customers a monthly administration fee of $38.14, plus a charge for the volume of gas delivered. This is structured as a series of declining block prices (e.g., $2.80 for each of the first 18.5 GJ, $2.26 for each of the next 40 GJ, $1.86 for each of the next 168 GJ, etc.). Enbridge's rates have traditionally gone up by approximately inflation, but the recent merger between Enbridge and Union Gas in Ontario may result in distribution rates being relatively flat for most of the next ten years.

Carbon Tax

The Province of Ontario's cap and trade program was recently repealed by the current government. However, the federal government has now decided to impose its carbon tax directly on the province. In 2019 the tax is $20/tonne of CO2. For the burning of natural gas, this amounts to $0.0391/$m^3$ consumed. In 2020, when the carbon tax is scheduled to rise to $30/tonne, the additional charge on natural gas will be $0.0587/$m^3$, and in the subsequent two years the rate will rise to $0.0783/$m^3$ and $0.0929/$m^3$.

Assuming the tax rises to its scheduled level of $50/tonne by 2022, the full tax on natural gas will almost double the current commodity cost of natural gas for Ontario consumers. However, when measured against the total delivered cost today, it would amount to approximately a 33% increase. Note that since the carbon tax is a "tax", HST should not be imposed on top of it (unlike the rest of the bill). Given the lack of any policy statements about the post-2022 period, it was assumed that the carbon tax will remain at $50/tonne in perpetuity. Moreover, given the uncertain future of carbon taxes in general, and the existing political opposition to carbon taxes, the price of natural gas was considered both with and without carbon taxes.

Capital and Tax Assumptions for Buildings

Every building owner will have different amounts of debt/mortgages on each of their buildings, and depending on their particular circumstances and preferences, will have a different amount of overall debt in their portfolio. Also, depending on when a building was built or purchased, it will have a different book value on the balance sheet, and a different Undepreciated Capital Cost for tax purposes.

It is neither possible, reasonable nor necessarily useful to try to anticipate all of the different combinations and permutations of these circumstances, and describe how they would interact with various policy option scenarios. Nevertheless, it is important to have a starting point for analysis, so that a more complete financial picture of each option can be obtained.

In order to normalize all results and make them comparable, it was assumed that each building modeled was in one of two sets of circumstances:

A. The building is currently owned by its original owner, and has never been transacted. Since all of the buildings in the target population are more than 35 years old, this means that the book value of the building has been largely depreciated, and that there is little remaining tax shield.[12] At the same time, it will be arbitrarily assumed that there is either no outstanding debt applicable to the building, or that a CMHC-insured mortgage has just recently been taken out at the maximum level available, which is 85% of the status quo market value of the building. The result of these assumptions is that the owner's equity in the building is either equal to its status quo market value (assuming no debt), or it is equal to 15% of the status quo market value (assuming 85% debt).
D. The building has just recently been purchased at the full status quo market value. As a result, the book value and the UCC have been reset to the market value (meaning there is lots of tax shield). Depending on the purchaser, the building has either been purchased with no debt, or with the maximum amount of available CMHC-insured mortgage. As with the case above, the owner's equity in the building will either be 100% of market value, or 15% market value, depending on the debt assumed.

Cash Flow and Owner's Equity Return

In order to compare the value of a building with and without a retrofit, cash flows to owners must be calculated. Cash flows can be analyzed on a pre-tax or after-tax basis, and on a levered or unlevered basis, depending on the purposes of the analysis.

Some owners, such as pension funds, often focus on pre-tax unlevered returns. Other owners, such as insurance companies, are subject to income taxes but have flexible access to both equity and debt, so they may prefer to focus on after-tax unlevered returns and then make their own choices about debt vs. equity based on their portfolio needs at any given time. Finally, most private sector owners are squarely focused on after-tax returns, with varying amounts of leverage depending on their risk preferences and investment profiles. Therefore, the three cash flows considered are pre-tax unlevered, after-tax unlevered, and after-tax levered (no group focuses on pre-tax levered returns).

Complicating matters is the fact that some of the policy measures to be analyzed are related to either income taxes or leverage, and therefore will make a difference only on an after-tax or levered basis. In other words, the same building assumptions and policy scenario can result in significantly different cash flow results for each of the three types of cash flow.

[12] After 35 years of declining by 5% per year, the undepreciated capital cost of a building would be less than 15% of the original construction cost. In addition, the original construction cost of a 35-year-old building is a fraction of what the cost of new construction would be today, based on inflation alone. Inflation from 1983 to 2018 has been 227%, from 1973 455%, and from 1963 725%. The undepreciated capital cost of older buildings bears no relation to their current market value, or to the cost of new construction. In addition, the annual CCA tax shield provided by the remaining building capital cost would be less than 1% of the building's original capital cost. In effect, the tax shield would be near zero, and therefore was ignored in this building category.

For each of the cash flows (as appropriate for the presumed owner), an owner's internal rate of return was calculated, based on the assumed equity held in the building (as described above). The comparison of IRRs as between the status quo and various policy options indicates which scenario is beneficial for owners.

Calculating IRRs requires not only cash flows for the life of the model, but also a presumed value of the building at the end of the modeled period.

Cap Rate and Building Value

Both the status quo value and the building value at the end of the modeled period require that a formula be used for building valuation.

The industry standard is the use of the "Cap Rate", or capitalization rate. For an income-producing property like a multi-residential apartment building, the formula is:

Observed market Cap Rate for building class/type * Net Operating Income = Building Value

Recent public reports of observed market Cap Rates for multi-residential rental buildings in Toronto have been in the range of 3% to 4%, which implies building values that are extremely high by historical standards.[13] However, this is consistent with the historically low interest rates prevalent over the last number of years (discussed above), with the rapidly rising land values in the City of Toronto (subject of frequent public reports), and with the extremely tight rental market (also widely reported), which is driving increases in rental prices (for units that are changing hands, and which can therefore be reset to market prices, rather than only increased by inflation-based rent controls). If any of these major trends were to change, the Cap Rate for all buildings would be affected in a similar way.

For the purpose of this model, Cap Rate will be assumed to be stable over time. Should the general market-wide cap rate change over time (as it surely will), it would affect all buildings equally, so no information is gained by assuming trends in the Cap Rate.

