

**Socio-Economic Analysis:
Value of Toronto Community Housing's
10-Year Capital Investment Plan and
Revitalization**

Research Report
March 2015



**CANADIAN CENTRE FOR
ECONOMIC ANALYSIS**

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About This Report

In keeping with the Canadian Centre for Economic Analysis's guidelines for funded research, the design and method of research, as well as the content of this study, were determined solely by the Centre.

Statistics Canada, City of Toronto, Toronto Community Housing (TCHC) data and relevant peer reviewed literature was used to inform the computer simulation models used to produce the results of this report. All quantitative methods used are documented herewith.

The interpretation and reporting of the results of the analysis contained in this report do not necessarily represent the policy position or the opinion of the TCHC or any other acknowledged contributor.

Forecasts and research often involve numerous assumptions and data sources, and are subject to inherent risks and uncertainties. This information is not intended as specific investment, accounting, legal, or tax advice.

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EXECUTIVE SUMMARY

Affordable, well-maintained housing is a cornerstone of economic and social prosperity. Social housing provides a stable foundation that allows residents to participate in their communities, creates and expands opportunities, and promotes better health, social and economic outcomes. Toronto Community Housing (TCHC) provides 61 per cent of the city's social housing stock. It houses approximately 109,000 individuals—including 30,000 children and youth—in 59,700 homes located in neighbourhoods throughout the city. Currently, over 90 per cent of TCHC's homes are subsidized; this allows low-income households that cannot afford housing in the private rental market housing to pay rent to TCHC that is geared to household income.

The number of households waiting to access subsidized housing has recently surpassed 90,000. While demand for housing continues to grow, the supply represented by TCHC's portfolio of buildings faces increasing strain. On average, TCHC's buildings are more than 40 years old, and the majority of these buildings are reaching the end of their useful lives. Without major repairs over the next decade, by 2023 most of TCHC's buildings will fail to meet basic standards of decent housing.

Today, only 64 per cent of TCHC's portfolio is in good or fair condition, with an additional 35 per cent in poor condition and 1 per cent in critical condition. Without an investment in repairing these homes, by 2023, TCHC can expect 91 per cent of its units to be in poor or critical condition, or to have been closed as they reach an unsafe state of disrepair.

The effects of this increasing need for capital repair will extend beyond the buildings themselves, and even beyond the residents of these homes. These effects will be felt by the wider community in a number of ways, including through increased pressures on the healthcare system created as the health of residents is impacted by worsening conditions; increased costs in terms of the energy needed to operate buildings in poor repair; and decreased rental incomes in neighbourhoods with growing numbers of boarded up homes.

Toronto Community Housing has developed a plan to fix its buildings. Through its Revitalization program, TCHC is leveraging the value of the land in many of its communities to offset the cost of replacing and renewing the homes in those communities. With approximately \$5 billion in projects currently underway through this program, TCHC and its private sector development partners are addressing the capital needs of approximately 10 to 12 per cent of its portfolio where market conditions are conducive to TCHC's approach to community Revitalization.

To address the repair needs of the remaining 90 per cent of the portfolio, TCHC and the City of Toronto have developed the 10-Year Capital Financing Plan. Through an investment of \$2.6 billion, split between all three orders of government, the repairs needed to preserve this infrastructure can be made. TCHC and the City of Toronto have secured just over one-third of the funds needed to carry out these repairs. TCHC and the City of Toronto are now requesting that the provincial and federal governments each provide \$864 million, as outlined in the 10-Year Capital Financing Plan.

ANALYSIS OF THE IMPACT OF INVESTMENT

TCHC retained the Canadian Centre for Economic Analysis (the Centre) to analyze the full value of the investments in its portfolio to residents of the city of Toronto, as well as the municipal, provincial, and federal governments.

Traditional economic analysis of an investment often measures a limited set of outcomes for a limited number of affected parties. While these analyses often identify economic effects of investment, such as changes in GDP or tax revenues, they frequently miss impacts in other areas, such as health outcomes or criminal activity. As these are areas where the impacts of social housing are also pronounced, it is important that any analysis of the impacts of investing in social housing capital extends to measuring these areas as well. Beyond the initial impacts of these investments, a holistic economic analysis should incorporate the widespread, reverberating impacts that a single event, such as the decision to invest or not to invest in capital, generates throughout the system of the economy and the society from which it emerges.

These are the particular strengths of the agent-based modeling that is used in this analysis. The methodology employed reconstructs the economy and the entities that comprise it from a micro level. The model tracks individual agent behaviours and choices in response to stimuli, relative to evidence-based heuristic programming. As the agent-based modeling platform tracks individual agent behaviours, it creates a robust model by also linking demographic, financial, and geographic data, among others. This allows it to produce interconnected outcomes, including for economics, health, financial processes, and issues of social welfare. This approach can track individual agents while identifying aggregate effects, as agents interact with their environments and respond to interventions in ways that are rational and probabilistically driven, based on previous behaviours and existing observations. The results produced are multiple iterations of high-resolution projections, which when observed in tandem, provide patterns that depict possible futures likely to result from actions taken today.

KEY FINDINGS: THE REWARD SCENARIO

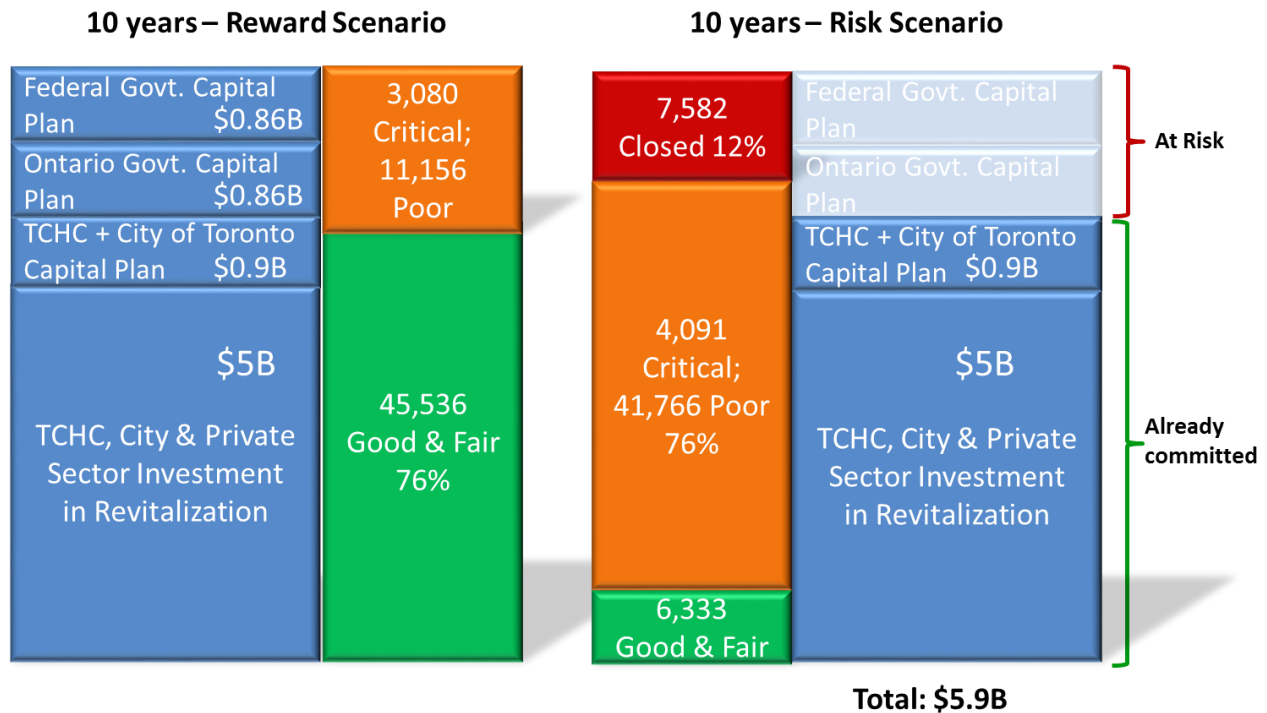
The reward scenario is characterized by the full investment in Revitalization and the capital plan by TCHC and all orders of government; the full rewards of the investment are discussed. As a first step, the Centre analyzed the impact of both the \$5 billion investment represented by the current Revitalization projects, as well as the full capital repair investment laid out in TCHC's 10-Year Capital Financing Plan. This scenario assumes that TCHC and the municipal, provincial and federal governments each provide investment support equivalent to one-third of the \$2.6 billion plan, enabling all needed repairs to be completed. The results show significant benefits from the investment for TCHC, the City of Toronto, the province of Ontario, and the country as a whole.

Housing Conditions

With full funding for the capital repair plan, TCHC will be able to return its portfolio to an industry-standard acceptable Facility Condition Index (FCI) of under 10 per cent. Through this investment, TCHC

will avoid needing to close a projected 21,739 units over the next ten years, and 28,151 units by 2043, which are expected to reach unsafe levels of disrepair. Instead, with full funding, TCHC will have 76 per cent of its homes in good or fair condition, with only 24 per cent in poor or critical condition in ten years. By comparison, in the absence of any investment in repair, over 90 per cent of these units would either be in poor or critical condition, or closed over the same period.

Figure 1 Housing Conditions in 10 Years



Economic Impacts

As a result of the Revitalization and capital repair programs, the Canadian economy can expect the creation of an additional \$18 billion in GDP over the course of thirty years, with 68 per cent of this effect occurring within the 10 years of the capital plan. This increase in aggregate income is expected to generate an additional 220,000 employment years as new jobs are created to support these projects, with 35 per cent of the employment impact remaining after the capital repair and Revitalization programs are complete. Furthermore, as this additional economic activity will generate opportunities for financial profit for industry, this investment can be expected to attract roughly \$5 billion in private capital investment. As a result of the total capital investment, the provincial and federal governments will collectively benefit from an additional \$4.5 billion dollars in tax revenue, nearly three times their initial contribution of \$1.7 billion. In fact, approximately \$3.5 billion of this tax revenue is already projected to be created as a result of investments for which TCHC has already secured funding. The \$1.7 billion that TCHC is seeking to complete funding represents an re-investment of less than half of the benefit already obtained through the portion of the plan funded to date, an investment which will itself generate an additional \$1 billion in tax revenue between the two levels of government.

Health Impacts

As noted above, through these repair programs, TCHC will be able to offer over eight times as many units in good or fair condition to current and prospective residents than it could without investment. This will have a significant impact on the wider community, as better condition housing will prevent over 544,000 instances of resident illnesses. This is expected to reduce the healthcare system use by roughly 2.1 million visits, 82 per cent of which represent visits to general practitioners, thereby reducing the wait times faced by other potential patients. This will also reduce healthcare costs by \$3.8 billion dollars, representing another source of savings for government.

Energy/Environmental Impacts

As capital repairs are made across the portfolio, the investments in higher quality homes will also result in better energy efficiency, leading to lower costs and a lower profile of greenhouse gas emissions. Through these investments it is predicted that TCHC will see an approximate 10 per cent reduction in average utility costs per unit, an area which represents a significant share of operating expenses. The improved energy efficiency will also contribute to a reduction in greenhouse gas (GHG) emissions, with average annual GHG emissions falling by approximately 390 kg per unit.

Social Impacts

Toronto Community Housing’s homes are present in neighbourhoods across Toronto and the condition of these homes has a significant impact on rental incomes and community life across the city. As neighbourhoods consisting of dwellings in good repair are less conducive to value depression and criminal activity, a full investment in the capital repair and Revitalization programs is expected to provide a \$13.6 billion increase in neighbourhood wealth across Toronto. This includes the cost savings resulting from a 15 per cent decrease in crime in these communities.

Table 1 Rewards of Investment in Capital Repair and Revitalization

Prosperity Metrics		Summary of Impacts of Investment: Reward Scenario	
Economic Impacts	Investment evaluated	\$5B Revitalization and \$2.6B capital repair	TCHC, development partners, and City of Toronto invest \$5.9B and Ontario and Federal governments invest \$1.73B collectively
	GDP contribution	\$18.5B more for Canada	68 per cent occurs within first 10 years. \$12.6B of the increased GDP is in the GTHA, of which \$8.3B is in the City of Toronto. 2014 real terms.
	Employment years	220,000 more for Canada and Ontario	108,000 for GTHA of which 40,000 are in the city of Toronto. 64 per cent occur within the first 10 years.
	Private capital	\$5B more for Canada	91 per cent located in GTHA with 88 per

	investment	and Ontario	cent occurring within first 10 years. 62 per cent benefiting industries other than construction. 2014 real terms.
	Ontario and Federal taxation revenues	\$4.5B more	\$2.3B Ontario government (44 per cent income taxes, 56% consumption/production taxes); \$2.2B Federal government (73 per cent income taxes; 27% consumption/production taxes). 2014 real terms.
Community, Health, and Energy Impacts	Condition of TCHC dwellings	28,151 closures avoided. 76 per cent of units in good and fair condition.	Impact upon 109,000 TCH residents of which 30,000 include children and youth.
	TCHC resident illness	544,000 less cases	Annual average of 18,100 fewer cases over 30 years 48 per cent due to respiratory and mental health conditions.
	Healthcare utilization	2,100,000 less health care cases	82 per cent general practitioner visits
	Healthcare costs	\$3.8B less	94 per cent due to fewer hospitalizations
	Greenhouse gas emissions	9 per cent lower	Yearly GHG emissions fall by over 390 kg per unit on average
	Social Assistance	Up to \$6.8B less	Up to approximately \$756M saved in the first 10 years
	Neighbourhood crime	15 per cent lower	An annual average of 127 crimes avoided per year over 30 years
	Neighbourhood rental income	\$4.27B more	Indicating strengthened neighbourhood profitability

KEY FINDINGS: THE RISK SCENARIO

A second analysis was done to examine the impact of the federal and provincial governments failing to invest their one-third shares required by the 10-year capital financing plan.

This scenario, the "Risk" scenario, examines the implications of the provincial and federal governments not participating in the capital plan investment. With the existing commitment of TCHC and the City of Toronto, some of the benefits of the investment in capital repairs will still accrue; however, the funds

allocated to the projects will fall \$1.7 billion short of what is necessary to generate the anticipated economic, social, and health effects listed above.

Housing Conditions

With only one-third of the needed \$2.6 billion, TCHC will be able to fund a portion of the necessary capital repairs; it will be left with a portfolio with over 7 times fewer units in good and fair conditions than it would have had otherwise. Under this scenario, 76 per cent of TCHC homes will be in poor or critical condition by 2023, and just over 7,500 homes will have been closed as they reach unsafe levels of disrepair. Only 10 per cent of the portfolio will be in good or fair condition, and the risk of full-building closures due to critical component failures will continue to climb.

Economic Impacts

Without the contribution of the provincial and federal governments, \$4.2 billion of the increase in GDP will be lost. In addition, this will reduce job creation by 62,700 employment years, or roughly 2,000 jobs each year over thirty years. The effects of this, in terms of diminished opportunities for private industry, will also reduce private capital investment by \$225 million below that which would be possible with tripartite participation. In addition, while the provincial and federal governments would save a joint \$1.7 billion by not participating in the 10-Year Capital Financing Plan, they will also lose approximately \$1 billion in taxation revenue alone, nearly eliminating the savings even before accounting for the economic, health and social impacts below.

Health Impacts

The relatively poorer housing quality will lead to an additional 312,000 instances of resident illness, leading to 1.1 million additional cases in which the healthcare system must be accessed, adding to wait times for others in need. In total, Canadians can expect to pay an additional \$1.55 billion in preventable healthcare costs alone over the next thirty years if the provincial and federal governments fail to provide their portion of the needed investment.

Energy/Environmental Impacts

Without the funding to repair the entire portfolio, TCHC will face 11 per cent more in average annual energy costs per unit in order to power and heat its less efficient units, representing an additional average energy cost of over \$240 per unit annually. This will cause a 10 per cent increase in GHG emissions, amounting to an average of over 390kg per unit per year.

Community and Social Impacts

As an increasing number of homes reach critical FCI levels, surrounding neighbourhoods will see lower levels of community wealth, as market rental incomes are impacted by building conditions. This will represent an approximate \$5.7 billion reduction in community wealth in neighbourhoods throughout Toronto. Additionally, as over 7,500 units in TCH's portfolio will face closure, there is expected to be a significant increase in the number of individuals experiencing homelessness in Toronto. Beyond these

impacts, most of the crime reductions expected to result from capital investments above will be lost, with a 10.5 per cent increase in crime linked to worsening building conditions.

Table 2 Losses Without Provincial and Federal Funding

Prosperity Metrics		Impact of Revitalization, and TCHC and City capital funding only: Relative to Baseline of No Investment	Losses Relative to Full Capital Plan and Revitalization Investment
Economic Impacts	Investment evaluated	\$5.9B City & TCH investment only	\$1.7B less Ontario/Federal government
	GDP contribution	\$14.3B for Canada and Ontario	\$4.2B less GDP
	Employment years	158,000 for Canada and Ontario	62,700 less
	Private capital investment	\$4.8B for Canada and Ontario	\$225M less
	Ontario and Federal taxation revenues	\$3.5B	\$1B less
Community, Health, and Energy Impacts	Condition of TCH dwellings	14,100 closures avoided. 70 per cent of units in critical or poor condition.	7,500 more closures 31,600 more units in critical & poor condition
	TCH resident illness	232,000 fewer cases	312,000 more cases
	Healthcare utilization	1,000,000 fewer health care cases	1,100,000 more
	Healthcare costs	\$2.3B less	\$1.55B more
	Greenhouse gas emissions	1 per cent higher	10 per cent higher
	Community wealth	\$7.9B more	\$5.7B less
	Neighbourhood crime	4.5 per cent lower	10.5 per cent more

CONCLUSIONS

As should be clear from the above, the full effects of the investment in capital repairs to Toronto Community Housing’s infrastructure extend beyond purely economic benefits to health, social, and

community benefits that have significant impacts on all orders of government and residents across the city. A failure to pursue necessary capital investments today will translate not only in benefits forgone, but also risks incurred. Using an agent-based model, this report illustrates that a failure to support TCHC's capital repair plan will have wide-reaching and varied consequences.

This analysis also demonstrates that by failing to invest in necessary repairs, the provincial and federal governments are failing to best serve themselves and their own stakeholders. The provincial and federal governments are significant beneficiaries of the program. Although they will experience some of the benefits of TCHC's investment in capital repairs and the Revitalization program regardless of whether they participate in the investment, the additional costs to each of them stemming from that inaction outweigh the total \$1.7 billion in support requested many times over. By providing support equivalent to \$864 million each, the federal and provincial governments can contribute to building a strong and prosperous economy while also reducing the health care, justice, and social spending cost pressures they face for decades to come.

With the support of all orders of government, Toronto Community Housing can repair the homes upon which their residents rely, while creating benefits that will be felt across the city, the province, and the entire country.

1.0 INTRODUCTION AND BACKGROUND

1.1 ABOUT TCHC

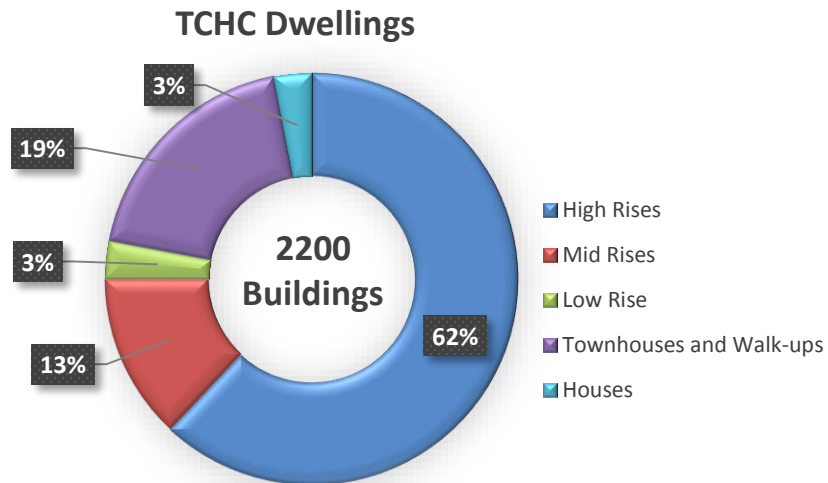
Toronto Community Housing (TCHC), the largest social housing landlord in Canada and second largest in North America, provides housing to 59,700 households. These dwellings house over 109,000 residents, including 30,000 youth and children, and 20,000 seniors. Residents have diverse backgrounds, representing a range of ethnicities, ages, sexes, physical abilities, and races. TCHC's residents also include low income earners, seniors, newcomers to Canada and single parents. TCHC aims to provide these individuals with access to clean, affordable homes that are safe and well-maintained.

The City of Toronto acts as the Service Manager and Program Administrator for social housing providers across Toronto, and is the sole shareholder of TCHC. The objectives, principles and accountability requirements of TCHC are outlined in the Shareholder Direction, a policy linking the City of Toronto to TCHC.

TCHC continuously invests in its resident community and views improving opportunities for this population as a key objective of the organization. The average income among TCHC households is approximately \$14,000, well below the Toronto median of \$58,000 (Toronto Community Housing, 2013). Without TCHC, these low and moderate income residents would be forced to devote significantly more than 30 per cent of their income to housing, above the level considered to be affordable (Canada Mortgage and Housing Corporation, 2015). This would leave them with little income left to access services and opportunities, a situation that could further contribute to and entrench the income divide within the city (Housing Connections, 2013).

TCHC's portfolio currently includes more than 2,200 buildings in more than 350 communities across Toronto. The breakdown of the dwellings are shown in Figure 2.

Figure 2 Breakdown of TCHC Dwellings



Of its portfolio, 90 per cent of the dwellings are designated as rent-geared-to income (RGI) units, with the remaining 10 per cent designated as market units (Toronto Community Housing, 2013). In RGI units, tenants pay a monthly rent set at 30 per cent of their gross income. By providing RGI units, TCHC ensures that residents are left with enough income to purchase other necessities of life, such as food.

The City of Toronto’s local access regulations protect a number of disadvantaged groups by ensuring that one in seven RGI units that become available will be offered to members of these populations. In particular, this group comprises individuals experiencing homelessness, separated families, new immigrants experiencing homelessness, and youth aged 16 and 17 who require a home (Housing Connections, 2013). Over 95 per cent of these units are usually assigned to homeless households.

Prior to the mid-1990s, the federal government was responsible for the provision of social housing. However, under pressure to address a growing deficit, the federal government decided to reduce its involvement in social housing creation and delivery (Zon, Molson, & Oschinski, 2014). It began with a series of devolution agreements in the 1990s with most provinces in order to transfer control and management of social housing. In Ontario, the passage of *The Social Housing Funding Act* in 1997 gave the province the power to charge municipalities for the costs of social housing (Social Housing Services Corporation, 2008). In late 2000, Bill 128, known as *The Social Housing Reform Act*, was passed in Ontario. This bill required municipalities to assume full responsibility for the funding and administration of social housing programs. This act represented the full devolution of social housing down to the municipal level in Ontario. In January 2002, TCHC was created by the City of Toronto, and was conferred the responsibility of managing social housing in Toronto. Funding from Queen’s Park and Ottawa, which is needed to maintain social housing, has been declining since the transfer of social housing to municipalities. This is not an issue that is isolated to Ontario, however; these trends are pervasive across Canada.

As a result of a lack of funding for capital, TCHC faces a funding gap that it cannot resolve alone. Most of the 2,200 buildings inherited by TCHC are 40 to 50 years old, with more than a thousand of these buildings aged over 50 years (Toronto Community Housing, 2014). This has resulted in a severe degradation of buildings within TCHC’s portfolio. TCHC measures the current conditions of their buildings using a Facility Condition Index (FCI). The FCI is an asset management tool that is used within the industry to measure a constructed asset’s condition at a specific point in time (BC Housing, 2011). The FCI for a building is obtained by dividing the value of the repairs needed to the asset by the total value of the asset to arrive at a percentage. The following table provides a summary of FCI levels and the corresponding asset condition categories.

Table 3 Facility Condition Index Levels

Facility Condition Index Level	Asset Condition
0-5 per cent	Asset is in good condition
6 per cent – 10 per cent	Asset is in fair condition
11 per cent – 30 per cent	Asset is in poor condition
31 per cent +	Asset is in critical condition

Currently, approximately 37 per cent of TCHC buildings are considered to be in poor or critical condition. Some of the daily problems facing TCHC residents in these buildings include holes in walls, damaged bathrooms, failing boilers, leaking roofs, and missing interior doors. For residents, living in these buildings means that they are at increased risk of health problems. These health conditions include asthma, depression, and cardiovascular illnesses (see Appendix B). Furthermore, without repair, the FCI levels of the buildings will increase further, and will likely experience the following:

- Increased risk of component failure
- Increased facility maintenance and operating costs
- Greater negative impacts to staff and residents

Current TCHC funding is not sustainable. If the status quo continues and buildings that are currently in critical condition are not repaired, a large number of them will necessitate closure over the near term. These closures will impact residents who will need to find alternate places to live which, given their circumstances, will be no trivial task. In fact, it is safe to assume that at least a proportion of these residents will be forced into homelessness as a result of these closures, exposing them to the health risks that are associated with homelessness.

Capital Repairs

In order to address growing repair needs and maintain its housing stock, TCHC will need to invest \$2.6 billion in capital repairs over the next 10 years. As such, TCHC has put forward a 10-year Capital Financing Plan that has been developed in partnership with their shareholder, the City of Toronto (Toronto Community Housing, 2013). Together, TCHC and the City of Toronto have secured over \$900 million of the funds needed through various activities including the sale of single-family homes and the remortgaging of properties. Through their *Close the Housing Gap* campaign, TCHC and the City of Toronto are attempting to secure the remaining funds. (City of Toronto, 2015). As part of this campaign, TCHC is calling upon the provincial and federal governments to return to funding social housing, and to provide the remaining funds needed to make the necessary repairs. Both the federal and provincial governments are each asked to invest \$864 million over the next 7 years. The total investment of \$2.6 billion will go towards repairing the social housing stock in TCHC, which would ensure that living conditions are adequate for residents.

Community Revitalization

TCHC has already begun improving conditions to some of its existing properties through its Revitalization program. Current Revitalization projects are expected to impact approximately 10 per cent of TCHC's portfolio across Toronto. TCHC expects to leverage over \$5 billion, funded primarily through the sale of market units in these communities, for Revitalization over the next 20 years. To date, over \$1.3 billion has already been invested.

Through Revitalization, TCHC is partnering with private-sector developers to leverage the value of their land to offset the cost of replacing or repairing their existing buildings, a form of public-private partnership (P3). A P3 generally refers to an arrangement of variable duration whereby the responsibilities and services of the public sector are provided by a private firm with a clear agreement on the shared risks and rewards of the project (World Bank Group, 2014). Some of the benefits of P3s are introducing innovation and operational efficiency to improve the public service, supplementing limited public sector resources in order to meet growing demand, increasing value added through appropriate risk transfer, and increasing competition for the health of the respective industry. Through these particular partnerships, TCHC has been able to benefit from the expertise of private developers, learning about their processes, decisions and cost-saving strategies. TCHC also benefits from the resources of private developers, allowing TCHC to maintain a relatively small development team. In addition, TCHC is able to reduce the cost of construction through the economies of scale that private developers are able to achieve. Each partnership opportunity is distributed in a Request for Proposal (RFP) process in which developers compete in an open bidding process. To date, TCHC has worked with five major developers: Context Development, The Daniels Corporation, DiamondCorp, Metropia, and Tridel.

The Revitalization investment is not limited to the replacement of RGI units. The expenditures also cover other investments into the community environment, led by both TCHC and developers, including:

- Scholarships,
- Local economic development,

- Infrastructure, such as storm water drains and sewers, and
- Recreational facilities and amenities, such as parks.

TCHC projects and partnerships have had a significant impact on residents and neighborhoods. By developing high-quality, mixed-income neighborhoods, TCHC is working to remove the negative stigmas associated with neighborhoods consisting solely of social housing and to renew communities in the process. While these projects are still in the early stages, part of this has been accomplished by ensuring a high quality of design and construction throughout both the market condos and social housing units. Another way this is accomplished is through improvements in the built environment. The principles of Crime Prevention Through Environmental Design (CPTED) have been incorporated into the planning process and considered when designing buildings, public spaces, lighting, and the development of parks and community centres (Toronto Community Housing Corporation, 2012). This has led to a significant increase in perceptions of safety among residents of Regent Park (Smith, 2013), and is expected to reduce crime rates (Charron, 2009).

Additionally, interviews with developers revealed that another significant way that TCHC positively impacts its communities through Revitalization is by approaching the development projects not solely with financial outcomes in mind, but also with an eye to social development outcomes for the community. TCHC actively works to ensure that their concerns and priorities are heard in a number of ways. Residents are present in committees involved in the RFP process required to select developers and during the unit design process for new buildings. TCHC also seeks to ensure that all proposals involve scholarships and job opportunities for residents.

When a TCHC project is under construction, it is also not uncommon for infrastructure improvements to roads and water systems to take place simultaneously—projects that may not have otherwise been a priority for several years. As well, Revitalization has led to additional investments in the form of new or improved amenities such as schools, parks, and community facilities in the neighbourhoods. These investments are expected to continue with future Revitalization projects. Finally, through a commitment to design by both TCHC and its developer partners, residents are benefitting from the creation of high-quality housing. Some of the buildings being developed have been ranked as the best designed buildings in the city, and have won numerous design awards (Toronto Community Housing Corporation, 2015). Improvements to building structures and utilities also aim to make the homes more energy efficient, representing a benefit to both the city and the residents.

The city of Toronto has already begun to witness the benefits of the Revitalization that has already taken place. Residents living within revitalized communities have experienced improvements to their neighbourhoods and increased opportunities. It is expected that future Revitalization and capital repair efforts will further augment these benefits.

1.2 STUDY OBJECTIVE

TCHC is a key provider of housing to over 100,000 Toronto residents. The Revitalization program already underway has begun to show promising progress in places like Regent Park towards the development of

stronger and more vibrant communities. TCHC has also developed a plan to improve the condition of its portfolio through its 10-year Capital Financing Plan, having already secured financial support from the municipal government. However, the approximate \$900 million that the City and TCHC have raised is not enough to make the needed repairs. Without additional funding, there will be insufficient funds to address TCHC's capital repair needs. Given this reality, the *Close the Housing Gap* (City of Toronto, 2015) campaign aims to persuade the federal and provincial governments to provide respective contributions of \$864 million for a total of \$2.6 billion (including contributions from TCHC and the City of Toronto), which would form the tripartite investment needed to address TCHC's full capital repair need.

As part of this campaign, TCHC has retained the Centre to undertake a socio-economic impact study that independently and objectively measures the effects of the implementation of both the 10-year Capital Financing Plan and the community Revitalization program for TCHC, the City of Toronto, and the province of Ontario. This study identifies the potential returns on investment in relation to the costs for multiple stakeholders, and examines these relative to the anticipated outcomes if the investment is not made.

The study requires a realistic analysis of actual and projected direct, indirect, and induced effects of the investment. This is conducted through agent-based modeling, explained in further detail in Section 2.0. The agent-based models are consistent with economic theory, while also allowing for the tracing of effects in fine detail. Furthermore, they incorporate the local characteristics of Toronto, the GTHA, Ontario and Canada, allowing for contextualized analysis. To adequately discern and interpret these effects, these models are deployed to illustrate the actual and projected economic impacts over the 30-year period from 2014-2043 of two scenarios: the 'Reward' scenario – the proposed tripartite investment of \$2.6 billion along with the Revitalization, and the 'Risk' scenario – the City and TCHC's investment of close to \$900 million along with \$5 billion in Revitalization efforts, and compare these two scenarios against the impacts anticipated to result from no further investment in repairs.

2.0 APPROACH TO THE ANALYSIS

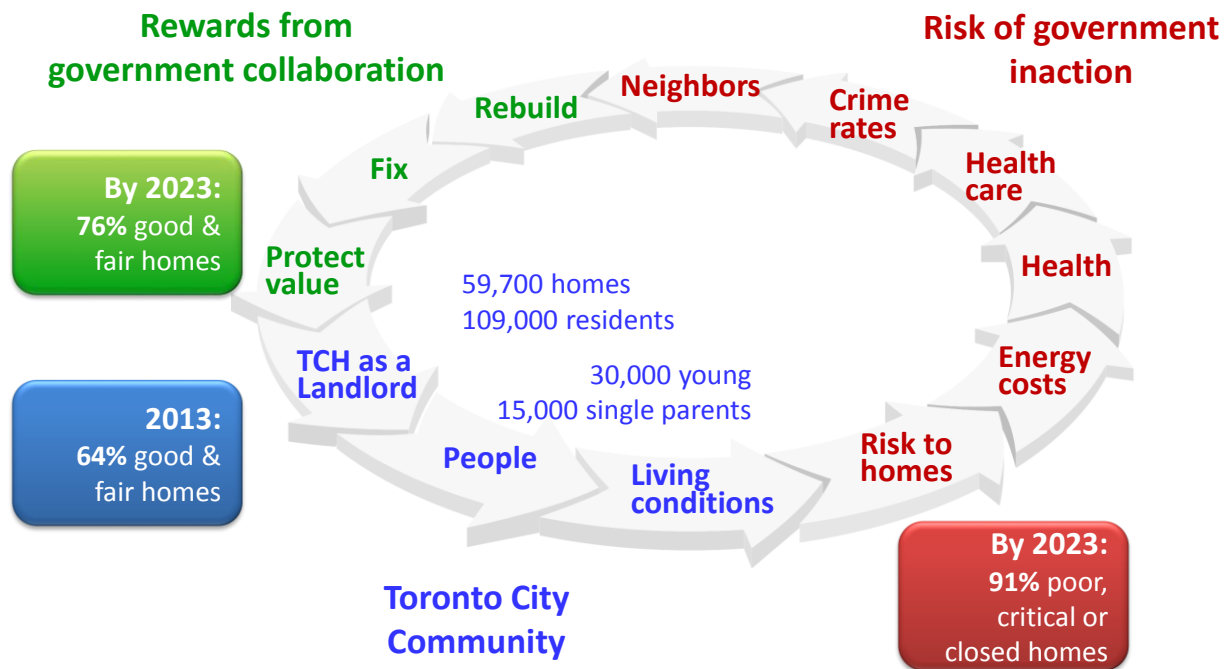
2.1 CONCEPTUAL FRAMEWORK

Traditional economic metrics of performance such as GDP and employment rates are taken as indicators of the health of an economy and of a city. While it is important to acknowledge and consider these metrics, they do not always capture the totality of a region's prosperity and well-being as there are many more factors that impact the welfare of a city's residents. Not only are health and social implications of an investment important on their own, they often also translate into financial risks and benefits to a variety of stakeholders, including the government. These cost impacts must also be considered when determining the value of the investment in capital repairs.

However, even if this multitude of factors is measured and assessed, the analysis stops short of reality if it fails to consider the interconnectedness between them. In actuality, a city does not emerge with pre-determined characteristics that unfold independently; rather, it is a system of these characteristics linked by the relationships amongst them. For instance, characteristics such as crime rates, health outcomes, and incomes are closely interrelated, such that the effect of an investment decision on the economy can be expected to impact one of those factors and will permeate throughout the system, impacting all other factors over time. Appreciating this system effect is paramount particularly when assessing the impacts of an economic event or investment, such as the proposed capital investment program initiated by TCHC.

Figure 3 demonstrates the links associated with the investments in TCHC housing. With a simulation beginning in 2014, the cycle of relationships associated with the potential investment and the potential risks of the absence of provincial and federal participation are displayed in the diagram that follows.

Figure 3 Systems Approach to understanding TCHC Value: 30 Year Simulation



To understand the system effects of investment into TCHC housing is to understand how these cycle of events are linked to TCHC housing. TCHC is the largest provider of social housing in Canada (Shenassa, Daskalakis, Liebhaber, & Braubach, 2007) and is situated in Toronto, a city which is often considered to be a financial hub for the country. The tenants that are served by TCHC are significant in number and the potential impacts of decreased access to affordable and habitable housing are readily imagined. Although a large population of tenants is affected, investment evaluation cannot be made based solely upon the impacts on TCHC tenants, as impacts are anticipated to reverberate throughout the city and across the province. To facilitate informed decision-making, the outcomes of each choice must first be accurately and wholly measured (including their respective wide-reaching system effects) and then compared.

2.2 PROSPERITY AT RISK: MODELING AND SIMULATION

A general equilibrium macroeconomic model would suffice if only direct, indirect, and the follow-on induced economic effects of the proposed capital investment program were relevant. However, the system effects transcend the induced effects because they include the analysis of variables that are not traditionally examined under the economic lens, such as health and other social outcomes. Furthermore, the approach captures non-financial events that translate into financial outcomes, which must all be reconciled in order to construct and simulate a cohesive system.

In order to simultaneously account for many of the social, health, and economic impacts generated as a result of the investment into TCHC capital repairs, agent-based modeling is employed. This method is preferred for the following reasons:

- Allows for the use of fewer *a priori* assumptions, relying on evidence-based relationships. For example, agent-based modeling does not require the imposition of equilibrium conditions;
- Micro-level decisions and heuristics give rise to macro-level aggregates and trends that enable a detailed bottom-up approach to value attribution;
- Allows agents to behave and interact based on historical information which in turn creates natural, realistic constraints on possible outcomes as agents compete for scarce resources;
- Agents are accompanied by data and rules regarding how to act on that information, creating adaptability to their environment as their data changes in time;
- Agent-based modeling allows for complete accounting of all flows of people, goods, or money, ensuring that, for example:
 - no financial assets are created without corresponding financial liabilities
 - all consumption is mapped to income sources
 - the demand for and timing of labour is realistically cleared through competitive labour market forces
 - the movement of people between regions is consistently accounted for
- Complex behavior can be modeled through combinatorial analysis and probabilistic rules, without referring to theoretical approximations.

Although agent-based modeling has a series of benefits over various other approaches, it is only as useful as the richness of the agent rules and data allow. In order to reconcile the complexity and variety of possible impacts that emerge from an investment, an agent-based modeling platform called *Prosperity at Risk* (PaR) is used.

PaR is an event-driven, agent-based platform that tracks and simulates over 50 million agents for all of Canada, with data on 1.2 billion attributes for them. Individuals, corporations, organizations, and government entities comprise the agents. Their attributes include demographic data, including all data available through Statistics Canada's databases, and financial data, including balance sheets, among others. Every agent also is modeled with a corresponding set of rational and expected behavioural heuristics that dictate how that agent will interact with other agents in the system as well as non-agent entities, including infrastructure and geographical characteristics. Agents are capable of engaging in a wide variety of processes, ranging from consumption and borrowing to import and export activity. This information is used to construct a simulation that is not limited by the axioms of a single discipline, and which appreciates that macro-level societal outcomes are the aggregate results of the micro-level choices and behaviours of every agent in the system.

Central to PaR's framework is agent-based modeling in the context of systems theory, the notion that all elements of an economy and society are connected to each other and influence one another both directly and indirectly. This occurs through a series of linkages between entities in the system, giving rise to impacts arising from some catalytic investment, for example, that are not immediately obvious. Using PaR's different but interconnected modules, the system impacts of an investment can be accurately ascertained through the linked analysis of health, social, and economic outcomes.

Economic Modules

In highly simplified terms, the economic portion of the model is driven by three constituent components: a Production Model; a Labour Force Model; and an Economic Account Model.

1. The Production Model simulates industries that consume inputs and produce both consumption and intermediate goods as outputs. Industries are able to hire workers, pay wages, or fire them, as needed in order to produce market-determined levels of respective commodities. They are constrained by the productivity of capital and labour, and can invest in capital and financial assets. Total output is driven by consumer demand and informed by consumer demand data from Statistics Canada. GDP is calculated, therefore, by the relationship of inputs and outputs aggregated over all industries.
2. The Labour Force Model follows individual agents as they make decisions related to labour, earn and spend income, consume goods, and comprise populations. Individuals also age over time and are associated with individual attributes regarding health, which are discussed further in the Health Module section to follow.
3. The Economic Account Model incorporates Canada's System of Macroeconomic Accounts, ensuring that aggregate economic activity is consistent with Statistics Canada's information, such that micro-level behaviours comprise and follow realistic aggregates. This information includes financial statements, balance of payments data, input/output information, and data on income and expenditure.

Health Modules

The health modules contain information on over 40 different conditions, including illnesses and external events impacting health, such as injuries arising from vehicular collisions. The population is modeled as being in one of several states relative to each condition, ranging from never having been exposed to having died from that condition. Each health condition is modeled relative to its idiosyncrasies. For instance, infectious diseases are mapped through models that follow a stochastic spread, while injury related to vehicular collisions are probabilistic. PaR is able to recover the incidence and prevalence of various conditions, calibrated to existing literature on the behaviour of each condition relative to individual agent risk factors and characteristics.

Once the incidence and prevalence of the conditions are computed in PaR, these are then mapped to healthcare utilization data for each respective condition, which was obtained from sources including the Canadian Institute for Health Information. Thus health states, utilization rates, and associated costs can be calculated for the entire population of Canada through time, or can be analyzed for a particular subgroup of the population. Because literature uncovered links between poor dwelling conditions and certain health outcomes, for instance, the health outcomes and costs of individuals living in variable dwelling conditions can be identified.

Social Modules

Aside from the participation of agents in the economy and their interactions with the healthcare system, various social outcomes can also be measured through the social applications of the PaR platform. Broadly, literature was used to inform the likelihood of criminal activity relative to dwelling conditions, as well as the associated costs that those crimes would impose on the system. Similarly, social assistance was linked probabilistically to residents of TCHC dwellings on the basis of data obtained from TCHC.

2.3 IMPACT OF THE INFRASTRUCTURE INVESTMENT: EXPERIMENTAL DESIGN

In order to determine the different potential outcomes corresponding to different levels of funding, an experiment featuring multiple futures was designed in PaR. This involves modeling the city as a system of interrelated entities and agents, presenting this system with one of the possible decisions that can be taken, and then measuring the outcomes of that decision decades into the future. In this case, a decision would correspond to a given level of capital funding that is allotted to TCHC's investment into their portfolio's state of repair. This process is repeated for each possible decision that can be taken regarding how much funding is injected into this initiative, including the decision to take no action at all.