Cap Rates are not uniform across all rental buildings, however, and can vary significantly (as implied by the 3% to 4% range stated above) depending on a variety of building-specific factors. For example, if a building is in need of repair in the near or medium-term future, the Cap Rate might be toward the higher end of the range (and therefore the perceived value of the building reduced) as compared to another building that is otherwise similar. Also, depending on a building's location, its underlying land value may be increasing more or less quickly because of location-specific factors, and hence this could be reflected in the Cap Rate. A building which has, for whatever reason, a higher rate of turnover than for typical buildings might benefit in value, because of the perception that rents can more often be reset to rising market prices.

One major issue which arises is whether retrofit work on a building will affect its Cap Rate. Retrofits obviously do not affect the building's location, access to transit, value of land, or other intrinsic characteristics. However, if the aesthetics and comfort of a building are improved through cladding, lighting upgrades, improved HVAC, better appliances, refinishing and updating internal fixtures, etc., then the building's value might increase beyond just the amount that may result from reducing operating costs and improving the NOI. Assessing the possible improvement in

[13] 10 years ago, typical Cap Rates for this class of building were in the range of 8%, implying buildings that were half as valuable as they are today given the same NOI.

the Cap Rate is a critical element in considering the long-term value of a retrofit, as this can make a significant difference in building value and hence overall IRR for the building owner.

At the extremely low Cap Rates currently prevalent in the Toronto market, a change in Cap Rate of only 0.25% represents a significant change in Building value. For example, $1 million in NOI at a Cap Rate of 4% amounts to a building value of $25 million. However, at 3.75% the same building would be worth $26.7 million, and at a 3.5% Cap Rate, the building would be worth $28.6 million. At a 3% Cap Rate the building would be worth $33 million, implying that the range of Cap Rates currently prevalent in Toronto is substantial.

Without substantially more detail about buildings and retrofit projects (and the characteristics of the existing market in Toronto!) it is not possible to estimate with any certainty the potential impact on Cap Rate of any retrofit. Instead, the model considers a range of potential improvement (within the overall Cap Rate range for buildings in this class) to consider whether any might be reasonable given the changes made by the retrofit.

Appendix D: Policy Options Detailed Description

Grants

Governments will consider grants where there is a demonstrable market failure – that is, where the true value of an action is not reflected in the market's response. Grants can bridge the shortfall, therefore, between the cost of renovations incurred by building owners and insufficient rent increases that would otherwise allow them to recoup those costs.

Historically, building retrofit grants in Canada have been provided on a "per measure" basis. For example, if a building owner buys a high efficiency boiler instead of a medium efficiency boiler, he or she may be eligible for government grants.

Countries like Germany have recently begun to offer holistic grants against qualifying retrofit projects. For example, a building owner would be eligible to receive up to 20% of the cost of a retrofit if the retrofit meets certain criteria. From an administrative perspective this "project percentage" mechanism is far easier to manage, and much more efficient.

Housing Repair and Renewal Stream of the National Housing Co-Investment Fund

Level of Government: Federal - Canada Mortgage and Housing Corporation

Implementation Instrument: Housing Repair and Renewal Stream program rules

Cost to Government: No new costs – the money has already been allocated to the program

Feasibility: Common & easy – changing eligibility criteria of an existing program

Opportunity

The Housing Repair and Renewal (HRR) Stream under the recently launched National Housing Co-Investment Fund is providing $3.46 billion in loans and $2.26 billion in capital contributions to community housing providers, municipalities, provinces and territories, indigenous governments and organizations, and the private sector. It is being delivered by Canada Mortgage and Housing Corporation (CMHC). The opportunity is to use a portion of this money to fund retrofits of privately-owned high-rise rental towers.

Barriers

This new federal program follows the industry's preferred approach of providing a grant as a percentage of the total cost of a qualifying retrofit. However, the HRR Stream places so many restrictions on projects that the funding mechanism in its current form is of no value to privately-owned apartment towers.

Feasibility

Without changes to the program design private sector tower owners will not be interested in the HRR Stream. It is typically very difficult to secure a change to a program that has already launched. However, because the HRR Stream is a 10-year program there is a possibility that the Government would be willing to tweak the criteria mid-

stream, especially if the volume and diversity of applications is seen as inadequate to achieve the desired program outcomes.

Development of New Funding Mechanisms

Level of Government: Federal – several possible Departments including Natural Resources Canada, Environment & Climate Change Canada, FedDev Ontario, CMHC

Implementation Instrument: Annual federal budgets or annual Fall Economic Statements

Cost to Government: Potentially significant new costs

Feasibility: Common & easy

Opportunity

Infrastructure renewal is a common focus of federal governments of all political stripes. The Conservative government under the leadership of Stephen Harper rolled out Canada's Economic Action Plan which included an $8.8 billion Building Canada Fund. The current Liberal government under Prime Minister Justin Trudeau has announced a $180 billion infrastructure program over 12 years, which includes the $40 billion National Housing Strategy. The strategy commits about $26 billion from the federal coffers over 10 years, with the remaining funds coming from provincial and territorial matching.

While the funds under the National Housing Strategy are fully allocated, governments can and often do reprioritize unspent funds to address emerging priorities. Similarly, newly elected governments will rewrite spending plans to reflect the mandate on which they were elected.

The Office of Energy Efficiency (OEE) within Natural Resources Canada is a possible source of new funding mechanisms. The OEE works in the fields of housing, building, communities, industry, and transportation to help Canadians realize this potential and take advantage of the benefits of energy efficiency, such as lower energy costs, cutting emissions, improving operating performance, and increasing asset values. The OEE develops codes and standards, manages the ENERGY STAR program, and develops toolkits to help building owners make investments in energy efficiency.

While the OEE has not provided grants in recent years, there is a U.S. model that may be emulated. In 2009 the Department of Energy launched the Energy Efficiency and Conservation Block Grant (EECBG) Program, which provided "$3.2 billion in block grants to cities, communities, states, U.S. territories, and Indian tribes to develop, promote, implement, and manage energy efficiency and conservation projects that ultimately created jobs."

A second option is to secure grant money from Environment and Climate Change Canada (ECCC) on the basis of GHG emission reductions. In October 2018 ECCCC announced that it would disperse up to $420 million under the Low Carbon Economy Fund that had initially been allocated to the Government of Ontario to distribute through provincial programs. When Premier Ford pulled Ontario's support for the Pan-Canadian Framework on Clean Growth and Climate Change, ECCC Minister Catherine McKenna announced that the federal would invest the money into Ontario directly. The details of how this money will be spent has not yet been announced.