The motivation behind taking such a comprehensive approach is two-fold. First, the impacts of any decision often cannot be seen immediately and, especially in the case of the full system effect, must be given ample time to manifest. As a result, the experiment uses investment projections provided by TCHC for the years up to and including 2023, and socio-economically simulates all census regions in the GTHA even further into the future, up to and including 2043. This allows for the induced economic effects and the system effects to be captured. Second, this type of approach ensures that the whole outcome of each decision can be compared while recognizing complete, rather than partial or immediate, costs and benefits. Without these full outcomes, any investment decision would be made under incomplete information.

Therefore, on a broad level, the economic, health, and social effects of the investment in TCHC's capital repairs are based on the following:

- The conditions of units in the TCHC portfolio are deteriorating each year, such that in ten years, 41 per cent of these units will necessitate closure if no investment is made;
- Capital funding of approximately \$900 million has been pledged by the municipal government and TCHC through the 10-Year Capital Financing Plan, along with \$5 billion through the remaining Revitalization initiatives approved to date;
- An additional total of approximately \$1.7 billion has been requested of the provincial and federal governments to fulfil the remaining funding requirements of the 10-Year Capital Financing Plan.

The research questions of interest then emerge as:

- What are the impacts on the housing portfolio of TCHC, including potential unit closures?
- What are the impacts on residents in terms of health outcomes?
- What are the impacts on former residents who become homeless as a result of unit closures in terms of health outcomes?
- What are the healthcare costs associated with residents and homelessness?
- What are the impacts upon the local, regional, and national economies with respect to employment, GDP, and private capital investment?
- What are the community impacts in terms of crime, market rental income, and social assistance costs?

Such research questions are answered by examining the differences between the simulated futures of each of the different investment decisions that can be made. The effects of an investment decision is then the net simulation that compares the possible futures when an investment has taken place against the possible futures assuming no investment had taken place. The difference between the two illustrates the value attributable solely to that investment decision.

Simulations are conducted for four possible scenario types:

- 1) The first scenario assumes no capital funding at all was invested into TCHC’s portfolio. This is the scenario of inaction and demonstrates what the future state of Toronto would be if neither future Revitalization nor capital repair initiatives take place.
- 2) The second scenario involves showing the impacts of the Revitalization investment, with no additional investment into capital repair.
- 3) The third scenario involves showing the impacts of TCHC and the City providing their share of the funding for the 10-Year Capital Financing Plan, along with TCHC Revitalization, with no additional contributions from the provincial and federal governments
- 4) Finally, the experiment simulates the full funding scenario, which consists of Revitalization and contributions from TCHC and the City and two funding partners, both the federal and provincial governments. The following table provides a summary of the scenarios:

Table 4 Scenarios

Scenario	Description
Base Scenario	Assumes no Revitalization and capital repair investments take place. Demonstrates the socio-economic outcomes of TCHC and the City making no Revitalization and capital investments.
Revitalization only	Assumes only the planned Revitalization has taken place. Demonstrates the socio-economic outcomes of TCHC’s \$5B Revitalization program.
City Funding + Revitalization	Assumes only TCHC and City capital investment and the planned

	Revitalization has taken place. Demonstrates the socio-economic outcomes of TCHC’s and the City’s \$5B Revitalization and \$900M capital repair investments.
Full capital repair investment and Revitalization	Full funding scenario. This scenario demonstrates the socio-economic outcomes of TCHC’s and the City’s planned \$5B Revitalization and \$2.6 B capital repair investments.

For the purposes of this report, two scenarios are of particular interest: the reward scenario and the risk scenario. The reward scenario is that in which all levels of government have contributed their shares towards financing TCHC’s capital investments. The reward scenario is created as follows:



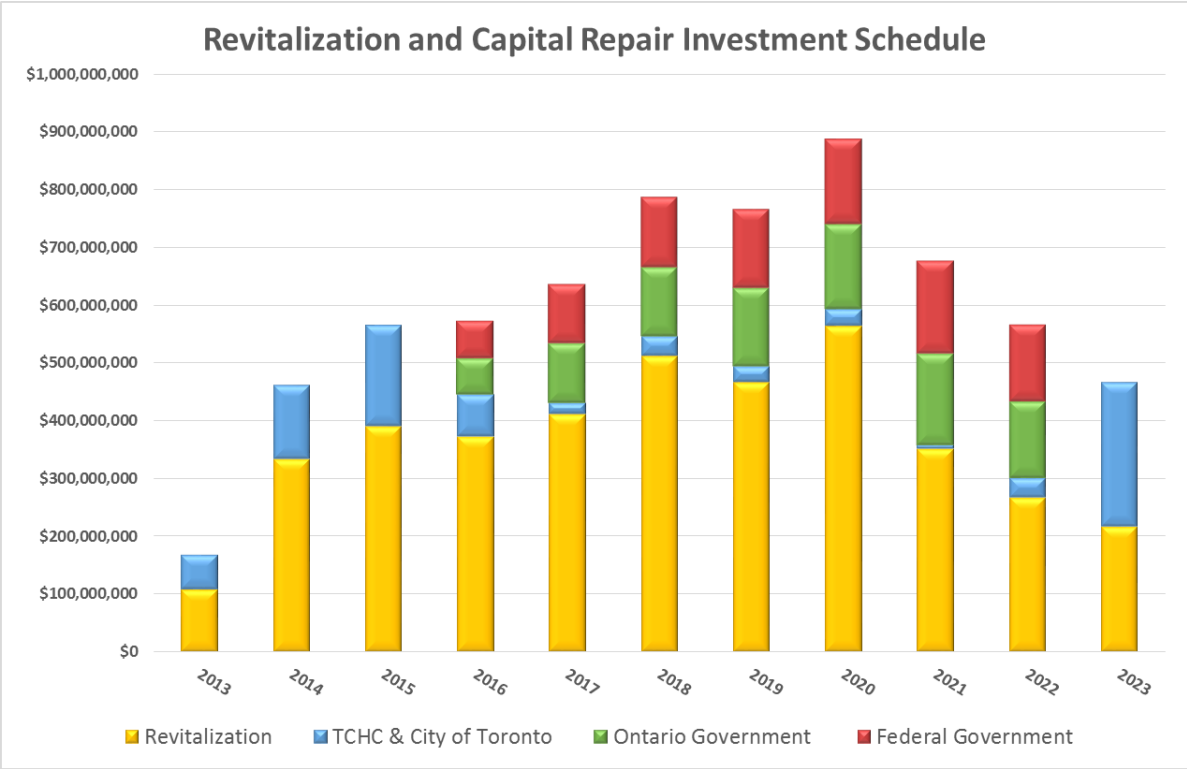
The second scenario, the risk scenario is created to illustrate a simulated future wherein only TCHC and the municipal government participate in the capital repair and Revitalization programs. In effect, the risk scenario will show the long-term impacts of failing to fully fund the restoration of TCHC’s portfolio. The risk scenario is set up as follows:



2.4 MODEL PARAMETERIZATION

To simulate the dynamism of the health and economy of the city, province, and country, the model must be trained to reflect reality. The specifications of the model are centered on all available data, including that which was provided by TCHC. The following figure shows the Revitalization and capital repair investment schedule.

Figure 4 Planned Revitalization and Capital Repair Investment Schedule



Where data is unavailable, the model reflects relationships that have been identified in peer-reviewed publications. Where neither data nor literature are able to clarify relationships between variables, conservative assumptions are used in order to ensure that the effects are captured but not overstated. For a detailed description on data sources, please refer to Appendix B¹.

The indicator of the condition of a dwelling is represented by the FCI; therefore, all health outcomes of TCHC tenants that were identified to emerge as a result of housing conditions can be linked probabilistically to the FCI of the tenants’ dwellings. This logic is extended to account for all of the measured correlations between social or health outcomes and the FCI levels of TCHC’s portfolio. These effects can then be aggregated relative to the expected composition of the housing portfolio, in terms of the number of units that are in good, fair, poor, and critical conditions. Thus, the economic, health, and community effects of the investment can be understood as a network of impacts resulting from the changes in FCI levels of all dwellings in TCHC’s portfolio.

For example, asthma has been linked to poor housing quality as a result of exposure to dampness and mold (Bornehag, et al., 2001). The study found that mild, moderate, and severe exposure carried

¹ The literature table in the Appendix B outlines the research linking the quality of housing to health, social, and energy outcomes. The link between the exact FCI and the various outcomes have been mapped such that as FCI improves, the various outcomes improve proportionally. Because the literature does not provide explicit links between the exact FCI to the various outcomes, the odds ratios associated with the outcomes were interpolated proportionally to the FCI levels. The exact links used in the model between FCI and the health, social, and energy outcomes are also available in Appendix B.

different odds ratios associated with asthma. Namely, mild exposure was associated with an odds ratio of 1.1 for asthma among children under 16, moderate exposure was associated with a respective odds ratio of 1.9, and severe exposure was associated with a respective odds ratio of 2.8 (Bornehag, et al., 2001). These were then mapped to FCI, under the assumption that a higher FCI would increase the odds of exposure to dampness and mold, and therefore increase the risk of asthma. Therefore, good condition housing was modeled to feature an odds ratio of 1 for asthma among children, fair condition housing was modeled with the associated odds ratio of 1.1, poor condition housing was modeled with the associated odds ratio of 1.9, and critical condition housing was modeled with an associated odds ratio of 2.8. Similar associations between health risks and FCI were mapped for a variety of conditions, detailed in Appendix B.

While FCI has been linked to various health conditions, it was assumed that all residents benefiting from capital repair will enjoy all of the health benefits that could accrue to them as a result of the improved FCI of their respective units. In actuality, it may be the case that different residents' health will be impacted differently, not only on the precise nature of the capital repairs scheduled to be performed on their units (for example, elevators versus window retrofits), but also on the nature of the current health conditions of the residents.

While health profiles can be imputed using PaR's health modules, the exact health states of residents are unavailable as a result of health information confidentiality. The exact nature of the repairs to each unit are also unknown; the available data demonstrates the number of units in various FCI conditions, but does not detail the necessary repairs. Because of this, it is impossible to discern what type of repairs will be done to which units, and by extension, what health benefits will accrue to each unit's residents.

In light of these gaps, the links between FCI and various health outcomes are assumed to be pervasive across all TCHC units' residents, with all improvements in FCI leading to reductions in the prevalence of all conditions linked to poor FCI, which are mediated by other risk factors and socio-demographic indicators such as age. The relationships between FCI and a given health condition are governed by the odds ratios identified in literature; therefore in aggregate, this will not materially impact estimates.

Additionally, the closures of units are used to identify potential increases in social assistance, homelessness, the health impacts generated that are associated with homelessness, and results related to the composition of TCHC's portfolio, such as the rental incomes of adjacent neighbourhoods. Out of the pool of units whose FCI is determined to be in the critical category, some proportion of them are held for major repair each year. That is to say that while all units in critical condition may benefit to varying degrees from maintenance and repair, the units that are held for major repair require immediate action to avoid facing closure. Historical figures for the number units that held for major repair are known for the years 2007 through 2014. To estimate how many units in critical condition will be held for major repair following this period, the proportions of these units corresponding to the years 2007 to 2014 were averaged, indicating that in an average year, approximately 45.4% of all critical units will require major repairs or will face closure. This percentage can be multiplied to the number of critical units in any given year to determine the number of units that will be held for major repair in that year.

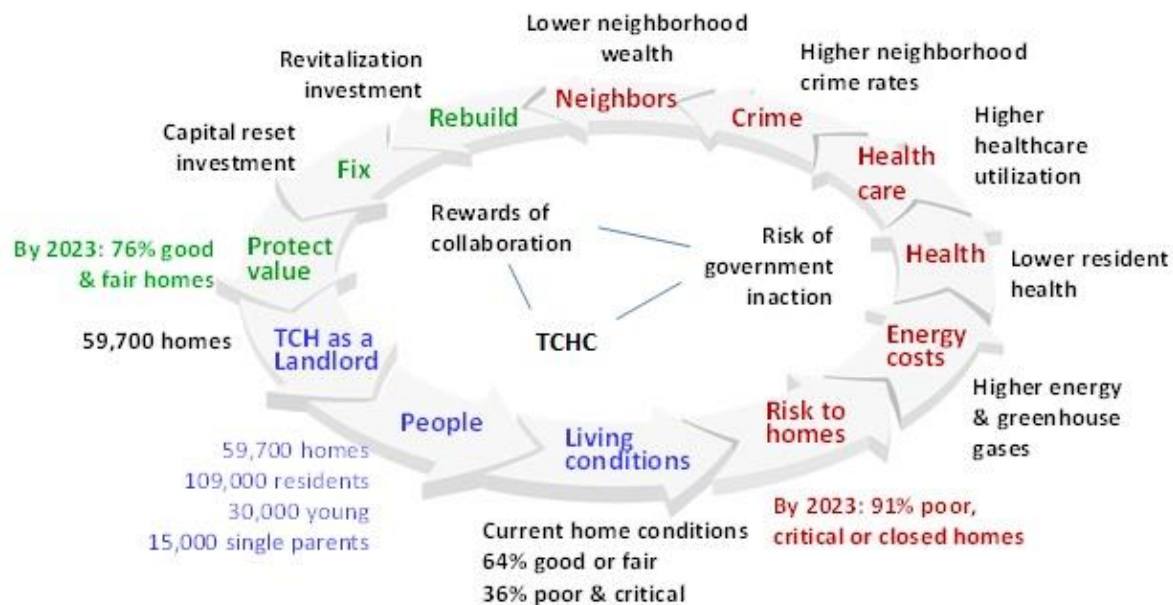
Of the units that require major repair in a given year, some proportion of them receives the necessary repairs, and the remainder are closed. As a result, no units held for major repair in one year continue to be in that category in the following year with no action taken. It is assumed that the proportion of these units that receive the necessary repairs is the same as the proportion of the \$2.6B in capital financing that is acquired. For instance, if the whole-of-government participates in the initiative with each level offering their respective share of the budget, 100% of the units that are held for major repair each year will be restored. If only two of the three levels of government contribute funds, then two thirds of the units held for major repair will be serviced, while the remaining one third will be closed. The same is true if only one level of government contributes its share; one third of units requiring major repairs will be serviced and remain open, while two thirds of those units will be closed. Any unit that is closed will not be re-opened; as long as TCHC is forced to close a unit due to lack of funding, it is assumed that the same lack of funding would prevent TCHC from being able to re-open units at a later date.

Furthermore, the PaR platform has been subject to extensive stress testing and validation practices to ensure it can reproduce results that are consistent with various other projections, such as those produced by provincial ministries and Statistics Canada. Refer to Appendix C for more details.

3.0 RESULTS: EVALUATING THE IMPACT OF THE 10-YEAR CAPITAL PLAN AND REVITALIZATION

The joint impacts of investment in social housing that are captured by this study are loosely described by the diagram below. TCHC houses approximately 109,000 residents and faces a backlog of repairs. Should no further investment be made in capital repairs, by 2023 91 per cent of TCHC’s housing portfolio will be closed, or will be in poor or critical condition. Poorer quality homes are less energy efficient, leading to higher energy consumption, costs, and greenhouse gas emissions. Poor housing quality is also linked to the poor health of residents, increasing resident illnesses and therefore their need to access the healthcare system. Neighbourhoods that fall into disrepair are associated with higher crime rates and lower potential rental income. Therefore, the capital repair and Revitalization investments can be seen to act as tools for not only the provision of affordable, adequate housing, but also as methods of preserving the social, economic, and health-related sustainability of TCHC neighbourhoods and those surrounding them.

Figure 5 Systems Approach to understanding TCHC Value: Risks and Rewards Links



3.1 REWARD SCENARIO: \$2.6B TRIPARTITE CAPITAL INVESTMENT AND \$5B REVITALIZATION

The reward scenario is that in which TCHC and all levels of government participate in capital repair funding for a total of approximately \$2.6 billion, and TCHC proceeds with \$5 billion in Revitalization efforts. This is compared to base projections for economic, social, and health outcomes if no future

Revitalization nor any capital repair work were to take place. A summary of the rewards of the full capital and Revitalization investments is shown in the table below.

Figure 6 Systems Approach to understanding TCHC Value: Rewards

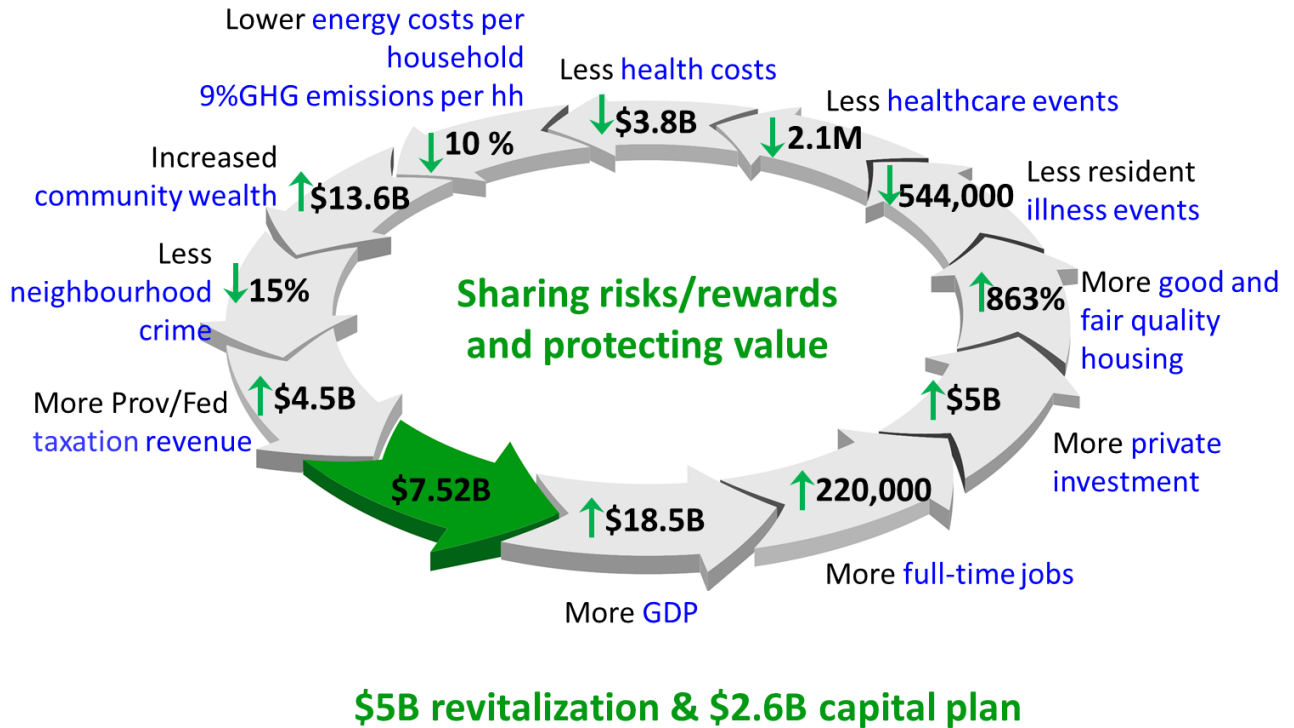


Table 5 Reward Scenario Summary: General Economic Metrics

Prosperity Metrics		Change	Source of Benefit	Comments
Economic Impacts	Investment evaluated	\$5B Revitalization and \$2.6B capital repair	65 per cent Revitalization; 35 per cent capital repair	TCHC and City of Toronto jointly invest \$5.9B and Ontario and Federal governments invest \$1.73B collectively
	GDP contribution	\$18.5B more for Canada	63 per cent due to Revitalization; 37 per cent due to capital repair	68 per cent occurs within first 10 years. \$12.6B for GTHA (including Toronto) and \$8.3B for City of Toronto. 2014 real terms.
	Employment years	220,000 more for Canada	55 per cent due to Revitalization; 45 per cent due to capital repair	108,000 for GTHA including 40,000 for City of Toronto. 64 per cent occurs within first 10 years.

Private capital investment	\$5B more for Canada	92 per cent due to Revitalization; 8 per cent due to capital repair	91 per cent located in GTHA with 88 per cent occurring within first 10 years. 62 per cent benefiting industries other than construction. 2014 real terms.
Ontario and Federal taxation revenues	\$4.5B more	63 per cent due to Revitalization; 37 per cent due to capital repair	\$2.3B Ontario government (45 per cent income taxes, 55 per cent consumption/production taxes); \$2.2B Federal government (73 per cent income taxes, 27 per cent consumption/production taxes). 2014 real terms.

Table 6 Reward Scenario Summary: Toronto Community Metrics

Prosperity Metrics	Change	Source of Benefit	Comments	
Community, Health, and Energy Impacts	Condition of TCHC dwellings	28,151 closures avoided. 76 per cent of units in good and fair condition.	59 per cent of closures avoided due to provincial + federal funding	Impact upon 109,000 TCHC residents of which 30,000 include children and youth.
	Homelessness	5,740 avoided	59 per cent due to provincial + federal funding	Avoiding a potential doubling of homelessness in Toronto.
	TCHC resident illness	544,000 less cases	57 per cent due to provincial + federal funding	Annual average of 18,100 less cases over 30 years 48 per cent due to respiratory and mental health conditions.
	Healthcare utilization	2,100,000 less health care cases	53 per cent due to provincial + federal funding	82 per cent general practitioner visits
	Healthcare costs	\$3.8B less	40 per cent due to provincial + federal funding	94 per cent due to fewer hospitalizations

Greenhouse gas emissions	9 per cent lower	100 per cent due to provincial + federal funding ²	Yearly GHG emissions fall by over 390 kg per unit on average
Community wealth	\$13.6B more	42 per cent due to provincial + federal funding	Less crime (down 15 per cent); improved market rental income; lower social assistance costs.
Neighbourhood crime	15 per cent lower	65 per cent due to provincial + federal funding	An annual average of 127 crimes per year over 30 years

3.1.1 ECONOMIC BENEFITS

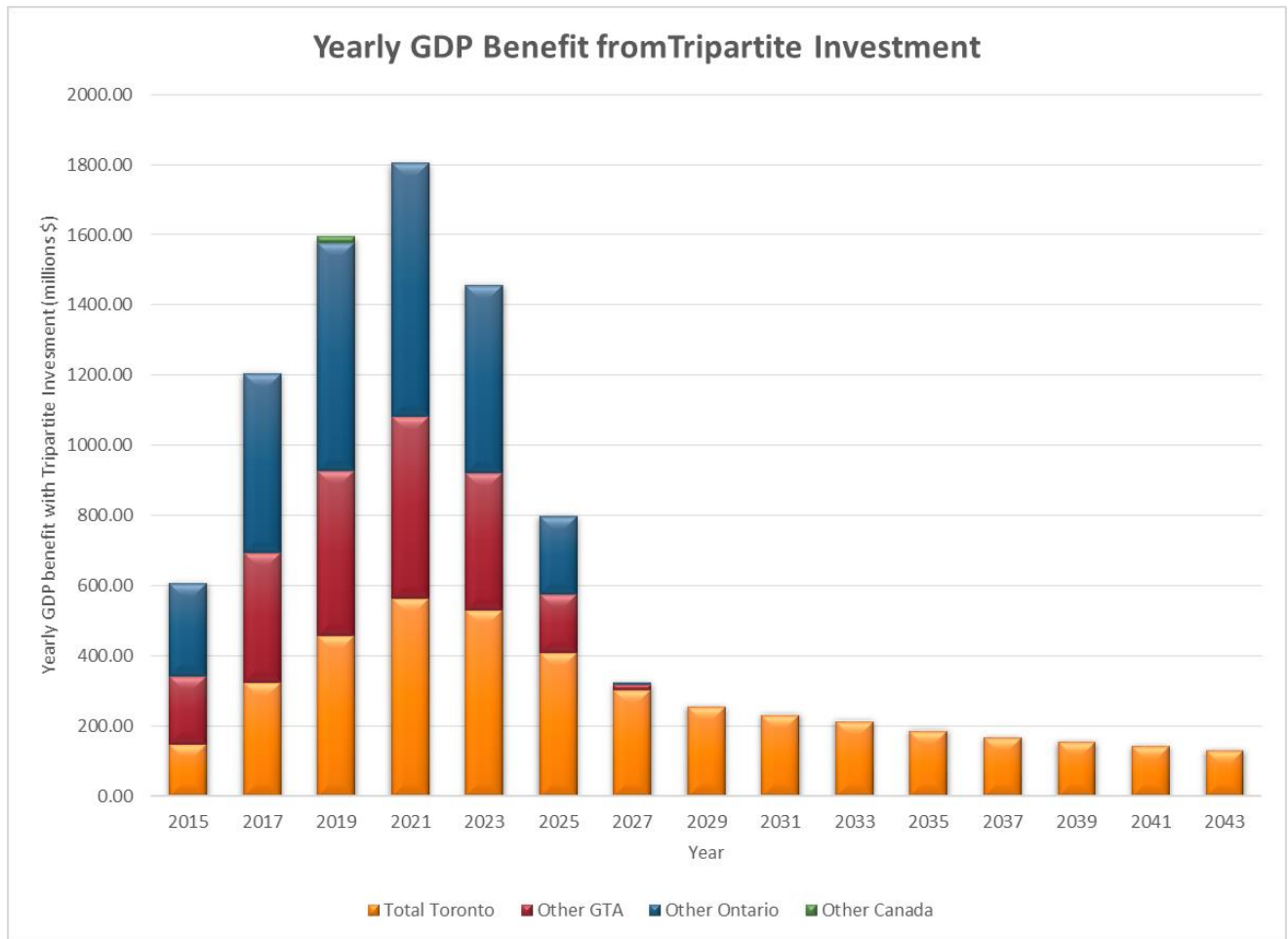
GDP - \$18.5 billion over thirty years for Canada

The injection of government capital into the economy will generate increased GDP levels initially through the direct effects, then through indirect and induced effects as a result of economic multipliers, and finally through system effects by means of the central network of relationships that give rise to the fundamental structure of the local, regional, and national economies. Once funding is pledged, TCHC facilitates a series of direct economic impacts. For instance, it must contract or purchase both labour and capital, as necessary, in order to begin the process of resolving backlogged repairs and conducting future Revitalization. This creates an immediate activity in local production. After accounting for the costs of investment (government debt financing, debt repayment, the opportunity cost of use of private capital and labour), the results in 2014 real terms are:

- Toronto gains \$8.3 billion in GDP over thirty years
- The GTHA (including Toronto) gains \$12.6 billion in GDP over thirty years
- Ontario (including the GTHA) gains \$18.4 billion in GDP over thirty years
- **Canada (in total) gains \$18.5 billion in GDP over thirty years**

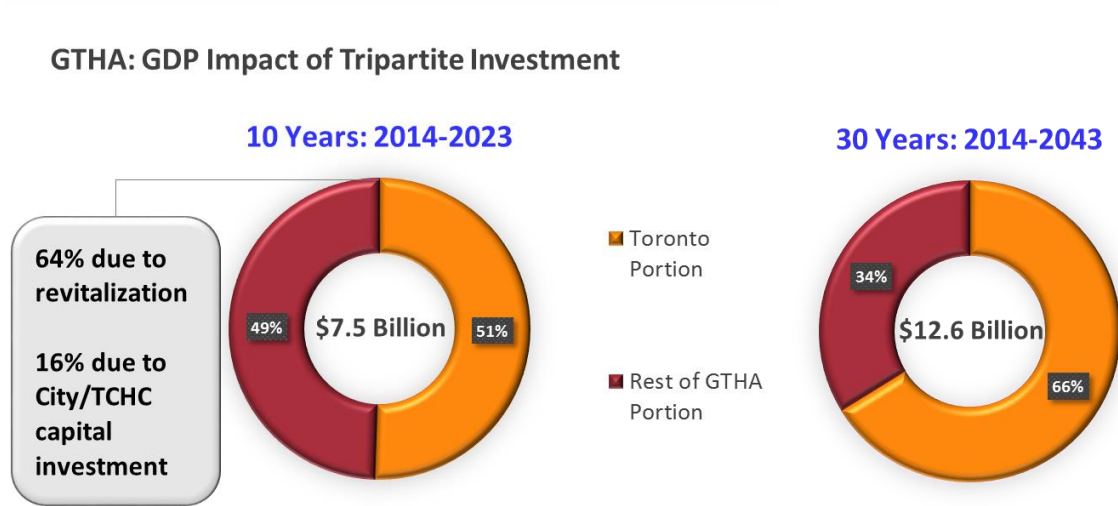
² In order to see a reduction in energy costs and greenhouse gas emissions, full funding is required. The reason for this is that partial funding will allow more units to avoid closure, but will not be able to mitigate the increasing average FCI of the portfolio as more units fall into disrepair and become less energy efficient. Closed units decrease energy costs and GHG emissions because they do not require heating, cooling, and other energy-related operations. Open units with higher FCI levels cause increases in energy costs and GHG emissions as they are less energy efficient. Therefore, with partial funding, the net impact of these two effects leads to an increase in average annual GHG emissions by approximately 1.82kg per open unit (from 4452.53kg to 4454.35kg), and an increase in average annual energy costs by \$6.38 per open unit (from \$2435.16 to \$2441.54). Full funding allows all units to stay open, but keeps the average FCI of the portfolio low enough that energy efficiency impacts can be observed. With full funding, average annual GHG emissions per open unit fall by 395.74kg, and average annual energy costs per open unit fall by \$239.11. Full details are available in sections 3.1.4 and 3.2.4.

Figure 7 Yearly GDP Benefit from Tripartite Investment³



³ Only every other year is presented. Benefits also accrue during omitted years for a cumulative benefit of approximately \$18.5B in GDP for all of Canada over thirty years.

Figure 8 GTHA: GDP Impact of Tripartite Investment

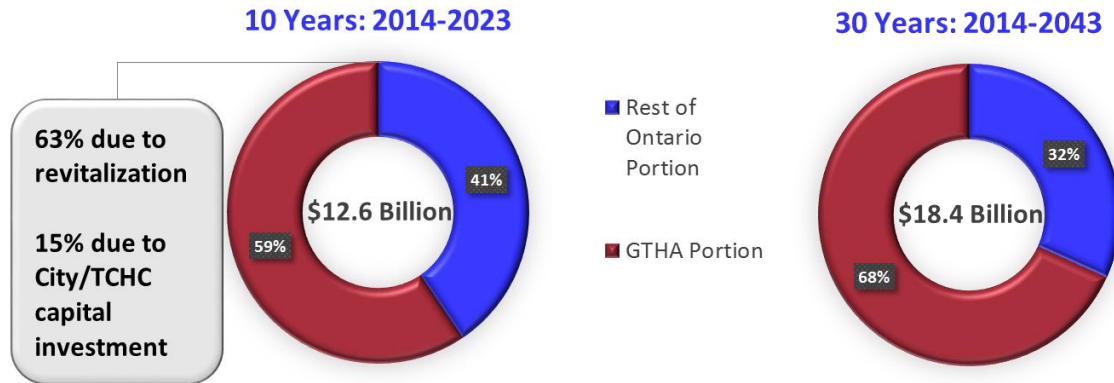


The attribution of GDP to a region is determined by where the performance of jobs occurs. The portion of real GDP change attributed to Toronto grows throughout the simulation period as the GTHA benefits significantly in the first 10 years of the simulation with the movement of construction jobs between Toronto and the rest of the GTHA. Thereafter, the economic value of the constructed and repaired buildings, in terms of GDP, persists after the initial 10 year construction period. Of the \$12.6 billion change in real GDP for the GTHA, the following attributions are reported:

- Toronto direct GDP contribution of \$3.3 billion;
- Toronto indirect and induced GDP contribution of \$5.0 billion;
- **GTHA (including Toronto): \$12.6 billion**
 - **direct GDP contribution \$5 billion;**
 - **indirect and induced GDP contribution \$7.6 billion**

Figure 9 Ontario: GDP Impact of Tripartite Investment

Ontario: GDP Impact of Tripartite Investment



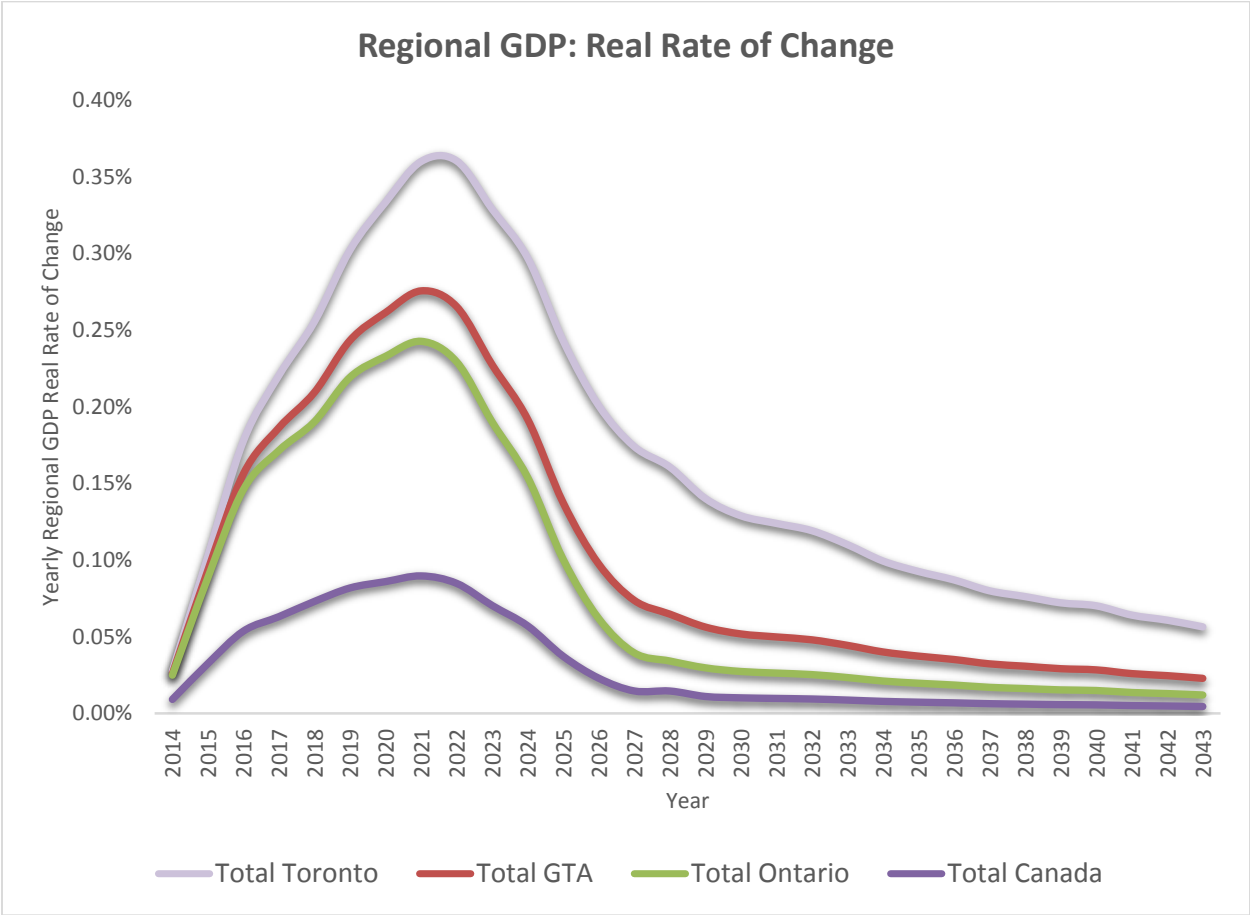
Regional attribution of GDP between the GTHA and the rest of Ontario is not significantly different over the 30-year period, as the geographic location of jobs is stable throughout the simulation period. Of the \$18.5 billion change in real GDP for Ontario, the following attributions are reported:

- GTHA direct GDP contribution of \$5 billion;
- GTHA indirect and induced GDP contribution of \$7.6 billion;
- **Ontario (including GTHA): \$18.4 billion**
 - **direct GDP contribution \$7.4 billion;**
 - **indirect and induced GDP contribution \$11 billion**

Toronto’s average rate of change in regional GDP as a result of the tripartite investment over thirty years is expected to be approximately 0.16 per cent; however the average rate between present day and 2023 is 0.25 per cent, reflecting the investment’s concentrated, positive impacts on GDP within this time period. Similar trends appear for the GTHA, Ontario, and Canada.

- The average rate of change in Toronto’s regional GDP over thirty years is 0.16 per cent
- The average rate of change in the GTHA’s (including Toronto) regional GDP over thirty years is 0.10 per cent
- The average rate of change in Ontario’s (including the GTHA) regional GDP over thirty years is 0.08 per cent
- **The average rate of change in Canada’s national GDP over thirty years is 0.03 per cent**

Figure 10 Real Rate of Change of Regional GDP



While this represents the total rewards of capital repairs and TCHC’s Revitalization program, the municipal government is also a significant driver of these benefits. With City funding in conjunction with TCHC, Toronto’s regional GDP will be about \$3 billion higher relative to projected base levels between 2014 and 2023, a figure that rises to \$6.6 billion by 2043. This implies that roughly 79 per cent of the increase in Toronto’s economic production generated by this work is attributable to the City’s participation in the 10-Year Capital Financing Plan, in combination with TCHC’s Revitalization investments.

A similar set of effects is visible when considering the impacts of the investment into capital repairs upon the economy of the GTHA, which for the purposes of this report is considered to be composed of Durham, Halton, Hamilton, Brampton, Caledon, Mississauga, Toronto, and York Region. Between 2014 and 2023, the GTHA’s total regional GDP as a result of tripartite investment will increase by a total over \$7.4 billion, of which \$5.8 billion (79 per cent) will be a result of TCHC and the City’s funding in capital repairs and the Revitalization program. Over the course of three decades, the total increase in productivity within the GTHA can be expected to be worth over \$12.6 billion by 2043. The yearly rates of change in regional GDP (relative to no investment) for the GTHA will increase from present day through 2021 to a peak of about 0.28 per cent, before declining but remaining positive up to and including 2043.

Over thirty years, the average rate of change in regional GDP for the GTHA caused by the investment is anticipated to be around 0.1 per cent. As in the case of Toronto, the GTHA experiences a greater average rate of change to its regional GDP between present day and 2023, at 0.19 per cent.

The GDP effects of the full investment into repairs for TCHC's housing, despite the projects occurring within Toronto, will have impacts throughout the province. In fact, over thirty years, Ontario's total regional GDP will be over \$18.4 billion above projected base levels, complemented by an average rate of change in GDP that is 0.08 per cent higher than it would have been without the investment. Most of this benefit will accrue within ten years, with the province experiencing just over \$12.6 billion in additional GDP by 2023. As most of these productivity benefits emerge within ten years, average rate of change in regional GDP for Ontario between the present and 2023 is over twice as high as the thirty year rate, at 0.17 per cent.

At the federal level, full investment into the 10-Year Capital Financing Plan will create a total production increase of over \$18.5 billion over thirty years, representing a 0.03 per cent improvement in the rate of change in GDP relative to projections that do not consider the investment. As most of the benefits accrue to Ontario, the total GDP increase for the province is approximately the same as that for Canada.

GDP Summary Tables**Table 7** Benefit to Regional GDP: Total for Toronto

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$3,784.1	36 per cent	64 per cent
2014-2043	\$8,356.6	35 per cent	65 per cent

Table 8 Benefit to Regional GDP: Total for GTHA (inclusive of Toronto)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$7,491.9	37 per cent	63 per cent
2014-2043	\$12,622.9	36 per cent	64 per cent

Table 9 Benefit to Regional GDP: Total for Ontario (Inclusive of GTHA)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$12,602.3	37 per cent	63 per cent
2014-2043	\$18,454.4	37 per cent	63 per cent

Table 10 Benefit to National GDP: Total for Canada (Inclusive of Ontario)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$12,678.7	38 per cent	62 per cent
2014-2043	\$18,574.7	37 per cent	63 per cent

Employment – 220,000 employment years over thirty years for Canada

The injection of funding into the capital repair and Revitalization projects will necessitate the use of labour in order to mobilize those funds in economically productive ways. Not only is it expected that TCHC will hire labour to complete the physical work required for capital repair and Revitalization, for example, but the effects will extend to the labour required to ensure that the necessary intermediate goods for these projects are made available and transported. The labour-augmenting effects of the investment therefore compete with other demand for labour and manifest as a direct increase in

immediately contracted employment, followed by a spread of this effect through every economic point of contact necessary (such as transportation or retail firms).

Because individuals in the economy work different numbers of hours per week for different durations of employment, employment will be discussed in terms of employment years rather than number of jobs. One employment year refers to one year in which one individual works full-time. Therefore, two employment years can signify one individual working full time for two years, or two individuals working full time for one year each. This unit of measurement therefore captures a standardized demand for labour.

The full-funding scenario has the following employment effects over the period from 2014 – 2043:

- Toronto gains over 40,000 employment years over three decades
- The GTHA (including Toronto) gains over 108,000 employment years over three decades
- Ontario (including the GTHA) gains over 192,000 employment years over three decades
- **Canada (in total) gains over 220,000 employment years over three decades**

Over 42 per cent of the new employment generated in the GTHA by the investment in community housing will be within the construction sector, with the retail trade sector sharing in 8 per cent of the total increase in employment over thirty years. As TCHC must recruit construction-related work in order to bring its declining portfolio back into a state of good repair, the large share of the employment increase attributable to that sector is consistent with the nature of the projects.

Although other studies have reported more modest increases in employment as a result of infrastructure investment, it is important to note that the results reported above represent the sum of direct, indirect, induced, and system effects. Beyond induced effects, system effects also consider not only impacts on the region in which TCHC is located, but also those in all of Canada that arise as a result of modeling the Canadian economy as a system of agents. The systems framework acknowledges that these impacts feature a compounding effect through a series of multipliers that are endogenous to the model and which reflect agents making decisions such as whether to work, where, how much to consume, and so on. These impacts therefore do not have arbitrarily imposed limits upon their geographical breadth or their magnitudes; these geographic and temporal limits arise naturally when agents no longer face incentives to work and firms no longer face incentives to hire labour. To demonstrate the calibration of the employment effect, we consider the first five years of the investment timeline. The table below shows the number of employment years generated in a given year relative to every \$1 million expended on TCHC capital repair and revitalization in that year, assuming that all orders of government offer funding support, over the first five years of the investment. These figures are contrasted to other studies reporting employment effects of capital investment to demonstrate the calibration of the employment figures before the compounding effects induced by the systems framework begin to manifest in a significant way.