Barriers

Federal budget asks typically require good alignment with pressing government priorities, support from senior officials representing one or more department, and strong analytics indicating a positive cost/benefit analysis. Because a National Housing Strategy was announced in 2017, housing is unlikely to be a focus of Budget 2019. Moreover, to impact the budget process the support of senior officials is critical. It will be difficult to impact Budget 2019. Impacting Budget 2020, or the Fall Economic Statements (which typically serve as a mid-year mini-budget) in the fall of 2019 or 2020 is more feasible. However, the federal election scheduled for October 21, 2019, may lead to a change in government, in which case advocacy efforts would need to reset.

Separate to the budget cycle, which allocates discretionary funding, the OEE has annually recurring base-level funding that may be explored. However, grants are a departure from the recent departmental strategy and will likely be difficult to obtain.

Feasibility

Securing new funding mechanisms that target tower renewal in Budget 2019, which will be released in late February or March of 2019, is unlikely. However, in October either the Liberals will be re-elected with a new mandate or the Conservatives or the NDP will form government. In all scenarios there is an opportunity to shape new spending ahead of Budget 2020.

Ontario Environment Plan and Ontario Carbon Trust

Level of Government: Provincial - Ministry of Environment, Conservation and Parks

Implementation Instrument: Ontario Carbon Trust

Cost to Government: Significant new costs

Feasibility: Medium: strong competition for limited funds

Opportunity

During the 2018 general election the Progressive Conservatives (PCs) set out their policy and campaign commitments in a document called For the People: A Plan for Ontario, also commonly referred to as the Plan for the People. Included in the Plan for the People is a commitment to 'Creating a Cleaner Ontario' that describes the party's proposed environmental initiatives. One of the commitments identified is to "set up an emissions-reduction fund to invest in new technologies to reduce emissions right here in Ontario."14 The total proposed combined cost of all environmental initiatives is $500 million over the course of the four-year mandate.

On November 29, 2018, the PCs released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan." A major plank is the Ontario Carbon Trust, to which the Ontario government will commit about $350 million over four years, to work with the private sector on developing clean technologies to reduce

[14] For the People: A Plan for Ontario

emissions. There will also be a $50 million reverse-auction program that will award money to projects with the greatest per-dollar carbon reduction.

Barriers

The description of the Ontario Carbon Trust contained in the "Made-in-Ontario Environment Plan" focuses on investing in new technologies and does not immediately lend itself to tower renewal per se. Specifically, the document notes that:

> *The Ontario Carbon Trust will use innovative financing techniques and market development tools in partnership with the private sector to speed up the deployment of low-carbon solutions. It will use public funds to leverage private investment in clean technologies that are commercially viable and will have a widespread presence. It will also seek to reduce energy costs for ratepayers, stimulate private sector investment and economic activity, and accelerate the transition to a low-carbon economy.*

While the overall climate strategy has been laid out, the details of the Ontario Carbon Trust are not finalized, which provides an opportunity to advocate for tower renewal as part of this initiative and possible grant-stream.

Feasibility

A sizeable advocacy effort with the MECP would be required to include a grant-stream for tower renewal in the climate change plan, whether within the Ontario Carbon Trust or other ministry expenditures. Considering the nature of the project, other ministries to involve in this advocacy could include the Ministry of Municipal Affairs and Housing; Ministry of Economic Development, Job Creation and Trade; Ministry of Finance; Ministry of Infrastructure; and the Treasury Board Secretariat.

Impacting the feasibility of this option is the backdrop of the government's focus on cost-effectiveness, efficiency of government, and saving taxpayers money. The Independent Financial Commission of Inquiry report reviewing the previous government's accounting practices and a line-by-line audit of government expenditures created the environment for a major shift towards austerity in government spending. The Fall Economic Statement solidified this shift making non-essential funding propositions, from any sector, increasingly more difficult to obtain. The austerity is expected to carry into the government's provincial budget, which is typically released in the spring.

Given this focus on Ontario's budget deficit there is a limited possibility of new provincial grants in general. However, the cancellation of the cap and trade program may provide an opportunity, however unlikely, for a new program that includes a cash component.

Loans

There are three ways in which governments can extend loans to spur investment in tower renewal projects: by lowering interest rates; by making more debt available (loan to project cost, or loan to value of building); and by providing easier repayment terms (e.g. delayed first payment, longer term of the mortgage, or longer amortization period).

While lower interest rates are certainly of value to building owners, the difference between the government borrowing rate and private mortgage rates is not currently significant enough to change retrofit investment behaviour. Mortgage

rates today are very low, and commercial mortgages for good borrowers are generally less than 1% higher than the government cost of funds. Interest rates alone simply will not make much of a difference in terms of incenting Tower renewal.

Debt is an important consideration for building owners. Normally, buildings only qualify for financing on up to about 65% of the value of a building. If an owner proposes a retrofit, and wants to borrow against the future, post-retrofit value of the building, the bank will estimate what it thinks the building will be worth after the retrofit, and will normally lend up to a maximum of 60% of the higher future value. Banks always discount the future value of the retrofit to some degree, making it more difficult to obtain financing based on the full value of the project. If a building is lightly mortgaged prior to the retrofit project, this limitation may not be problematic with respect to financing the construction cost. However, if a building has pre-existing mortgages, this limit may prevent full financing of construction with debt.

CMHC supports commercial mortgages for residential buildings at a higher level of indebtedness, and slightly lower interest rate. However, these mortgages are only provided to qualified buyers, and there may be some landlords of target buildings who do not qualify for CMHC programs.

Banks typically require repayment to begin immediately after a construction project is complete. Moreover, the longest mortgages out there are generally 10 years, and the amortization periods are often less than 25 years. Introducing flexibility on these parameters would help make retrofit investments more attractive to owners.

A government loan program could provide value to building owners under several approaches. First, it could lend against a higher percentage of the future value of the building (e.g., 75% or 85%) than a bank would. Second, a government could lend the whole amount of the retrofit, going above the 60% typical of a bank. Finally, governments could provide loans where repayment does not start until after a grace period has elapsed, perhaps one or two years; where the term is longer (e.g. up to 20 or 30 years with a guaranteed interest rate); and where the amortization period could match the life of the retrofit measures (cladding can last up to 40 years, for example).

Infrastructure Ontario Loan Program

Level of Government: Provincial - Infrastructure Ontario

Implementation Instrument: Municipal Act of Ontario

Cost to Government: Medium: funds exist but would need to be redirected

Feasibility: New & novel to redirect funds for this purpose

Opportunity

Infrastructure Ontario's Loan Program (IOLP) provides long-term financing in support of public sector infrastructure development. Since 2003, IO has financed over 2,600 projects for over 410 clients, approved over $9.4 billion in financing to clients, and supported more than $15 billion in local infrastructure development.15

The program provides benefits to public sector borrowers such as:

[15] Infrastructure Lending. Infrastructure Ontario website

- Affordable interest rates;
- Flexible terms of up to 30 years, designed to match the life of the asset;
- Instant access to capital markets with no extra fees or commissions; and,
- No need to refinance over the life of the loan.

Approved borrowers are not prohibited from applying for other kinds of government funding.

The loans can be used to finance a broad range of capital expenditure projects including construction and expansion, energy efficiency projects, as well as system and equipment purchases.16 Financing is available for all capital expenditure but not available for working capital needs.17

Barrier

Private companies are not eligible to apply to the IO loan program, but municipalities and municipal corporations do qualify. The City of Toronto or one of its corporations could be the loan intermediary between IO and building owners. However, legislative changes would be required to make this option feasible.

Section 106 of the Municipal Act of Ontario restricts municipalities from granting "bonuses" to manufacturing businesses or other industrial or commercial enterprises. Subsection 106(2) provides a non-exhaustive list of examples of transactions which are prohibited forms of assistance. As the examples indicate, these transactions are not limited to the payment of money, and may involve such things as guaranteeing borrowing, the giving or lending of property, or giving an exemption from a levy, charge or fee.

However, Section 107, titled General power to make grants, sets out exceptions to the prohibition in Section 106, largely focussed on economic development. One notable exception is that municipalities may make loans and grants to the boards of planning areas. Planning areas are designated by a provincial Minister, and generally consist of one of more municipality, but may also be comprised of "unorganized territory."

To move forward with this policy option tower renewal stakeholders will need to determine the best exception rule under Section 107 to pursue, or advocate for a new exception to be added.

Feasibility

Securing IO loans for tower renewal would require several steps. The first is to determine the willingness of the City of Toronto to re-loan IO funds for tower renewal programs. The second is to get IO on board with the concept. Finally, appropriate changes will need to be made to the Municipal Act to ensure that tower renewal loans are permissible as a pass-through from the province via a municipality.

Planning Issues

Expedited Permits and Approvals for New Construction Associated with Retrofits

Level of Government: Municipal – City of Toronto

[16] FAQs – Loan Program. Infrastructure Ontario website
[17] Loan Program Guidelines – Municipalities

Implementation Instrument: City of Toronto Official Plan & Design Guidelines; permitting process rules

Cost to Government: No new costs

Feasibility: Medium

Opportunity:

Retrofits require a myriad of permits and approvals. There may be an opportunity to expedite permits for qualifying retrofits through municipal processes, including for new construction such as adding floors to buildings and filling in space around a building.

Barriers

There are two primary barriers to this option. The first is the logistical challenge of accelerating the review of permitting applications, including limited personnel capacity and the perception of fairness. The second barrier is the limited financial value of expedited permits. Faster project approvals may reduce project risk but have little impact on project economics.

Feasibility

Beyond possible staffing requirements, this policy option would have limited impact on the budget of the City of Toronto. It would, however, require administrative changes and would require prioritizing tower renewal projects ahead of other project types. This is unlikely to occur unless it can be shown that expedited permits would have a material impact on the investment decisions of tower owners.

Infill and Development Charge Discount

Level of Government: Municipal – City of Toronto

Implementation Instrument: City of Toronto Act; by-laws

Cost to Government: Medium – no new expenditure, but some forgone revenues

Feasibility: Medium

Opportunity

The City of Toronto charges fees on all permit applications submitted by building owners. For example, in 2019 the fee rate charged for an application pertaining to interior alterations of a multi-unit residential building is $4.93 per unit. HVAC and Air Conditioning permits cost $1.29/m2.

Chapter 363 of the Toronto Municipal Code provides the City of Toronto the legal authority to administer and enforce of the Ontario Building Code Act and Ontario Building Code, including setting fees for permitting construction activities. The Chapter could be amended to provide fee relief to certain types of tower renewal activities, to be reflected in the fee schedule. Alternatively, Chapter 441 of the Code, which sets out specific fees in a series of Appendices, could be modified to exempt activities related to tower renewal. Specifically, construction permit fees are listed in Appendix C, Schedule 8.

Barriers

The most significant barrier associated with this policy option appears to be the foregone revenues to the City of Toronto. The fee schedule set out in Appendix C, Schedule 8 of Chapter 441 of the Toronto Municipal Code categorizes building permit fees as "full cost recovery". The fees are designed to cover the administrative costs of the service provided by the City. By foregoing the fees for certain projects the City would either have to operate this service at a loss or increase the fees for other activities in order to offset the lost revenues.

Feasibility

This policy option is fairly straight-forward from a technical feasibility perspective. It is clear which City of Toronto by-laws would need to be amended, and which fee schedules would need to be altered. Defining the project types eligible for relief from fees is also feasible. What is more difficult is making the case to the City that forgoing this revenue – in effect abandoning the principle of cost recovery for certain project types – would spur the kinds of tower renewal investment the City seeks.

Limited Above Guideline Rent Increases (with alternative rent support)

Level of Government: Provincial

Implementation Instrument: Residential Tenancies Act; Rent Increase Guidelines

Cost to Government: No new costs

Feasibility: Medium – rent control is a contentious issue but the Province has recently made some changes to the treatment of new rental units.

Opportunity

The Residential Tenancies Act provides the legislative framework for a rental housing system in Ontario establishing roles, responsibilities and protections afforded to both tenants and landlords. The Act provides the province's rent control provisions. The Act has been updated frequently since 2006.