Table 11 Calibration: Employment years generated for each \$1M in capital investment

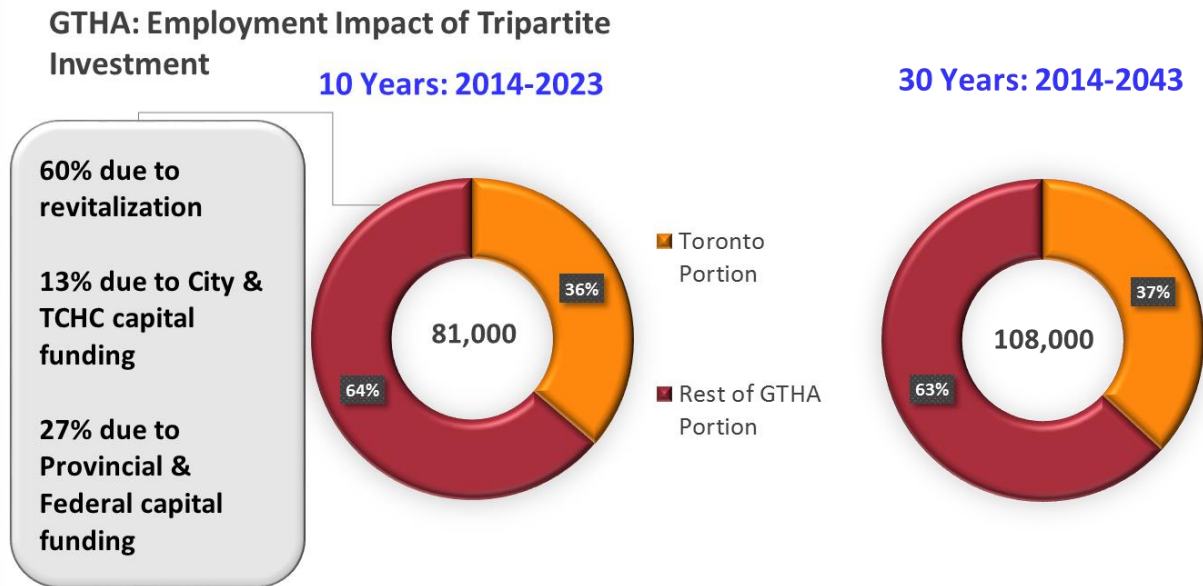
Year	Current Study Investment in TCHC capital repair and revitalization	Other Study 1 Economic Impact of Ontario’s Infrastructure Investment Program ⁴	Other study 2 Manitoba’s Infrastructure Investment ⁵
2007		15.82	
2008		14.70	
2009		13.98	
2010		15.54	
2011		15.69	
2012			
2013			
2014	0.65		11.05
2015	4.16		10.52
2016	9.78		10.72
2017	22.61		11.27
2018	21.61		10.87
Five-year average	11.76	15.15	10.88

Results show that employment estimates are in line with traditional economic impact studies conducted by representatives of the Conference board of Canada.

⁴ (Antunes & Palladini, 2013)

⁵ (Owusu, 2014)

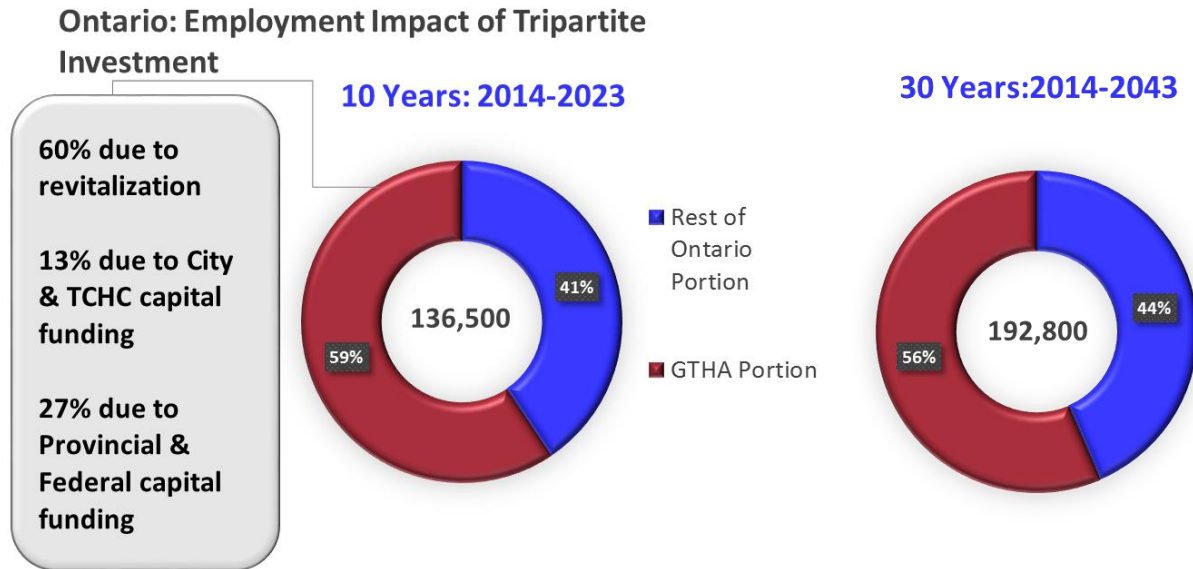
Figure 11 GTHA: Employment Year Impact of Tripartite Investment



Unlike the location attribution of GDP, the attribution of employment to a region is determined by where the employee resides. The portion of employment attributed to Toronto and the rest of the GTHA is stable throughout the simulation period as many of the employees affected reside outside of the City of Toronto. Of the 109,000 employment years generated for the GTHA, 82,000 are project related with 26,800 permanent employment. The following attributions are reported:

- Toronto direct employment years of 16,000;
- Toronto indirect and induced employment years of 24,000;
- **GTHA (including Toronto): 108,000 employment years**
 - **direct employment year contribution of 43,700;**
 - **indirect and induced employment year contribution of 65,100.**

Figure 12 Ontario: Employment Year Impact of Tripartite Investment



Regional attribution of GDP between the GTHA and the rest of Ontario is also stable as the location of jobs and the residency of employees on these geographic scales are stable throughout the simulation period. Of the 220,000 employment years generated for Canada, 192,800 are located with Ontario. Of those, 145,300 are project related with 47,490 permanent employment (a factor of which is population growth during the simulation period). The following attributions are reported:

- GTHA direct employment years of 43,770;
- GTHA indirect and induced employment years of 65,170;
- **Ontario (including GTHA): 192,800 employment years**
 - **direct employment year contribution of 77,500;**
 - **indirect and induced employment year contribution of 115,360.**

Figure 13 Ontario Regional Sector Employment

Ontario Regional Sector Employment

Additional employment years created by tripartite investment



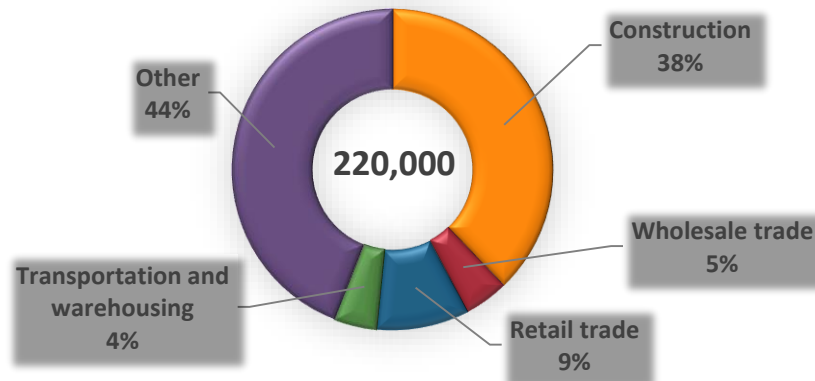
Between present day and 2023, the Province of Ontario will gain a total of over 136,000 employment years as a result of the tripartite investment in capital repair. By 2043, this benefit will increase to a total of over 192,800. Over 40 per cent of these will be in the construction sector.

Although the investment will primarily increase employment within Ontario, other regions within Canada will also see spillover employment benefits. Like for Toronto and the GTHA, similar proportions of these employment years will be attributable to the same sectors, with 38 per cent of total national employment increases occurring in the construction sector, along with an approximate 18 per cent of the thirty-year employment benefit occurring within the wholesale trade, retail trade, and transportation and warehousing sectors combined.

Figure 14 Canada Sector Employment

Canada Sector Employment

Additional employment years created by tripartite investment



Employment Summary Tables

Table 12 Regional employment benefit: Total for Toronto

Time Period	Total impact of Tripartite investment	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	29,379	40 per cent	60 per cent
2014-2043	40,135	40 per cent	60 per cent

Table 13 Regional employment benefit: Total for GTHA (Inclusive of Toronto)

Time Period	Total impact of Tripartite investment	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	81,101	40 per cent	60 per cent
2014-2043	108,948	40 per cent	60 per cent

Table 14 Regional employment benefit: Total for Ontario (Inclusive of the GTHA)

Time Period	Total impact of tripartite investment (employment years)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	136,564	40 per cent	60 per cent
2014-2043	192,845	41 per cent	59 per cent

Table 15 National employment benefit: Total for Canada (Inclusive of Ontario)

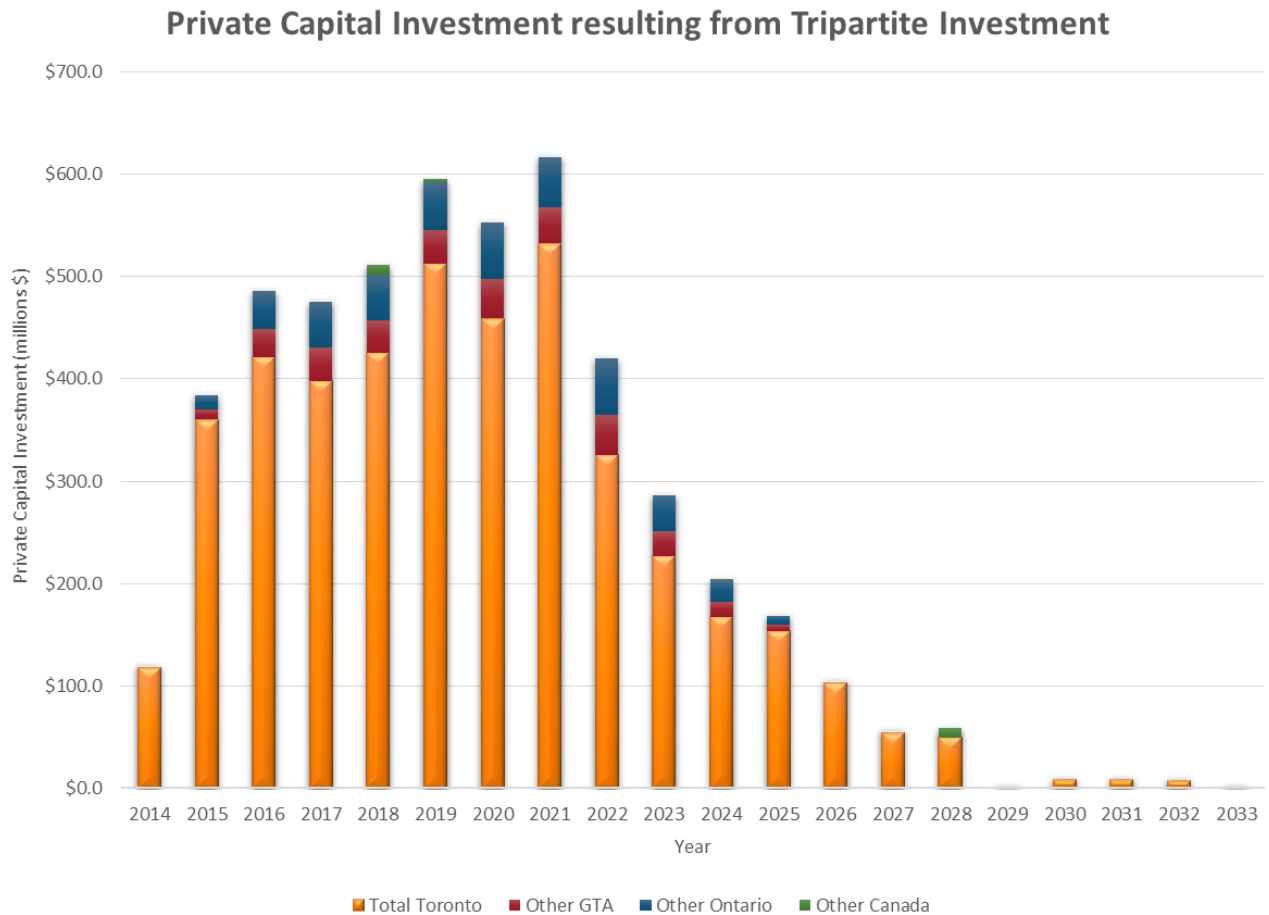
Time Period	Total impact of tripartite investment (employment years)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	142,039	42 per cent	58 per cent
2014-2043	220,997	45 per cent	55 per cent

Regional Private Capital Investment - \$5 billion over thirty years for Canada

Capital formation refers to the creation or acquisition of capital stock, including assets such as equipment or buildings, which enhance the productive capacity of an economy. While public investment in capital is a strong generator of improved economic activity by means of increased output and increased aggregate incomes, private investment in capital is a necessary complement to foster even greater short and long term growth benefits. The majority of the private capital investment stimulated by the completely funded public capital investments will accrue to Toronto, with an expected \$3.7 billion by 2023, and a total of \$4.3 billion by 2043. Other regions in the GTHA will also receive modest benefits, bringing the 10-year total private capital investment for the GTHA up to just over \$4 billion, which will rise to a sum of over \$4.6 billion over thirty years. Revitalization efforts attributable to TCHC, representing public-private partnerships, are the main drivers of private capital investment.

- Toronto attracts a over \$4.3 billion in private capital investment over thirty years
- The GTHA (including Toronto) attracts over \$4.6 billion in private capital investment over thirty years
- Ontario (including the GTHA) attracts over \$5 billion in private capital investment over thirty years
- **Canada (in total) attracts over \$5 billion in private capital investment over thirty years**

Figure 15 Private Capital Investment resulting from Tripartite Investment



Outside of the GTHA, Ontario is able to attract an additional \$410 million in private capital investment, for a total of just over \$5 billion for the province over the course of thirty years. The majority of this effect (88 per cent) is concentrated to the project timeline, which is a crucial complement to public capital investment for the creation of additional income and jobs within the economy, and is stimulated primarily by Revitalization.

The sizeable anticipated contribution of private industry is a suggestion that the investment in subsidized housing is not only a social necessity, but also a financial opportunity. For every dollar that the provincial and federal governments invest, almost 3 additional dollars will be leveraged from private industry. Some private investment is also accrued to Canada outside of Ontario; approximately \$27.5 million will be invested by private industry in other provinces. This demonstrates the power of creating opportunities for private investment; if employment and income increase, private capital will follow, further increasing demand. On the basis of supporting social housing in Toronto alone, the private sector will contribute to growth by widening the cycle of economic benefits to other provinces and augmenting them over the capacity of public capital investment alone.

Private Capital Investment Summary Tables⁶

Table 16 Regional private capital investment benefit: Total for Toronto

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$3,781.2	2 per cent	98 per cent
2014-2043	\$4,332.7	1 per cent	99 per cent

Table 17 Regional private capital investment benefit: Total for GTHA (Inclusive of Toronto)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$4,053.4	4 per cent	96 per cent
2014-2043	\$4,625.8	4 per cent	96 per cent

Table 18 Private capital investment benefit: Total for Ontario (Inclusive of the GTHA)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$4,434.6	7 per cent	93 per cent
2014-2043	\$5,036.5	7 per cent	93 per cent

Table 19 Private capital investment benefit: Total for Canada (Inclusive of Ontario)

Time Period	Total impact of tripartite investment (Millions)	Percentage of total benefit attributable to capital funding	Percentage of total benefit due to Revitalization
2014-2023	\$4,447.3	7 per cent	93 per cent
2014-2043	\$5,064.0	8 per cent	92 per cent

⁶ Note: The figures for the percentage of the total benefit attributable to TCHC and City capital funding and the percentage of the total benefit due to Revitalization do not sum to 100% for any given time period. The remaining portion of the benefit is due to provincial and federal capital funding.

3.1.2 CONDITION OF TCHC DWELLINGS

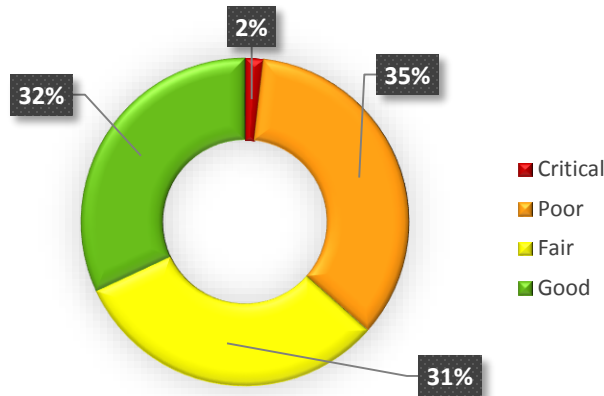
In this scenario, the full level of proposed funding is made available to TCHC for maintaining and restoring its most critical units, therefore the overall condition of TCHC’s portfolio is strengthened. It is natural that some units will continue to fall into disrepair and their condition will depreciate as a result of age and normal use. Despite the effects of a decade of usual wear and tear, by 2023 TCHC stands to improve the number of units it has in poor or critical condition by means of repairing and maintaining units.

Specifically, based on this investment scenario, we can expect the following distributions of units, by FCI over the next 30 years:

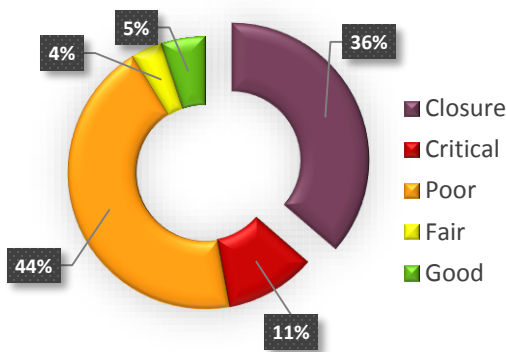
- With no capital funding, we could have expected over 5,200 units in good and fair condition, over 32,700 units in poor and critical condition, and over 21,700 units closed by 2023
- With City and TCHC capital funding only, we can expect over 6,300 units in good and fair condition, over 45,800 units in poor and critical condition, and over 7,500 units closed by 2023;
- With City and TCHC capital funding with one funding partner (either the federal or provincial government, but not both), we can expect over 13,500 units in good and fair condition, over 44,400 units in poor and critical condition and over 1,700 units closed by 2023; and
- With complete funding, we can expect we can expect over 45,500 units in good and fair condition, over 14,200 units in poor and critical condition and 0 units closed by 2023.

Figure 16 TCHC Portfolio Condition by FCI and funding scenario for select years

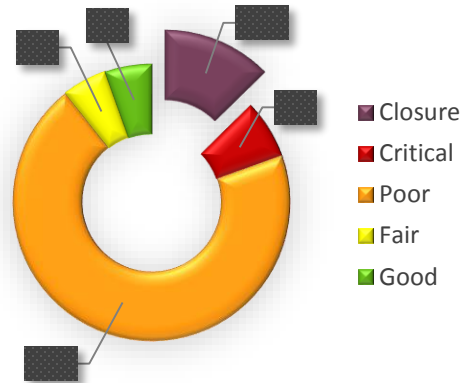
Portfolio Composition by FCI: 2014



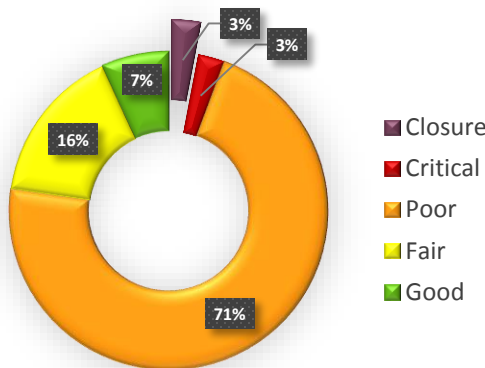
Portfolio Composition by FCI: 2023
No capital repair - Revitalization only



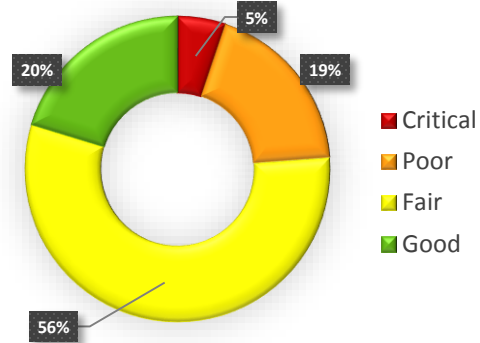
Portfolio Composition by FCI: 2023
City and TCHC funding Only + Revitalization



Portfolio Composition by FCI: 2023
City and TCHC funding + 1 funding partner + Revitaliz.