Privately-owned rental units in the province are generally subject to Rent Increase Guidelines. These guidelines are updated annually and dictate the percentage by which landlords can increase rent in their units for that upcoming 12-month period. For example, the rent increase guideline has been set at 1.8% for increases between January 1 and December 31, 2019.18

The challenge is that while this small annual increase allows building owners to keep up with inflation, it does not allow them to recoup investments in tower renewal retrofits. However, by expanding the types of investments that can be passed on to tenants, such as investments in upgrades to apartment towers, the rent control guidelines could provide an incentive for owners to undertake retrofit projects.

[18] Rent Increase Guidelines

As described in the Information About Applications for a Rent Increase Above the Guideline document, there are three instances whereby a landlord can apply to the Landlord and Tenant Board for a rent increase above the guideline. These include:

A. The landlord's costs for municipal taxes and charges have increased by an "extraordinary" amount.
B. The landlord did extraordinary or significant renovations, repairs, replacements, or new additions to the building or to individual units (also known as Capital Expenditure).
C. The landlord's costs for security services increased, or the landlord began providing security services for the first time.

In the first case, investments that increase the value of a building will increase its assessment value for tax purposes. A tax increase is considered "extraordinary" if it is greater than the guideline plus 50%. The guideline used to determine if the increase is extraordinary is the rent increase guideline for the calendar year in which the first rent increase requested in the application will take effect.

Example: If the first rent increase requested in the application takes effect on September 1, 2019, the 2019 guideline of 1.8% is used. The following calculation can be used to figure out how much the increase must be to be considered "extraordinary":

1.8% x 50% = 0.9%,

1.8% + 0.9% = 2.7%

If the increase in taxes is greater than 2.7%, it is considered "extraordinary" and any costs above the 2.7% increase may be passed along to the building's tenants.

In the second case, when deciding whether to allow a capital expenditure to be passed along to tenants, the Ontario Landlord and Tenant Board must consider:

- whether the work meets the definition of a capital expenditure in the regulations to the Residential Tenancies Act,
- when the work was done,
- whether the work is "eligible", and
- if an item was replaced, whether it needed replacing.

In general, a capital expenditure item is not "eligible" if it replaces something that did not need replacing. However, even if the item did not need replacing, it could still be considered eligible if it promotes:

- access for persons with disabilities,
- energy or water conservation, or
- security at the residential complex.

Barriers

The challenge in both cases is that these are ex post incentives. The building owner makes the capital investment and then either hopes that the property taxes increase sufficiently to allow a partial pass-through to the tenants or that the Landlord and Tenant Board agrees that the capital expenditure is eligible for pass-through. This creates

significant risk to building owners, and history has shown that they are reticent to make tower improvement investments in the hopes of getting a favourable ruling from the Landlord and Tenant Board.

Feasibility:

An option for motivating desired tower investments is to make it clearer what types of investments can be passed through to tenants without an ex post ruling from the Landlord and Tenant Board. This would require amending the Residential Tenancies Act and the Rent Increase Guidelines.

The Government of Ontario has shown a willingness to consider changes to these laws. In November 2018 it released its Housing Supply Action Plan consultation text, which removes rent control on new-build rental units. The Government stressed at the time that "current tenants with lease agreements, or who are paying month-to-month rent as part of a previous lease agreement, would still be protected by rent control. Rent increase limits will continue to protect existing tenants." However, as part of the Action Plan the Government may be open to considering exemptions for some tower renewal activities.

Taxation

Tax Liability Re-assessment

Level of Government: Province and Municipal - Ministry of Municipal Affairs and Housing (MAH) and Municipal Property Assessment Corp (MPAC)

Implementation Instrument: Assessment Act; City of Toronto Act

Cost to Government: Medium

Feasibility: Medium

Opportunity

There may be an opportunity to impact how retrofitted buildings are re-assessed such that the normal schedule for property value assessments would not be followed in the case of an eligible retrofit.

Ontario's Assessment Act, 1990 states that all real property in Ontario is liable to assessment and taxation. Subsection 19.2 sets out the schedule for property assessment re-evaluation. For the four taxation years 2021 to 2024 assessments will be made on January 1, 2019.

There are really two possible opportunities here for forgoing an increase in property taxes: through the mechanism of delaying a reassessment or refunding the increase.

The first is for the province to agree to delay the reassessment of building value after eligible tower renewal retrofits. To meaningfully impact investment decisions the reassessment delay would likely have to be at least ten years. The building owner would continue to pay property tax based on the existing value assessment, and hence not see a property tax increase.

Subsection 19.2 (5) gives the Minister discretion as to when the date for assessment is set for a given taxation period, by exception. Extending this exception to the application of a class of buildings would provide the Minister with the authority to postpone the re-assessment of towers fitting a specific type.

The second options is for the City to choose either to not collect or to refund the extra property tax associated with a higher reassessment of the property value: in this case, the City would execute the policy change instead of the province. However, the impact would be the same, in that the City would be foregoing higher tax revenue for a period of time.

Barrier

While the first option is executed by the province and the second option is executed by the City the result is the same: foregone property tax revenue for the City. The challenge will be to convince the City to give up tax revenues for a period of time.

A second barrier will be to design this policy option in a way that is most attractive to building owners. The property taxation system discourages investment in building upgrades and retrofits – the higher the value of the property, the higher the tax burden. However, if the tax burden rises more than the annual guideline multiplied by 1.5, the landlord can pass along the excess costs to tenants in the form of higher rents (please see the rent control policy option for more details). The greatest benefit to building owners come from postponing modest tax increases for as long as possible. Reassessment holidays of more than 10 years may not be politically palatable.

Feasibility

The feasibility of an assessment and taxation holiday for building owners based on upgrading and retrofitting their properties will likely require amendments to both the Assessment Act and the City of Toronto Act. The development of a new exemption provision that targets building owners pursuing improvements, perhaps with stipulations around job creation and with prescribed time limits to such exemptions, would require engagement with the Ministry of Municipal Affairs and Housing, as well as with City of Toronto officials. The technical feasibility in terms of regulatory changes is high –

New Building Class for Taxation

Level of Government: Municipal

Implementation Instrument: City of Toronto Act; by-laws

Cost to Government: No new costs, but foregone revenues.

Technical Feasibility: Common & easy

Opportunity

In addition to the province delaying reassessment or the City rebating tax money owed, a third policy option is for the province to create a new building class with a special, lower tax rate for towers that meet certain performance standards. This would incent building owners to invest in tower renewal in order to access the lower tax rate.