Portfolio Composition by FCI: 2023
Full capital funding + Revitalization



In 2014, 28 per cent of TCHC's portfolio were units that were in poor or critical condition. With full funding, this figure is expected to drop to 24 per cent in ten years, and the overall FCI of TCHC's portfolio will fall below⁷ the acceptable industry standard of 10 per cent. Should no investment have been made into capital repair, however, 55 per cent of TCHC's dwellings would be in poor or critical condition by 2023, with a further 36% of the portfolio having been closed. Ensuring that full funding for capital repairs is available, TCHC stands to offer 8.6 times the number of good or fair quality homes after 30 years, relative to no investment⁸.

3.1.3 HEALTH BENEFITS

⁷ It is expected to be approximately 7 per cent by 2023, which is an FCI level that is, in fact, better than the 10 per cent industry standard.

⁸ FCI composition projections take into consideration the 6,000 units that will be removed from the inventory and will be refurbished or replaced. For those units, their FCI is reset to 0.

The improvement in the overall FCI levels of TCHC's units means that a greater proportion of tenants will reside in homes that are in good repair, which is conducive to better health. For instance, it is well documented that homes in poorer condition are associated with dampness⁹, which in turn leads to an increased risk of illnesses ranging from stress (Hopton & Hunt, 1996) and depression (Shenassa, Daskalakis, Liebhaber, & Braubach, 2007) to asthma (Bornehag, et al., 2001). Depression has been linked to an increased likelihood of stroke (National Institute of Mental Health, 2011), compounding the adverse health effects. Mental and respiratory illnesses are among the many conditions that may arise from living in homes that are not in adequate living condition, but these studies also demonstrate that even tenants who live in units that are in good repair may face deteriorating health as a result of the potential exposure to neighbouring units in disrepair. The majority of the illness events avoided are due to the significant reduction in stress-related cases. Each case of such an illness, which is avoided by means of maintaining the good repair of homes, represents a source of healthcare cost savings.

Over the next 30 years, with improvements to tenants' health profiles, we can expect a significant reduction of visits to emergency departments (EDs), general practitioners (GPs), and hospitals. The effects range over the next 30 years based on the amount of funding received:

- With City and TCHC funding only, we can expect 675,000 fewer resident visits to GPs, 1,600 fewer resident visits to the ED and 192 fewer resident visits to hospitals;
- With City and TCHC funding with one funding partner, we can expect 1,000,000 fewer resident visits to GPs, 3,200 fewer resident visits to the ED and 363 fewer resident visits to hospitals; and
- With complete funding, we can expect 1,586,000 fewer resident visits to the GP, 6,500 fewer resident visits to the ED and 730 fewer resident visits to hospitals.

These reduced rates of healthcare utilization lead to the following reductions in resident healthcare costs, by scenario:

- With City and TCHC funding only, we can expect to avoid \$50 million in total resident healthcare costs
- With City and TCHC funding with one funding partner, we can expect to avoid \$83 million in total resident healthcare costs; and
- With complete funding, we can expect to avoid \$126 million in total resident healthcare costs.

Individuals experiencing homelessness have a different and far more severe set of health outcomes, and place greater burdens on the healthcare system than a housed individual does as a result. Notwithstanding a greater risk of the incidence of illness, between 31 and 46 per cent of individuals experiencing homelessness face a chronic medical problem (Chicago Housing for Health Partnership, 2011). However, the negative effects of these conditions can be prevented by offering stable housing to those experiencing homelessness. In fact, if provided with housing, the chronically ill homeless can

⁹ Although central heating does mitigate some causes of dampness, dampness can also arise as a result of pipe leaks and overflows, water penetration from the exterior of the building, and poor ventilation of internally produced moisture (Peterborough City Council, n.d.)

exhibit a 29 per cent reduction in yearly hospital visits and a 24 per cent reduction in yearly ED visits (Sadowski, Kee, VanderWeele, & Buchanan, 2009).

An investment of \$2.6 billion represents savings of over \$3.2 million from the reduction in ED visits by the homeless for chronic conditions over the course of ten years, and over \$50 million in savings from the reduction in hospital visits by the homeless for chronic conditions. Over the next thirty years, a total of over \$38 million will be saved from the reduction in ED visits by the homeless, along with over \$589 million in costs associated with hospitalizations for chronic conditions, if TCHC, the City, Ontario and federal governments were to fully support the 10-Year Capital Financing Plan. The costs avoided can be used to reallocate scarce resources to other areas in the healthcare system that may be experiencing funding shortages. To summarize, the savings associated with healthcare utilization by the homeless for chronic conditions only reflect:

10 Years: 2014-2023

- A reduction of approximately 8,000 ED visits for chronic conditions, representing a savings of over \$3.2 million
- A reduction of approximately 3,700 hospital visits for chronic conditions, representing a savings of over \$50 million
- A reduction of approximately 16,100 GP visits, representing a savings of over \$880,000

30 Years: 2014-2043

- A reduction of approximately 71,200 ED visits for chronic conditions, representing a savings of over \$38.5 million
- A reduction of approximately 32,800 hospital visits for chronic conditions, representing a savings of over \$589 million
- A reduction of approximately 142,200 GP visits, representing a savings of over \$10.3 million

Besides chronic illness, mental illness is highly prevalent among the homeless and can be mitigated significantly by offering these individuals access to reliable housing. In particular, individuals who are experiencing homelessness exhibit a 60 per cent decrease in hospital visits and a 50 per cent decrease in emergency department (ED) visits for mental illness once they are housed (Goering, et al., 2014). In effect, ensuring that these individuals retain their homes allows for all of these additional visits to be prevented. Due to a reduction in mental illness-related ED visits among the homeless, more than \$76 million will be saved as a result of capital repair and Revitalization over 30 years. A significant \$3 billion will be saved in the costs of hospital visits for mental health conditions among the homeless.

To summarize, the savings associated with healthcare utilization by the homeless for mental illness only reflect:

10 Years: 2014-2023

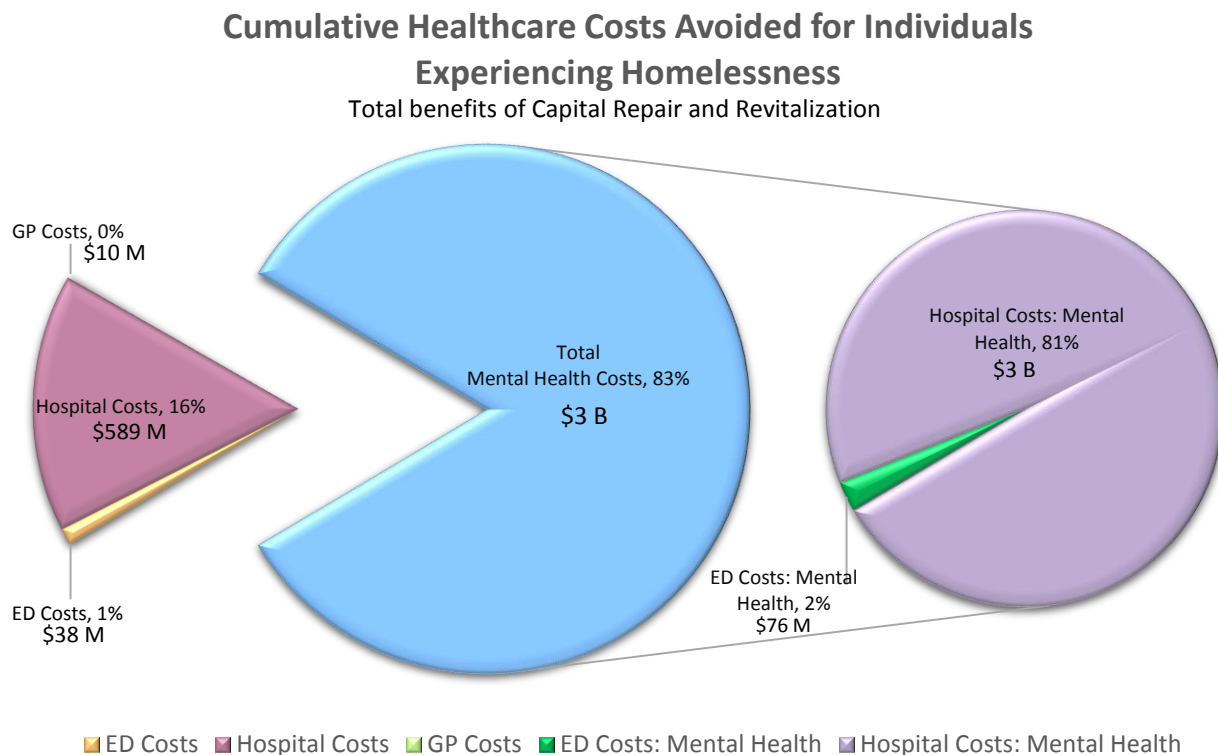
- A reduction of approximately 16,100 ED visits for mental illness, representing a savings of over \$6.5 million

- A reduction of approximately 14,500 hospital visits for mental illness, representing a savings of over \$257 million

30 Years: 2014-2043

- A reduction of approximately 142,200 ED visits for mental illness, representing a savings of over \$76 million
- A reduction of approximately 128,000 hospital visits for mental illness, representing a savings of over \$3 billion

Figure 17 Cumulative Healthcare Costs Avoided for Individuals Experiencing Homelessness



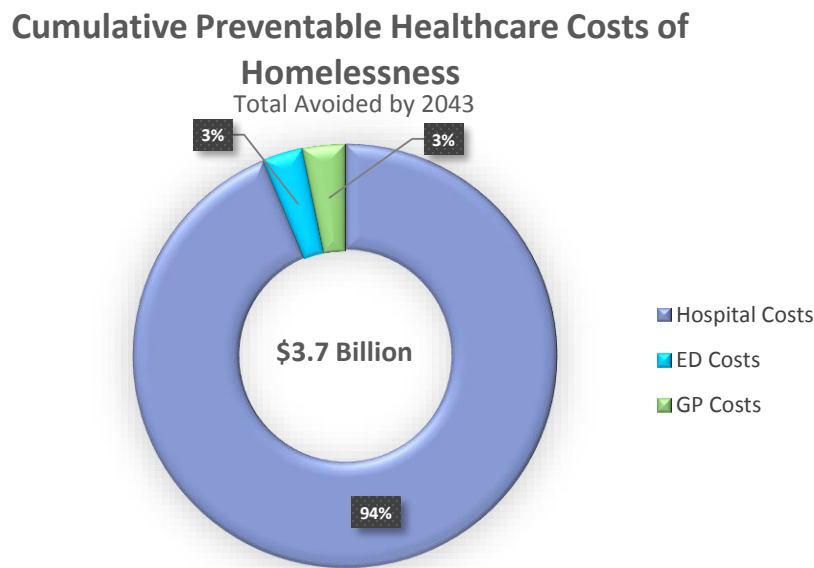
Not only do individuals at risk of homelessness visit hospitals and emergency departments less frequently if they retain their homes, but they spend less time in the hospital as well¹⁰. One study found that the homeless spend 36 per cent more time in the hospital once they are there relative to housed individuals (Salit, Kuhn, Hartz, Vu, & Mosso, 1998). This may be the case for a number of reasons. It is possible that poorer health necessitates greater lengths of stay. It is also possible that some individuals experiencing homelessness turn to hospitals in order to find a temporary source of shelter and care. In

¹⁰ The exact costs associated with various types of utilization of the healthcare system by the homeless are unknown. We therefore conservatively estimate that the average costs of each type of healthcare utilization (i.e. ED visits, GP visits, and hospital visits) by the homeless are the same as usage costs of residents.

all cases, securing adequate and financially accessible homes for at-risk and disadvantaged populations manifests as a reduced burden on the healthcare system, freeing up valuable and scarce resources for other patients. Over the next thirty years, Canada stands to save over \$3.7 billion if those at risk of homelessness continue to be provided with adequate housing by TCHC. In effect, every dollar spent on the 10-Year Capital Financing Plan will save taxpayers approximately \$1.40 in caring for individuals forced into homelessness¹¹ by the lack of funding alone. By scenario, this represents total costs avoided as follows¹²:

- With City and TCHC capital funding only, we can expect to avoid \$2 billion in hospital costs, \$69 million in ED costs, and \$6 million in GP costs due to homelessness;
- With City and TCHC capital funding with one funding partner, we can expect to avoid \$3.2 billion in hospital costs, \$100 million in ED costs, and \$9 million in GP costs due to homelessness; and
- With complete funding, we can expect to avoid \$3.6 billion in hospital costs, \$115 million in ED costs, and \$10 million in GP costs due to homelessness.

Figure 18 Cumulative Preventable Healthcare Costs of Homelessness



In total, as a result of keeping homes in good repair and preventing an increase in homelessness, over 2.1 million fewer healthcare events can be expected over the next 30 years, avoiding over \$3.86 billion in costs associated with both resident healthcare utilization and utilization among the homeless¹³. 60

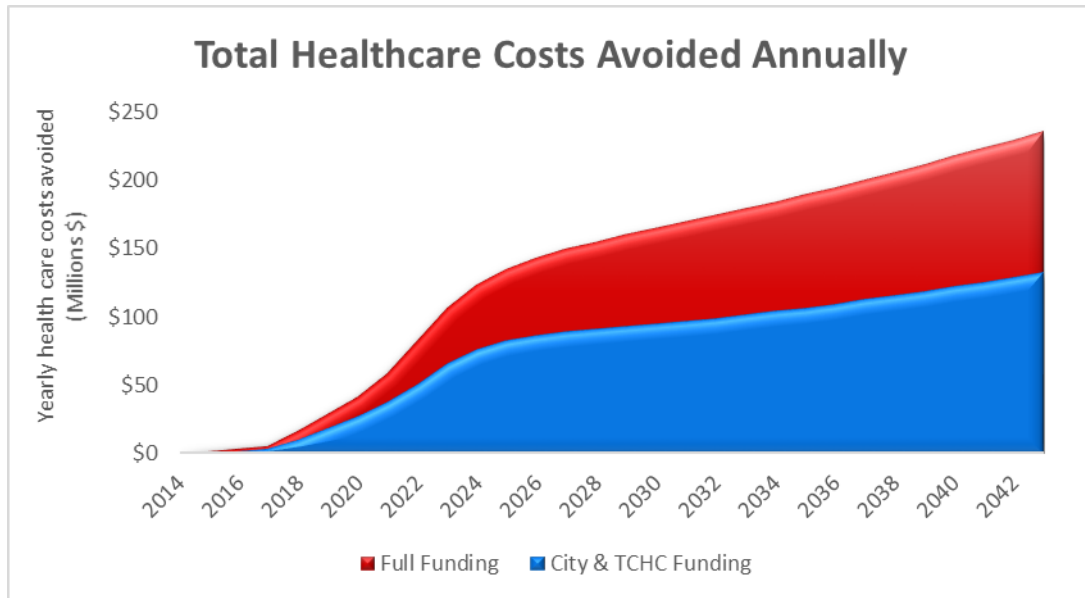
¹¹ For details on how many individuals experience homelessness, please see section 3.1.5 Community Benefits.

¹² Including visits and costs associated with both chronic conditions and mental illness by the homeless

¹³ While the tripartite investment is projected to prevent additional, cumulative healthcare costs of approximately \$3.86B over thirty years, these are not expected to represent cash reserves. Any available budget is likely to be allocated according to needs across the healthcare system. The figure of \$3.86B represents healthcare utilization-related costs, based on average costs of ED, GP, or hospital visits, which would be incurred as a result of additional TCHC resident and homeless utilization if the tripartite investment does not take place.

per cent of these savings are made possible by the contributions of TCHC and the City, whereas 40 per cent of these savings are made possible by provincial and federal contribution.

Figure 19 Annual Total Healthcare Costs Avoided

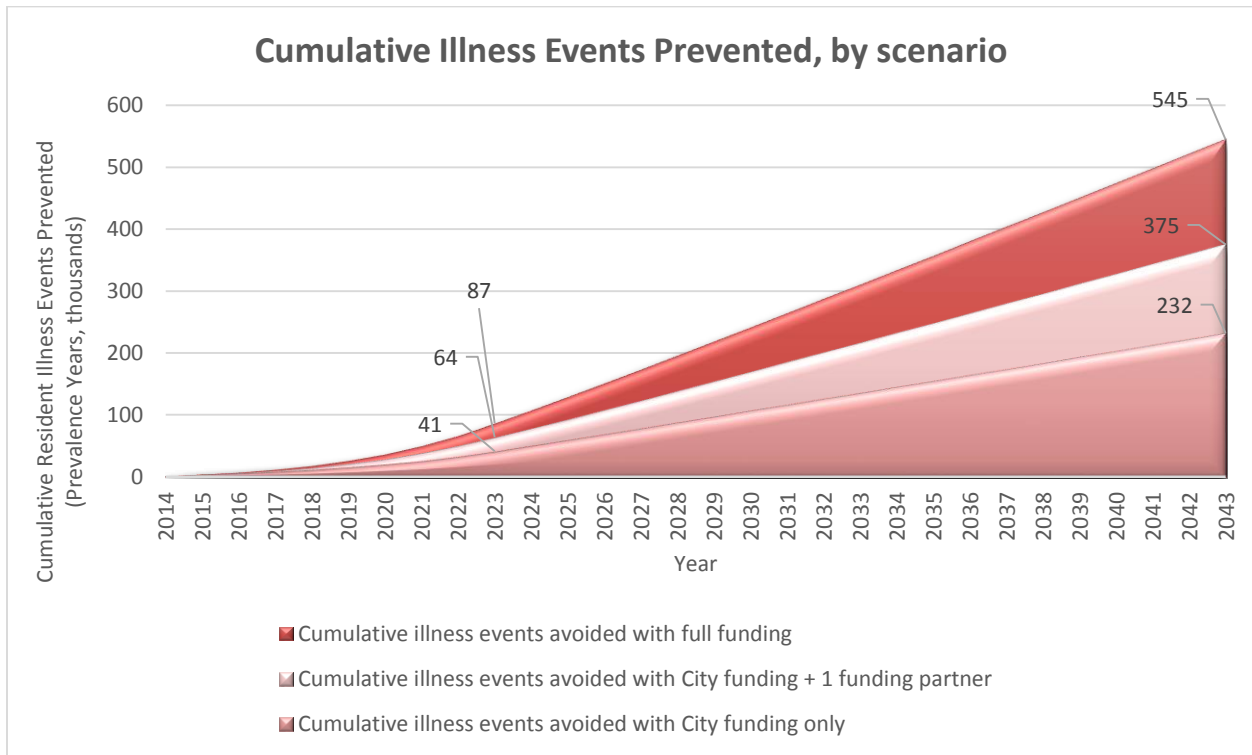


Based on the different investment scenarios, we can expect the following reduction in total illness events¹⁴ over the next 30 years (including those associated with homelessness), which cause the above savings in total healthcare costs:

- With City and TCHC funding only, we can expect approximately 232,000 fewer illness events;
- With City and TCHC funding with one funding partner, we can expect approximately 375,000 fewer illness events; and
- With complete funding, we can expect we can expect approximately 545,000 fewer illness events.

¹⁴ Illness events are a measure of health among the population. A person with a particular illness may or may not engage in utilization of various aspects of the healthcare system, based on agent characteristics and the nature of the illness. Illness events are measured in prevalence years, where each prevalence year represents one person having a given illness for one year. Two prevalence years may be two individuals having an illness for one year, or one person having an illness for two years, for example.

Figure 20 Cumulative TCHC Illness Events Avoided



3.1.4 ENERGY BENEFITS

Higher quality homes place less strain on energy infrastructure and resources, reducing consumption and therefore the unit’s utility costs, as well. Therefore a lower FCI can be linked, on average, to greater energy efficiency and lower levels of greenhouse gas emissions. One measure that can be taken in the improvement of the housing stock is the installation of efficient energy and water technologies. To date, a number of initiatives to improve the energy consumption of units have been undertaken, including retrofit programs, appliance replacements, and the refurbishment of unit interiors (Tsenkova & Whitty, 2013).

While these initiatives and programs are not necessarily linked to the major capital repairs that will be completed under the 10-Year Capital Financing Plan, similar effects can be observed as an indirect impact of performing major repairs. For instance, if poor quality or condition windows are upgraded or replaced in a unit, the amount of energy needed to heat that unit decreases significantly.

An immediate reduction in energy costs leads to additional benefits. TCHC bears responsibility for utilities consumed by most of its residents (Tsenkova & Whitty, 2013) and stands to face growing energy costs if it cannot secure sufficient resources to finance necessary repairs. However, units in better condition consume less energy (Tsenkova & Whitty, 2013), costing TCHC less in utilities as the composition of units in TCHC’s portfolio by FCI trends towards better states of repair. By completing

capital repairs with participation from the provincial and federal governments, these energy efficiency effects result in an average savings of almost 10 per cent in annual energy costs per unit by 2043. This relieves additional resources for TCHC that would otherwise be used to cover utility bills, which represent an expense rather than an investment. Those additional resources may be used to fund the restoration of different units, or to support the development of new units.

In addition to energy cost savings, it is important to note that apartment towers, particularly those built between 1945 and 1984, represent some of the largest contributors to residential greenhouse gas emissions. Relative to a single detached house, such dwellings require 25 per cent more energy per square meter for operation alone, excluding requirements for other household uses of energy (Stewart & Thorne, 2009). Greenhouse gas emissions can be expected to fall with decreased energy consumption, representing another social and environmental benefit. As a result of Revitalization and the implementation of the necessary capital repairs, the average yearly greenhouse gas emissions is expected to fall by 390 kg, or just under 9 per cent per unit¹⁵.

3.1.5 COMMUNITY BENEFITS

Beyond the immediately visible economic impacts of supporting the 10-Year Capital Financing Plan, a number of additional social benefits can also be expected. A number of these benefits stem from the key role that TCHC plays in providing homes to formerly homeless individuals in Toronto.

Reducing homelessness is a goal set by all levels of government, as is evident in government support for such programs as the Housing First model (Mental Health Commission of Canada, 2014). A key part of addressing this issue, TCHC fills one in every seven RGI units that come available with members of disadvantaged groups, most of whom qualify due to homelessness.

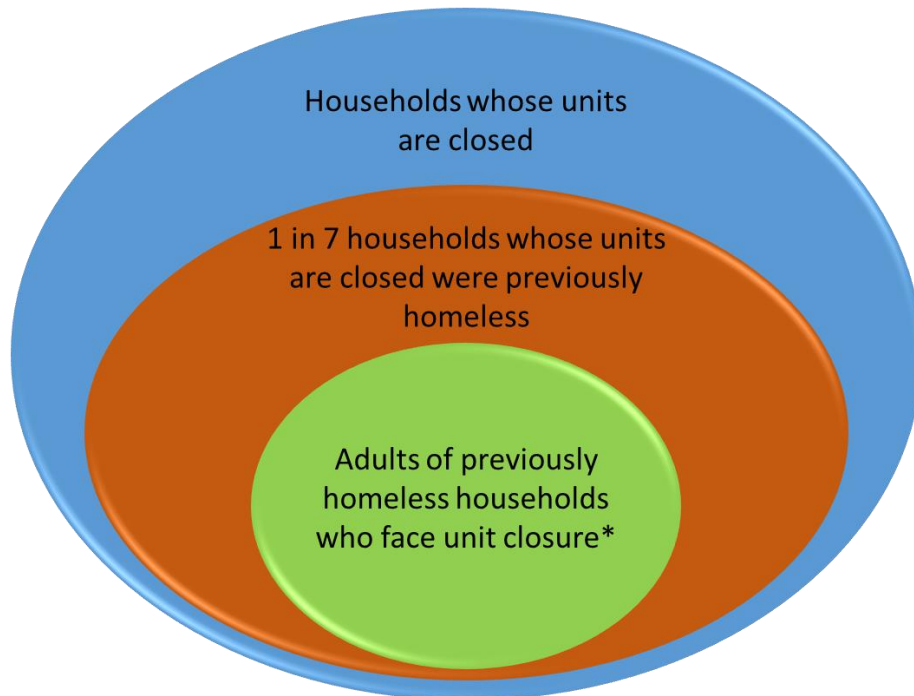
In order to ensure that the calculations for the number of new individuals experiencing unit closures are conservative, we employ the following assumptions:

- 1) Of all units that are closed, one in seven housed a household that was previously homeless
- 2) Of the previously homeless households that faced unit closure, only adults will become homeless again

This is illustrated in Figure 21, below.

¹⁵ The exact types of repairs to take place on the TCHC portfolio are unknown. As a result, energy cost savings and GHG emissions were computed based on average energy costs and GHG emissions of a sample of dwellings in each respective FCI category, provided by TCHC. Weighted averages were computed using the number of open units in each condition as frequency weights in order to calculate the average annual energy costs and GHG emissions for each funding scenario. An inherent assumption under these data limitations is that all dwellings in a given FCI category will feature the same improvements in energy efficiency and GHG emissions.

Figure 21 Individuals assumed to become homeless as a result of unit closure



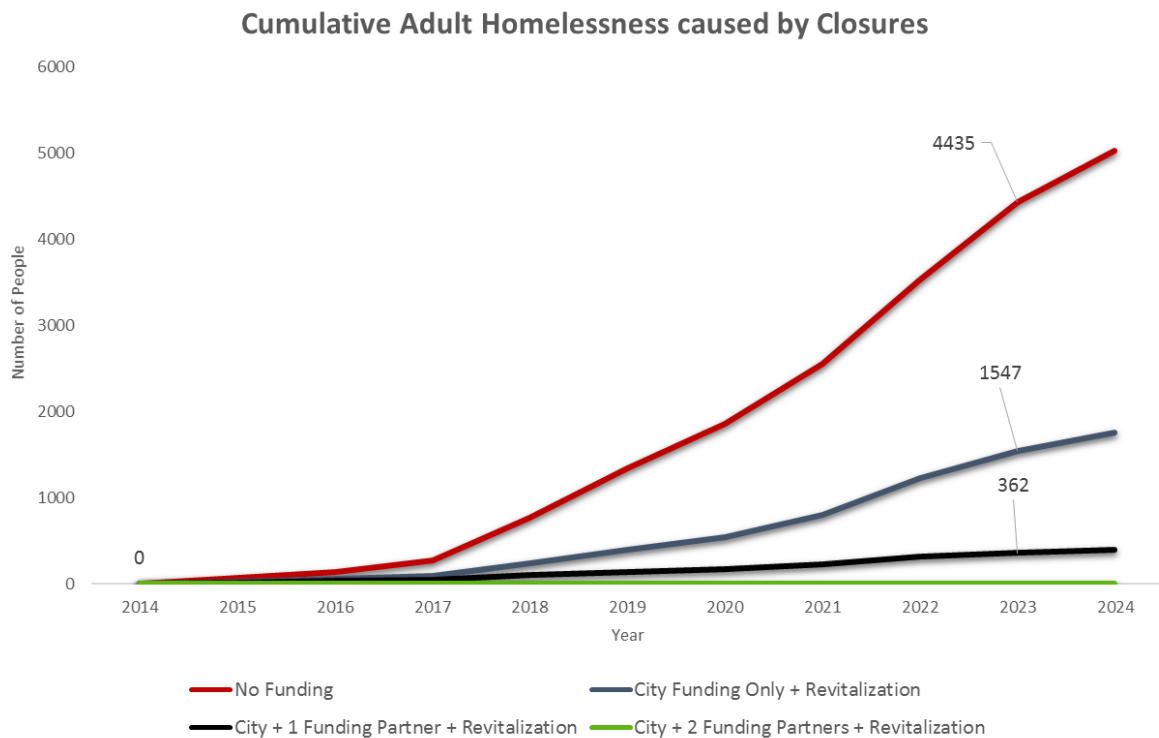
* Subgroup assumed to become homeless as a result of unit closure

This ensures that the figures for individuals experiencing homelessness are conservative and allows for the possibility that children who were homeless prior to being occupants of TCHC homes will find alternate housing in the event of a unit closure.

With full funding, individuals classified as being at risk of homelessness who are currently living in TCHC units will not face the risk of being left homeless as a result of the condition of their building reaching a critical state. Investing in the state of repair of TCHC units allows at least 4,435 adults to avoid homelessness by 2023; this figure is likely to be much larger for the total number of individuals who would avoid homelessness, as it does not include affected children or youth¹⁶.

¹⁶ Although it is possible that various programs or protocols would be designed by TCHC or the City of Toronto in order to prevent eviction and therefore limit the increase in homelessness, at this time, no such programs exist. In addition, data limitations do not allow for the estimation of costs associated with such programs, nor their economic impacts. An analysis of the possible homelessness prevention options available to TCHC or the City of Toronto are outside of the scope of this study. As a result, the homelessness that is generated due to unit closures reflects what would occur if no such programs were created.

Figure 22 Cumulative Adult Homelessness due to Closures



- With City and TCHC funding only, we can expect 2,888 fewer new individuals experiencing homelessness by 2023, and 3,364 by 2043;
- With City and TCHC funding with one funding partner, we can expect 4,073 fewer new individuals experiencing homelessness by 2023, and 5,081 by 2043; and
- With complete funding, we can expect 4,435 fewer new individuals experiencing homelessness by 2023, and 5,743 by 2043.

According to TCHC data, approximately one fifth of residents access social assistance through the Ontario Works (OW) program. It is reasonable to presume that tenants who are currently accessing social assistance and who face closure will continue to access social assistance programs once their units are closed. However, those who are currently able to survive without social assistance in TCHC RGI units may need to utilize such programs if their units close, even if they do not face homelessness. For instance, if another RGI unit is not available for the tenants that experience unit closure, they may need to access a market unit and therefore pay more rent¹⁷. While their OW eligibility may not change as a result of increased housing expenditures, it may make it more likely that a person who is already eligible and did not previously access social assistance will do so at that point, for example.

¹⁷ Additional OW costs do not reflect the potential increase in social assistance that may be paid out to families that move from an RGI unit to a market unit. The additional costs focus solely on new recipients of social assistance. As a result, the social assistance estimates are conservative.

It is unknown what proportion of individuals facing unit closure will access social assistance. In order to resolve this lack of data, sensitivity analysis has been conducted on the social assistance costs associated with new OW recipients based on varying proportions of former TCHC tenants accessing it once they face unit closure. It is conservatively assumed that those already receiving support through the OW program will continue to do so at the same rate. In order to further ensure that these estimates are conservative, only OW is considered, and it is assumed that only individuals experiencing unit closure will contribute to additional social assistance costs. That is to say, among residents that continue to live in TCHC, it is assumed there will be no new individuals accessing OW. On the basis of these assumptions, the additional social assistance costs vary as follows:

- If 50 per cent of all adult tenants (including existing recipients) facing unit closure would access social assistance, the total social assistance costs prevented¹⁸ by full funding sum to over \$378 million over ten years and \$3.4 billion over thirty years.
- If 75 per cent of all adult tenants (including existing recipients) facing unit closure would access social assistance, the total social assistance costs prevented by full funding sum to over \$567 million over ten years and \$5.1 billion over thirty years.
- If 100 per cent of adult tenants (including existing recipients) facing unit closure would access social assistance, the total social assistance costs prevented by full funding sum to over \$756 million over ten years and \$6.8 billion over thirty years.

Therefore, by eliminating the need for additional individuals to access social assistance through the continued provision of RGI housing, the total potential social assistance costs avoided over the next decade sums to over \$756 million, and over the next three decades, the savings climb to over \$6.8 billion¹⁹.

TCHC communities and those adjacent to them also benefit from an average yearly reduction in crime of 15 per cent. The reason for this is that physical neighbourhood characteristics resulting from major repairs to units have been empirically linked to reductions in the rates of threats, major assaults, and robberies (Charron, 2009; Keizer, Lindenberg, & Steg, 2008). As the costs of crime are absorbed by the public system, the City can expect to avoid over \$2.5 million as a result of the reductions in crime by 2023, and a total of over \$17 million by 2043, on the basis of the average cost per crime, according to a report published by the Canadian Department of Justice (Zhang & Qin, 2012). 65 per cent of this reduction effect is directly attributable to the collaboration of the provincial and federal governments. The reduction in crime is its own reward, but it is also conducive to other positive community outcomes. For instance, while not quantified here, lower crime rates will attract businesses and private investment, supporting the economic development of the area.

Beyond the injection of capital into the community, even adjacent communities can expect to enjoy enhancements to their rental incomes. Due to the Revitalization of communities, the economic development, and the greater strength and vibrancy as a result of TCHC and City initiatives and their

¹⁸ These refer to only new recipients. It is assumed that the existing proportion of tenants accessing social assistance cannot be reduced and will persist.

¹⁹ For the purposes of this report, this figure will be referenced throughout.

impacts, surrounding neighbourhoods will enjoy substantial increases in the rental incomes earned. Studies have shown that dilapidated dwellings create negative externalities to the properties adjacent to them, and that restoring those properties creates “positive spillovers to the surrounding community” (Gould Ellen I. , 2006) in terms of property value, which are linked to rental incomes in this study by means of the average rental yield for properties in Toronto. During interviews with developers that have partnered with TCHC in previous revitalization endeavours, it was identified that the investment in TCHC properties yielded a 3.5% premium in the property values of dwellings adjacent to those TCHC dwellings, in excess of the property values of other comparable, non-TCHC homes.

In order to estimate the changes to the rental income for neighbourhoods adjacent to the TCHC neighbourhoods, the value of market rental rates was estimated through its link to FCI levels of units, wherein units neighbouring those associated with a higher FCI would draw in less rent on the market than those adjacent to units that registered lower FCI levels. This, by extension, causes decreases in rental income for dwellings in adjacent neighbourhoods, as factors external to a given building can impact its values²⁰. The model accounts for the proportion of the housing stock that is rented, the average turnover rate in leases, and the average rent yield, which were computed and drawn from CMHC data for the Toronto CMA (Canada Mortgage and Housing Corporation, 2014).

As rental incomes are linked to property values by means of rental yields, estimates for the property values of properties surrounding TCHC dwellings were created. In order to parse the market values of TCHC properties from those of surrounding dwellings, current value assessments from 2012 for the city of Toronto were employed for the neighbourhoods in which TCHC properties are situated.

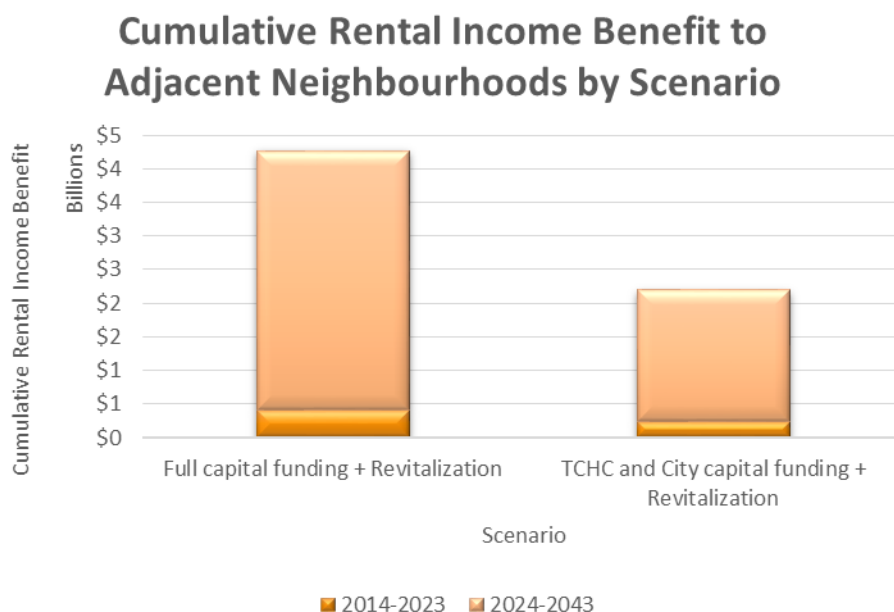
The results show that by 2023, the increase in total market rental incomes of surrounding neighbourhoods is expected to reach over \$407 million. By 2043, these benefits will sum to almost \$4.3 billion²¹. Approximately 51 per cent of this benefit is a direct result of the participation of the City and TCHC. Demonstrably, the multiplier effects that materialize as a result of Revitalization and restoration initiatives do not only compound the benefits vertically in the focal communities, but they spread across neighbourhoods as well. When considering social assistance and crime costs avoided, as well as the increase in adjacent neighbourhoods' rental incomes, the total benefit to the community will register at approximately \$13.7 billion over the next 30 years. In other words, every dollar spent on either Revitalization or the 10-Year Capital Financing Plan will return almost twice that in community benefits alone²².

²⁰ The surrounding areas do not face as large a decrease in rental income as the buildings with a high FCI, but are impacted nonetheless.

²¹ These estimates do not factor the potential increase in property taxes and impacts on rental incomes.

²² Although social assistance costs will be absorbed by the provincial government rather than the community, it is considered a community benefit that social assistance costs will be prevented. The reason for this is that in this study, any new social assistance dependents resulting from lack of investment are considered to be a subpopulation of TCHC residents only, rather than other Toronto or Ontario residents.

Table 20 Cumulative Rental Income Benefit



Summary Tables: Benefit to Adjacent Neighbourhoods

Table 21 Benefit to Adjacent Neighbourhood Rental Income

Time Period	Total impact of tripartite investment (Millions)	Percentage of Total Benefit attributable to capital funding	Percentage of total benefit attributable to Revitalization
2014-2023	\$407.9	65 per cent	35 per cent
2014-2043	\$4,271 (\$4.27B)	63 per cent	37 per cent

3.1.6 FEDERAL AND PROVINCIAL RETURNS

The economic, health, community, and energy benefits discussed are made possible by the support of the federal and provincial governments. Toronto is a driver of economic prosperity for both Ontario and Canada, and is home to over 2.7 million residents. The public and private capital investments injected into Toronto’s economy, which generate additional incomes and the capacity for additional employment throughout primarily Ontario, will also affect demand pressures throughout the economic system for all of the goods and services needed to support the project. Furthermore, additional income for individuals and firms will spur greater consumption amongst households, which will also place further demand on firms for goods and services outside of the project scope. Firms will increase productive capacity in order to meet this greater demand. Behind these complementary upward effects in the economy are two major beneficiaries: the provincial and federal governments.

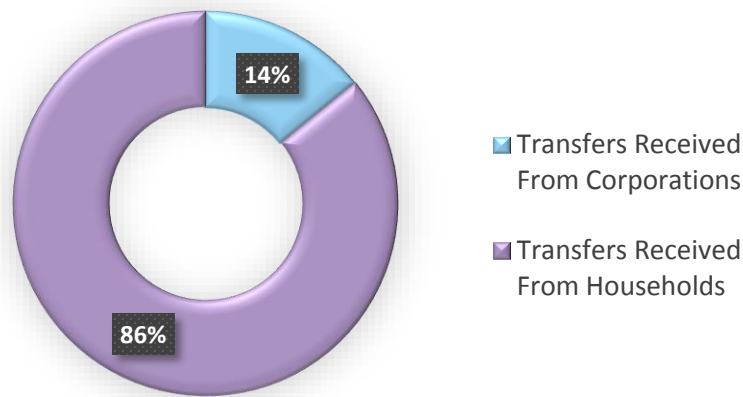
- The provincial government gains approximately \$2.2 billion in tax revenue by 2043

- The federal government gains approximately \$2.2 billion in tax revenue by 2043

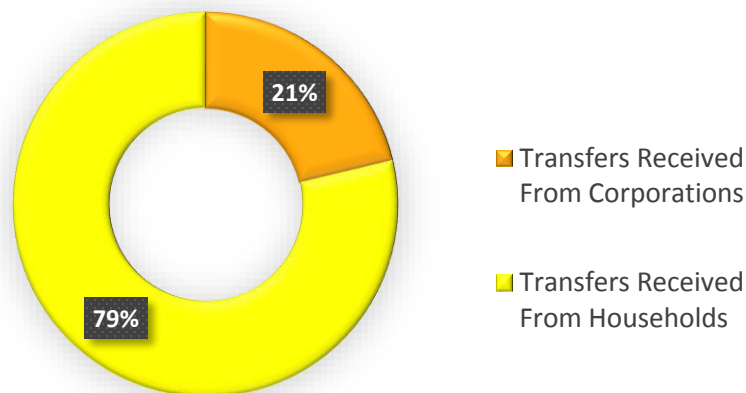
The governments will benefit through a system of taxation revenue channels, including taxes drawn from production and consumption, as well as income taxes. Therefore, both households and business entities will support stronger government revenues, primarily over the next decade. Households will contribute more to government tax revenues than corporations.

Figure 23 Provincial and Federal Income Taxes by Source

Provincial Income Tax by Source



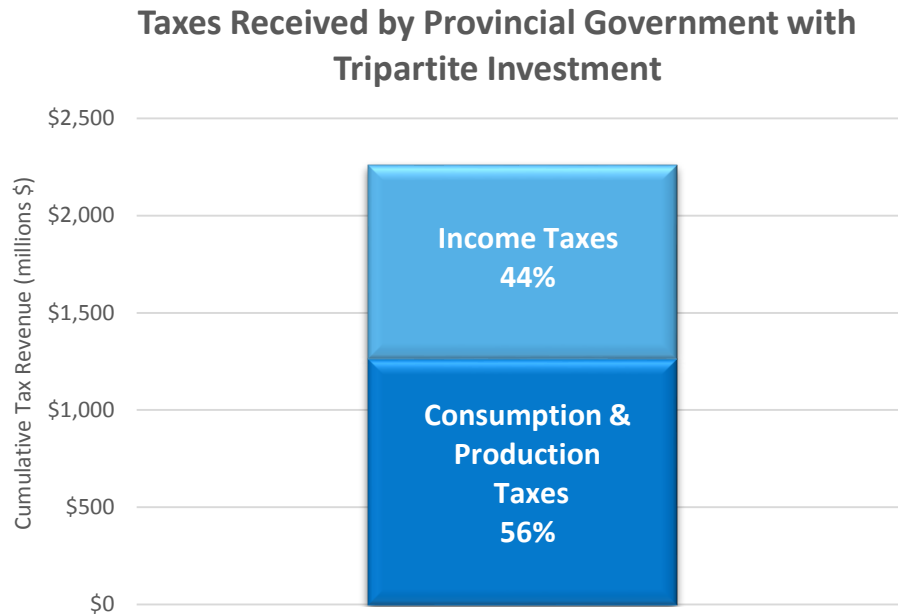
Federal Income Tax by Source



There is a somewhat symmetrical distribution between income taxes and consumption/production taxes, with consumption taxes leading by a small margin. By 2023, the province can expect to draw in over \$986 million in consumption taxes and \$767 million in income taxes. Over the course of thirty

years, these numbers rise to \$1.2 billion and \$996 million, respectively, for a total of over \$2.2 billion in provincial tax revenue alone. 64 per cent of the total, thirty-year tax revenue that will be received by the provincial government will be a result of TCHC Revitalization efforts, with the remainder linked to investments in repairs under the 10-Year Capital Financing Plan.