In this case the province would create a new class under the Assessment Act, which would be referenced by the City in the Toronto Municipal Code, Chapter 767.

Barriers

The barrier again is having the City of Toronto forgo tax revenue that would otherwise be due.

Feasibility

Technically this policy would be relatively simple to implement. The legislation and regulations that would need to be amended are clear. This is simply a matter of political will.

Change CCA Classifications and Rates

Level of Government: Federal – Canada Revenue Agency; Finance Canada

Implementation Instrument: Canadian Income Tax Regulations; Annual Federal Budget; Fall Economic Statements

Cost to Government: Medium

Technical Feasibility: Common & easy

Opportunity

Capital cost allowance (CCA) is the means by which businesses may claim depreciation expenses when calculating taxable income. Capital costs are normally discounted over time based on their expected useful life. However, in special cases policy may allow for accelerated depreciation which provides a financial incentive by deferring taxation.

The federal 2018 Fall Economic Statement, released in November, included significant changes to CCA rates.

Including investments in buildings are now eligible for a first-year deduction for depreciation at three times the former first-year rate. So, if the CCA rate for a Class is 5% per year, equipment that falls under that class will now be depreciated on a schedule of 15% in year one and 5% in all subsequent years. This is significant for tower renewal investments, as most additions to buildings (like light fixtures, windows, doors, cladding, roof insulation, etc.) would be included in either CCA class 1 (4%) or class 4 (5%), or class 32 (10%) depending on the age of the building and when it last changed hands. Tripling any of these for the first year is valuable. In addition, boilers, appliances, fans and other moveable property typically falls into class 8 (20%), an even bigger benefit.

Most interesting is Class 43.1/43.2, which focusses on clean energy investments. These are now eligible for 100% write off in year one. There may be an opportunity to expand the Class 43 definition to include more investments typical to tower renewal, in addition to the 19 categories currently included under this Class:

i. Cogeneration and Specified-Waste Fuelled Electrical Generation Systems
ii. Thermal Waste Electrical Generation Equipment
iii. Active Solar Heating Equipment and Ground-Source Heat Pump Systems
iv. Small-Scale Hydro-Electric Installations
v. Heat Recovery Equipment
vi. Wind Energy Conversion Systems

vii. Photovoltaic Electrical Generation Equipment
viii. Geothermal Energy Equipment
ix. Landfill Gas and Digester Gas Collection Equipment
x. Specified-Waste Fuelled Heat Production Equipment
xi. Expansion Engine Systems
xii. Systems to Convert Biomass into Bio-Oil
xiii. Fixed Location Fuel Cell Equipment
xiv. Systems to Produce Biogas by Anaerobic Digestion
xv. Wave or Tidal or Water Current Energy Equipment
xvi. District Energy Systems/Equipment
xvii. Producer Gas Generating Equipment
xviii. Electric Vehicle Charging Stations
xix. Electrical Energy Storage

Barriers

CCA classes and rates are set out in Canada's Income Tax Regulation. Changes to tax legislation may be tabled by the Minister of Finance (or any other parliamentarian) but most changes to CCA rates are announced in the federal Budget and enacted through the Budget Implementation Legislation. For example, budget 2017 announced accelerated CCA rates for geothermal energy equipment, while Budget 2018 extended accelerated CCA rates for most clean energy equipment investments.

The window to impact Budget 2019 – which will likely be tabled in late February or March - is closing but is not completely shut. The Liberal Government has made it clear that CCA rates are a tool it favours to incent new capital investment. The challenge will be in moving quickly to impact Budget 2019 or the 2019 Fall Economic Statement.

Feasibility

The inclusion of increased CCA rates for tower renewal projects in the 2019 federal budget is not high. However, there is a path to inclusion in Budget 2020 or other tax legislation outside of the budget process.

The path to successful tax reform for tower owners requires influencing the complex tax policy process. The Tax Policy Branch of the Department of Finance is responsible for idea generation and in initial assessment. From there, Justice Department officials work with Canada Revenue Agency officials to craft the legislative language required to enact the policy. There is typically a public review period before the draft legislation is finalized and introduced in parliament.

The Tax Policy Branch may be influenced by a number of factors, including Ministerial support for an idea, cross-government support (i.e. from CMHC or Infrastructure Canada), and sound analysis.

Energy Costs

Providing a Floor Price on Energy Benefits

Level of Government: Federal / Provincial - Natural Resources Canada; Canada Revenue Agency; Finance Canada; Ontario Ministry of Energy, Northern Development & Mines; Ontario Independent Electricity System Operator

Implementation Instrument: E.g. Natural Resources Canada Office of Energy Efficiency programs

Cost to Government: New & novel

Technical Feasibility: Very expensive

Opportunity

The idea is to provide a "floor price" for the calculation of energy benefits in planning a retrofit.

Normally, when a building owner is planning a retrofit they will start with their status quo energy consumption, and then multiply by the expected future energy costs to calculate forward-looking energy costs.

This can then be compared to energy saving retrofits, both in terms of energy demand and cost over time as energy prices fluctuate. The comparison between the status quo projected energy costs and the projected costs following a retrofit puts the value of the retrofits in terms of total savings over time. Building owners then compare those savings to the cost of financing the retrofit (debt and equity), in order to decide whether doing the retrofit is a good idea.

A critical issue in this calculation is the assumptions made about future energy prices. In the last 20 years, there has been enormous volatility in energy prices, so making these assumptions is hard. At the same time, there is an enormous amount of uncertainty about they future of carbon taxes, and how they will affect energy prices (if at all). The result is that building owners are unwilling to assume that energy prices will go up, or they are extremely conservative in their estimates. This makes it much less likely that they will do retrofits because it undervalues future savings.

The opportunity is to have either the federal or the provincial government set and backstop target energy prices.

Barrier

The main and significant barrier to this approach is not only its novelness, but also that any amount of energy costs that would be reduced would need to be subsidized by either taxpayers generally or other electricity ratepayers. The Ontario government has expressed an overall aversion to this type of policy and program approach. That said, many jurisdictions have used price floors to incent renewable energy investments. In this case the government is essentially guaranteeing a minimum value for the 'nega-watts' that energy conservation delivers.

Feasibility

To implement this idea a government department or agency, either the Ministry of Energy, Northern Development and Mines or the Independent Electricity System Operator, would need to enter into a contractual arrangement with tower owners that a) defines a forward-looking schedule of expected energy price increases b) defines the life of the agreement and c) commits the government to truing up the value of the retrofits on an annual basis.

If energy prices prove to be lower than expected, the government will pay the building owner the difference. If prices are higher than expected there is no action taken by either party but the building owner sees heightened value in the retrofit investments because of the higher avoided energy costs.

The higher the prices that the government guarantees, the more likely it is that the government would pay in the future, but at the same time it would also be more likely that retrofits would go forward.

Alternatively, the federal government could backstop energy price increases by indexing the federal carbon price to energy costs (i.e. if natural gas prices stay low, the carbon price increases are accelerated to offset the negative impact on energy conservation and efficiency).

Scoring and Benchmarking

Developing Standards for Building Performance

Level of Government: Federal / Provincial - Natural Resources Canada, Ontario Ministry of Energy, Northern Development and Mines (MENDM)

Implementation Instrument: Documented standards and guidelines

Cost to Government: No new costs

Technical Feasibility: Common & easy

Opportunity

The idea here is that the government would develop standards for building performance that a retrofit would achieve. Retrofits could be segmented by outcomes achieves (e.g. reduction of 25% of energy and water consumption is Retrofit Class A, 35% is Class B, etc.).

Alternatively, they could refer to things such as LEED Building standards, but adapted for retrofits.

The purpose of doing this would be to allow projects to qualify for different kinds of incentives developed for tower retrofits. For example, Class A retrofits could qualify for better CCA rates than Class B retrofits, or be given more favourable treatment under a possible property tax assessment holiday.

An alternative to voluntary standards tied to a funding program is to develop a mandatory benchmarking program for all buildings in Ontario/Canada, which would then be required to be assessed from an energy performance perspective. This information would be available publicly and would be made available upon a sale of the building. Mandatory standards would force owners to understand their own buildings and might prompt some owners to take action if they have not already done so.

A third option is to develop a concierge service whereby governments set up offices to work with building owners to provide them information and benchmarking, and help them through the process of applying for and getting approval for all of the incentives that might be applicable. NRCan's Office of Energy Efficiency has an information portal that aims to educate building owners and homeowners. However, information could be targeted to individual buildings based on benchmarking results.

Barriers

The difficulty with benchmarking is determining fair and meaningful metrics and a common methodology for scoring results. If the application of the metrics will be for voluntary programs it will alleviate some of the challenges; however, if the standards will be referenced in regulations or programming designs and decisions then significant stakeholder consultation will be required to achieve consensus.

Feasibility

Developing standards for tower retrofit classes should be feasible, bearing in mind that as it becomes increasingly likely that the standards well be referenced in either regulations or programming decisions (e.g. loan and grant distribution) stakeholders will want their views reflected in the standards-setting process. Another challenge will be to segment tower retrofits into neat categories with simple metrics. NRCan's Office of Energy Efficiency may be of assistance here.

Mandating Minimum Building Performance

Level of Government: Provincial

Implementation Instrument: Ontario Building Code

Cost to Government: No new costs

Technical Feasibility: Medium – intensive consultation likely required

Opportunity

One option for setting a minimum performance threshold for apartment towers, thus encouraging ongoing renewal, is for the government to put higher standards in the Building Code. The Code could set out, for example, that by a certain date all rental apartment buildings with the following characteristics (e.g., floors, number of units, etc.), must meet set standards for heating, cooling, water consumption, etc.), must have specified insulation, must have specified classes of windows and doors, etc.

Barriers

Compelling action is often more difficult than incenting it. Also, building owners would reasonably expect a run-way for implementation which could delay the effectiveness of this policy option.

Feasibility

The Ontario Building Code is administered by the Building and Development Branch of the Ministry of Municipal Affairs and Housing. The latest edition was published in 2012. In July 2011 the Minister of Municipal Affairs and Housing revised the Code as it relates to energy efficiency, imposing mandatory standards on new large buildings in the province19. However, the application to existing buildings were grandfathered.

The Building Code Act that governs the development and implementation of the Ontario Building Code does allow for regulations to apply to existing building stock. Section 34, subsection (2) specifies that "the Lieutenant Governor in Council may make regulations to establish standards that existing buildings must meet even though no construction is proposed, including regulations, (b) establishing standards for maintenance, retrofit, operation, occupancy and repair."

An example of the usage of this authority was the passing of O. Reg. 517/06, which set out maintenance standards for building owners under the Residential Tenancies Act. The regulation came into force on January 31, 2007, and

[19] http://www.mah.gov.on.ca/AssetFactory.aspx?did=9227

requires, for example, that “adequate artificial lighting shall be available at all times in all rooms, stairways, halls, corridors, garages, and basements of a residential complex that are accessible to tenants.”

Appendix E: Retrofit Measures

Measures	Measures	Measures	Measures	Measures	Scenarios	Scenarios	Scenarios	Scenarios	Scenarios
Primary Motivation	**Motivation**	**Area**	**Area**	**Retrofit Measure**	**State of Repair**	**Resilience Only**	**Light**	**Medium**	**Deep**
Utility Reduction and Environmental Impact	Utility Cost Savings	Lighting	Common Area, Corridor and Stairwell	New tamper-resistant LED fixtures and lamp replacements. Provide occupancy sensor at garbage chute rooms on each floor			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Lighting	Exterior	New exterior LED wall pack fixtures and light standards c/w lamp replacements on daylight sensor control			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Lighting	In-suite	New LED fixtures and lamp replacements in suites				X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Lighting	Exit Signs	Green LED running man exit signs and and lamp replacements			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Lighting	Parking Garage	New tamper-resistant LED fixtures and lamp replacements c/w occupancy sensors over non-drive aisle locations			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Plumbing	In-suite	Low-flow aerators on kitchen (5.7 Lpm) and washroom (1.9 Lpm) faucets			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Plumbing	In-suite	Low-flow toilets (3.0 Lpf) and showerheads (1.9 Lpm)			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Plumbing	Booster Pump	New variable speed, duplex booster pump serves domestic water.				X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Operations	Building Automation Sysems	Replacement centralized Building Automation System (BAS) to monitor equipment, allow for remote access if required, provide energy management functionality, and automated operation of the larger pieces of equipment that comprise the central plant for the building.			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Operations	Parking Garage Ventilation on Demand Control	Install CO detection system and replace existing parking garage exhaust fans/dampers. Provide VFDs on fans to reduce exhaust airflow in parking garage			X	X	X
Utility Reduction and Environmental Impact	Utility Cost Savings	Waste	Waste Diversion Room	Refit room on ground floor for recycling / green waste: Provide floor drain and connect to sanitary; extend ground floor sprinkler system; provide occupancy sensor for lighting.			X	X	X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Heating and Domestic Hot Water	Heating and Domestic Hot Water Plants	Replace heating and DHW boilers with high efficiency units of comparable size			X	X	
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Heating and Domestic Hot Water	Heating and Domestic Hot Water Plants	Replace four heating and three DHW boilers with central heating high-efficiency heat pump plant.					X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Heating and Domestic Hot Water	In-Suite Heating Equipment and Controls	New low-temperature radiators connected to existing piping					X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable	Heating and Domestic Hot Water	In-Suite Heating Equipment and Controls	New in-suite thermostatic controls		X		X	X

Measures Primary Motivation	Measures Motivation	Measures Area	Measures Area	Measures Retrofit Measure	Scenarios State of Repair	Scenarios Resilience Only	Scenarios Light	Scenarios Medium	Scenarios Deep
	Indoor Environments								
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Heating and Domestic Hot Water	Solar Water Pre-Heating	Solar pre-heating including water piping, solar tube array, PV panels.					X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Envelope	Windows and Balcony Doors	Re-seal exterior windows and balcony doors			X		
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Envelope	Windows and Balcony Doors	Exterior window and balcony door replacement with high performance double glazed units c/w operable awning lites.				X	X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Envelope	Building Envelope and Balconies	Provide mineral wool EIFS overcladding system					X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Envelope	Building Envelope and Balconies	Insulate balcony slabs and wrap with new cladding. Provide new balcony guardrails and dividers.					X
Utility Reduction and Environmental Impact	GHG Reduction / Healthier and More Comfortable Indoor Environments	Envelope	Roof	Provide new insulated inverted roof assembly					X
Utility Reduction and Environmental Impact	GHG Reduction / Indoor Air Quality	Ventilation and Cooling	Distribution Cleaning	Ventilation system cleaning			X	X	
Utility Reduction and Environmental Impact	GHG Reduction / Indoor Air Quality	Ventilation and Cooling	Air Handling Unit Replacement	Replace existing make-up air units with new units c/w heat recovery. Modify rooftop ductwork to accommodate new MUA units as well as provide ductwork to implement large scale exhaust energy/heat recovery of existing centralized exhaust fans			X	X	X
Utility Reduction and Environmental Impact	GHG Reduction / Indoor Air Quality	Ventilation and Cooling	Passive Cooling	New ceiling fans in each suite (1 per suite)		X		X	X
Utility Reduction and Environmental Impact	GHG Reduction / Indoor Air Quality	Ventilation and Cooling	Passive Cooling	Interior manually operated roller shades		X		X	
Utility Reduction and Environmental Impact	GHG Reduction / Indoor Air Quality	Ventilation and Cooling	Passive Cooling	External roller blinds installed at each window					X
Resilience and Social Inclusion	Inclusivity, Circulation and Accessibility	Accessibility	Common Areas	Lobby and common areas receive: New drop ceilings; flooring; new interior glazed doors; new shopfront and vestibule glazing and entry doors c/w operators. Include new universal washroom at ground floor.		X			X
Resilience and Social Inclusion	Inclusivity, Circulation and Accessibility	Accessibility	Circulation	Provide standard modernization upgrade to all existing cabs.		X			X
Resilience and Social Inclusion	Inclusivity, Circulation	Circulation	Circulation	Elevator System Modernization		X			X

Measures Primary Motivation	Measures Motivation	Measures Area	Measures Area	Measures Retrofit Measure	Scenarios State of Repair	Scenarios Resilience Only	Scenarios Light	Scenarios Medium	Scenarios Deep
	and Accessibility								
Resilience and Social Inclusion	Inclusivity, Circulation and Accessibility	Open Space	Open Space	Provide curb cuts, upgrade pedestrian surfaces, new planting beds and trees, and new seating.		X			X
Resilience and Social Inclusion	Life Safety	Life Safety	Life Safety	Provide new sprinklers throughout building		X		X	X
Resilience and Social Inclusion	State of Repair	Grounds and Site	Grounds and Site	Repair and provide new membrane on parking garage rof slab and replace landscape and drive aisle surfaces above.	X				
Resilience and Social Inclusion	State of Repair	Envelope	Envelope	Balcony Guardrail Replacement		X		X	
Resilience and Social Inclusion	State of Repair	Envelope	Envelope	Balcony slab patch and repair				X	
Resilience and Social Inclusion	State of Repair	Envelope	Envelope	Masonry Repair		X		X	
Resilience and Social Inclusion	State of Repair	Heating and Domestic Hot Water	Heating and Domestic Hot Water	Distribution Riser Replacement / Repair	X				
Resilience and Social Inclusion	State of Repair	Ventilation and Cooling	Ventilation and Cooling	Distribution System Replacement / Repair	X				
Resilience and Social Inclusion	State of Repair	Plumbing	Plumbing	Plumbing and Sanitary Stack Replacement / Repair	X				
Resilience and Social Inclusion	State of Repair	Electrical Systems	Electrical Systems	Equipment Replacement	X				
Resilience and Social Inclusion	State of Repair	Electrical Systems	Electrical Systems	Distribution Replacement	X				
Resilience and Social Inclusion	State of Repair	Electrical Systems	Electrical Systems	Replace emergency natural gas generator with larger unit c/w back-up power capacity (sufficient to power domestic water booster pumps / ground floor amenity areas / two elevators for up to 72 hours).		X		X	X
Resilience and Social Inclusion	State of Repair	Waste	Waste	Garbage Chute Repairs / Upgrades		X		X	X
Resilience and Social Inclusion	State of Repair	Life Safety	Life Safety	Fire Alarm System Upgrade to fully addressable system.		X		X	X
Average Cost Per Unit					$24,000	$21,500	$15,500	$50,000	$83,000

Credit: Tower Renewal Partnership and ERA Architects