Figure 24 Taxes received by provincial government with tripartite investment

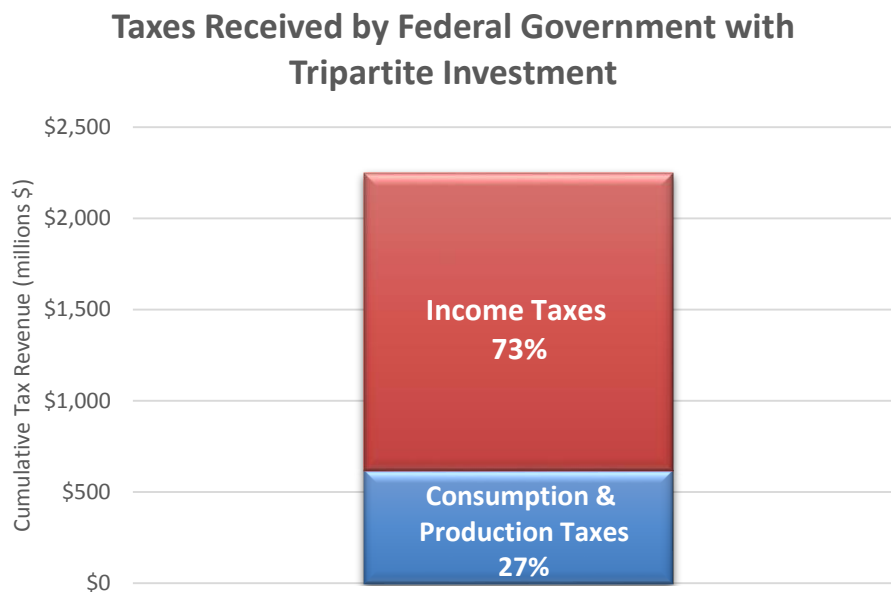


In fact, even considering only provincial tax revenues over ten years of the project, Ontario will accumulate over \$1.7 billion, over twice its investment in the 10-Year Capital Financing Plan. This demonstrates that provincial balance sheets will not have to wait for benefits until after the project is over, as repayment will not be deferred. Even before considering the savings from healthcare costs, social assistance costs, and additional community benefits, the investment benefits in terms of revenue alone essentially nullify the costs of the investment altogether. The province will enjoy additional income that it can re-invest to support the economic development of Ontario.

Over the course of thirty years, the province will net over \$1.3 billion in valuable tax revenue, above their recuperated investment costs. Furthermore, Ontario will have been an active participant in promoting and ensuring continued access to adequate and affordable housing in partnership with municipalities. Having recognized a pressing need to ensure that housing infrastructure for some of its most disadvantaged communities, Ontario will ensure it is able to keep pace with population growth, infrastructure aging issues, and general demand. These goals and mandates have already been pledged by the Ontario Ministry of Economic Development, Employment and Infrastructure, as outlined in the *Building Together Plan* (Ontario Ministry of Infrastructure, 2011), and as well in Ontario’s Long-Term Affordable Housing Strategy (Ontario Ministry of Municipal Affairs and Housing, Housing Policy Branch, 2010).

The federal government, like the provincial government, can expect significant benefits from the investment in social housing in Toronto. Income taxes will represent a greater contributor than consumption taxes to federal tax revenues resulting from this project, at approximately 73 per cent of the thirty year total of over \$2.2 billion. Furthermore, 62 per cent of the \$2.2 billion in tax revenues to be enjoyed by the federal government are made possible by Revitalization efforts, with the remaining 38 per cent the result of investments in repairs under the 10-Year Capital Financing Plan. Of this total, approximately \$1.7 billion will be received by the federal government within the duration of the investment schedule. Households will provide the greatest contribution to federal tax revenue.

Figure 25 Taxes Received by Federal Government with Tripartite Investment



The tax revenue generated through additional economic activity as a result of the investment will provide the federal government with over \$1.3 billion in net cash flow over thirty years, similar to the net taxes to be collected by the provincial government.

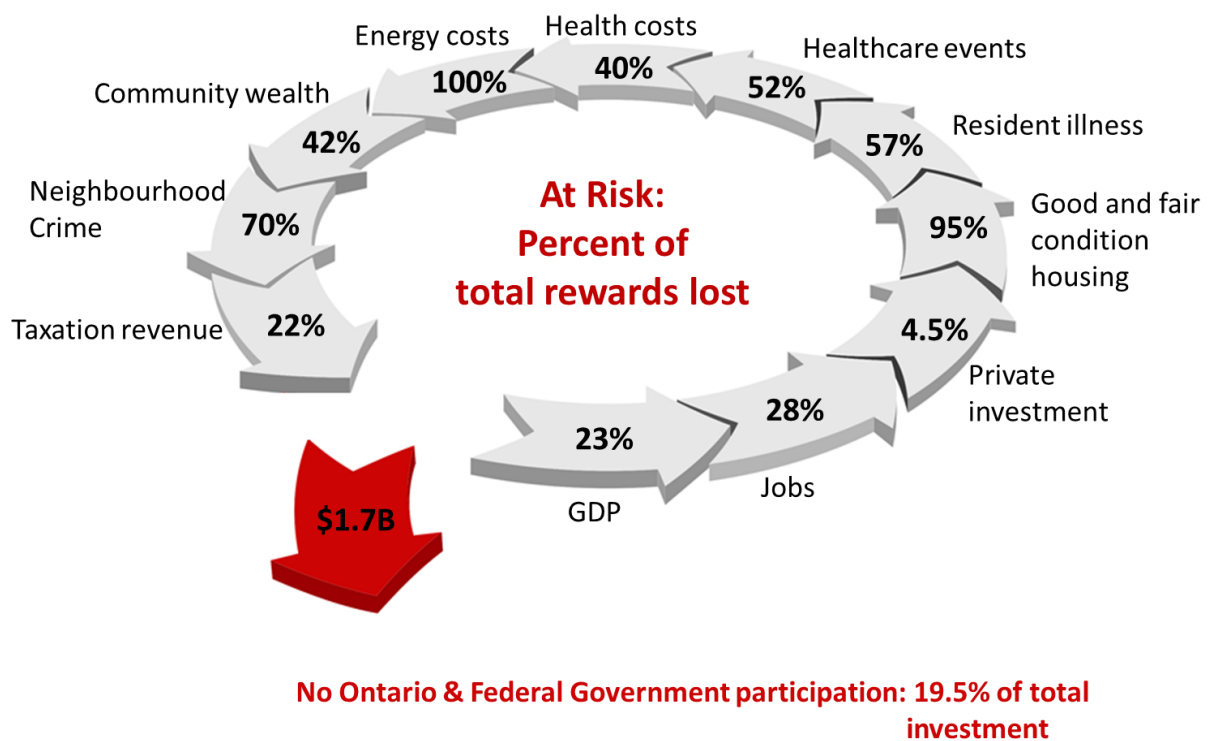
3.2 RISK SCENARIO: \$900M TCHC & CITY OF TORONTO CAPITAL INVESTMENT AND \$5B REVITALIZATION

From the reward scenario, it is clear that the funding identified in the 10-Year Capital financing Plan will have benefits for all three levels of government. In addition to supporting housing for the city’s most marginalized populations, there are substantial health and economic benefits to be accrued from the investment. However, these benefits are highly dependent on the participation of both the federal and provincial government. The risk to these benefits is the possible lack of financial participation from Queen’s Park and Ottawa. The risk scenario, therefore, illustrates the benefits that are at risk as a result of lack of participation from the federal and provincial governments.

The provincial and federal governments, when considered together, have been asked to contribute approximately 19.5 per cent of the total investment in capital repair and Revitalization (including past Revitalization). However, more than 19.5 per cent of the total benefits of the investment are at risk for all types of impacts except for private capital investment.

With support from the municipal government alone, TCHC has begun to implement its 10-Year Capital Financing Plan; however, without additional funding, Toronto still faces the risk of an accelerating deterioration in the social housing portfolio, the deterioration of the health of its residents, and growth in the number of individuals experiencing homelessness. The Revitalization of TCHC communities already underway has begun to address some of the declining conditions of dwellings and neighbourhoods, as recommended in *Putting People First: Transforming Toronto Community Housing* (Special Housing Working Group, 2012), but this initiative alone will prove insufficient to attain the goals set by the City of Toronto and TCHC without the participation of the provincial and federal governments.

Figure 26 Systems Approach to understanding TCHC Value: Percent of total rewards lost



A summary of the risks of no provincial or federal participation is shown in the table below.

Table 22 Risk Scenario Summary: General Economic Metrics

Prosperity Metrics		Reward Scenario Impacts	Benefit at Risk	Change
Economic Impacts	Investment evaluated	\$5B Revitalization and \$2.6B capital repair		\$1.7B less Ontario/Federal government
	GDP contribution	\$18.5B more for Canada and Ontario	23 per cent	\$4.2B less GDP
	Employment years	220,000 more for Canada and Ontario	28 per cent	62,700 less
	Private capital investment	\$5B more for Canada and Ontario	4 per cent	\$225M less
	Ontario and Federal taxation revenues	\$4.5B more	22 per cent	\$1B less

Table 23 Risk Scenario Summary: Toronto Community Metrics

Prosperity Metrics		Reward Scenario Impacts	Benefit at Risk	Change (compared to Reward Scenario)
Community, Health, and Energy Impacts	Condition of TCHC dwellings	28,181 closures avoided. 76 per cent of units in good and fair condition.	27 per cent (closures)	7,500 more closures 31,600 more units in critical & poor condition
	Homelessness	5,740 avoided	41 per cent	2,380 more
	TCHC resident illness	544,000 fewer cases	57 per cent	312,000 more cases
	Healthcare utilization	2,100,000 fewer health care cases	52 per cent	1,100,000 more
	Healthcare costs	\$3.8B less	39 per cent	\$1.55B more

Greenhouse gas emissions	9 per cent lower	100 per cent	10 per cent higher ²³
Community wealth	\$13.6B more	42 per cent	\$5.7B less
Neighbourhood crime	15 per cent lower	70 per cent	10.5 per cent more

3.2.1 ECONOMIC RISKS FOR TORONTO AND THE GTHA

GDP - \$4.2 billion at risk for Canada

While the benefits of the existing investment in Revitalization and the municipal participation in TCHC’s 10-Year Capital Financing Plan will still generate economic activity through the same mechanisms that the full investment would, these effects are dampened by the reduced levels of investment. Toronto will accrue \$1.7 billion less in regional GDP over the course of thirty years than would have otherwise been possible. This implies that approximately 21 per cent of the total, potential investment benefit to regional GDP is lost without the contributions of the provincial and federal governments.

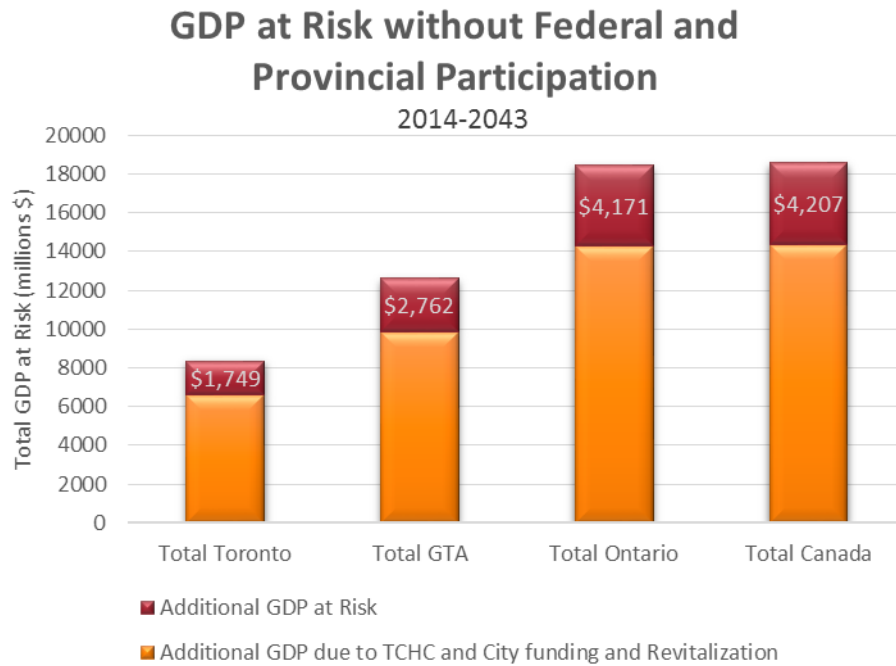
Because the GTHA is another strong potential beneficiary in terms of economic activity, the non-participation of the provincial and federal governments increases the amount of regional GDP at risk for both Toronto and the GTHA to \$2.7 billion. This represents an average of \$90 million each year at risk, which the GTHA could have otherwise contributed to Canada’s national production. The average GDP rates of change will also reflect a relatively weaker economy, such that Toronto will lose 21 per cent of the benefit to its average rate of change in regional GDP over thirty years, and the GTHA will similarly lose 22 per cent of its rate of change benefits if the provincial and federal governments do not offer their contributions to the 10-Year Capital Financing Plan.

The provincial and federal governments, should they choose not to contribute to repairing the existing social housing in Toronto, will bear losses to potential GDP levels and growth. Both Ontario and Canada stand to forfeit 22 per cent of the GDP benefit from the capital investments over ten years, approximately \$2.7 billion, and 23 per cent of the thirty-year benefit to both provincial and national GDP, approximately \$4.2 billion.

²³ In order to see a reduction in energy costs and greenhouse gas emissions, full funding is required. The reason for this is that partial funding will allow more units to avoid closure, but will not be able to mitigate the increasing average FCI of the portfolio as more units fall into disrepair and become less energy efficient. Closed units decrease energy costs and GHG emissions because they do not require heating, cooling, and other energy-related operations. Open units with higher FCI levels cause increases in energy costs and GHG emissions as they are less energy efficient. Therefore, with partial funding, the net impact of these two effects leads to an increase in average annual GHG emissions by approximately 1.82kg per open unit (from 4452.53kg to 4454.35kg), and an increase in average annual energy costs by \$6.38 per open unit (from \$2435.16 to \$2441.54). Full details are available in section 3.2.4.

- \$1.7 billion of Toronto's GDP benefit is at risk over thirty years
- \$2.7 billion of the GTHA's (including Toronto) GDP benefit is at risk over thirty years
- \$4.1 billion in Ontario's (including the GTHA) GDP benefit is at risk over thirty years
- **\$4.2 billion of Canada's total GDP benefit is at risk over thirty years**

Figure 27 GDP at Risk



GDP at Risk: Summary tables

Table 24 Regional GDP at Risk: Toronto

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$3,784.1	\$770.6	20 per cent
2014-2043	\$8,356.6	\$1,749.4	21 per cent

Table 25 Regional GDP at Risk: GTHA (inclusive of Toronto)

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$7,491.9	\$1,608	21 per cent
2014-2043	\$12,622.9	\$2,762.3	22 per cent

Table 26 GDP at Risk: Ontario (inclusive of the GTHA)

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$12,602.3	\$2,775.6	22 per cent
2014-2043	\$18,454.4	\$4,171.1	23 per cent

Table 27 GDP at Risk: Canada (inclusive of Ontario)

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$12,678.7	\$2,793.4	22 per cent
2014-2043	\$18,574.7	\$4,207.5	23 per cent

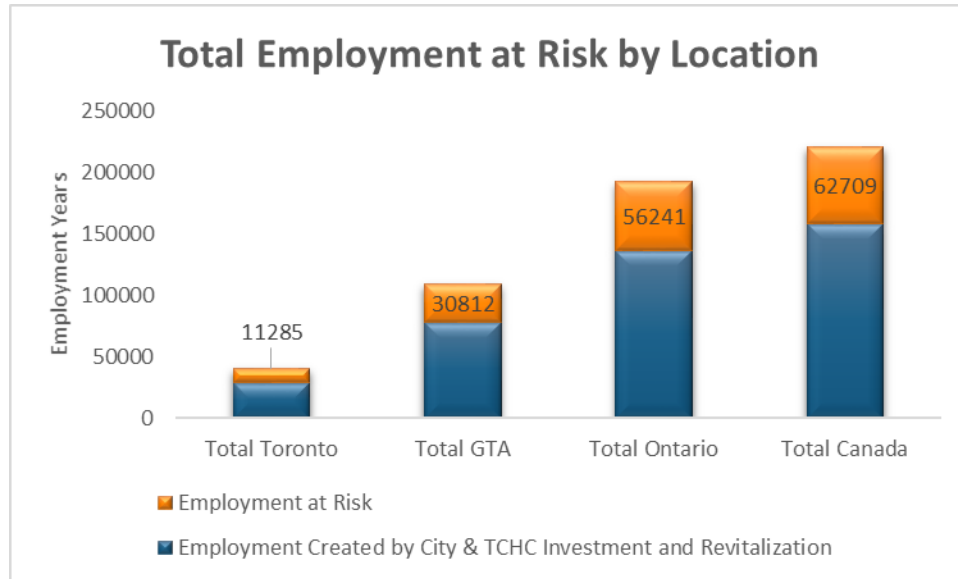
Regional Employment – 62,700 employment years at risk for Canada

Increases in GDP stimulate increases in employment, which is a lagged indicator of economic strength. However, smaller increases in GDP mean that the economy's productive and consumption capacities grow by diminished amounts, allowing fewer individuals to benefit through employed labour. Over the next ten years, Toronto will generate approximately 7,900 fewer years of employment, if only the municipal government and TCHC continue the capital investment initiative. Over thirty years, this figure will rise to over 11,000 fewer years of employment, or approximately 28 per cent of the full

investment’s benefit to employment. The total jobs at risk as a result of the absence of federal and provincial funding represent:

- Over 11,000 employment years at risk for Toronto over thirty years
- Over 30,000 employment years at risk for the GTHA (including Toronto) over thirty years
- Over 56,400 employment years at risk for Ontario (including the GTHA)
- **Over 62,700 employment years at risk for Canada, in total, over thirty years**

Figure 28 Employment at Risk by Location

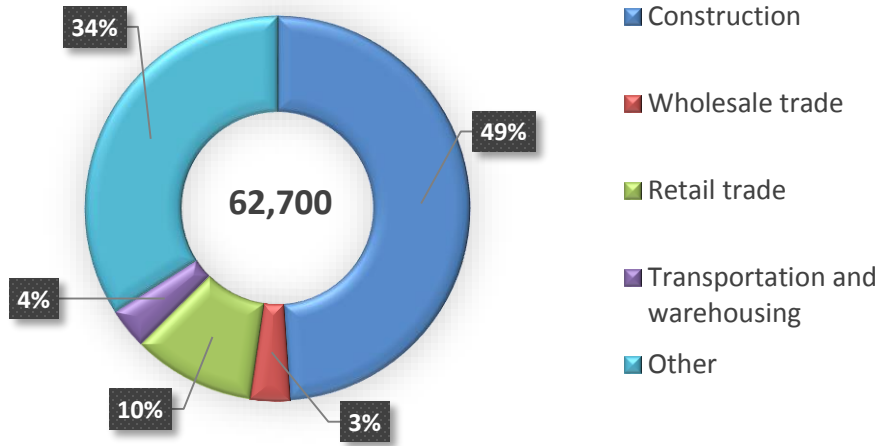


Both provincial and national employment can be expected to rise due to the contributions of TCHC’s Revitalization program and municipal participation in capital funding; however significant proportions of the benefits that could be accrued with full funding are at risk. Similar to Toronto and the GTHA, approximately 29 per cent and 28 per cent of Ontario’s and Canada’s respective employment benefits from the 10-Year Capital Financing Plan are at risk over a thirty year period. In total, this represents over 62,700 employment years lost for all of Canada, or an average of approximately 2000 full-time jobs each year.

Throughout Canada, 49 per cent of the employment years at risk over thirty years will be in the construction sector, with another 10 per cent lost from the retail trade sector. The partial investment (that is to say, TCHC’s Revitalization investment and the municipal government’s participation in the 10-Year Capital Financing Plan) implies that fewer units of direct labour will be funded, generating fewer benefits in auxiliary jobs attracted to support the direct employment effects.

Figure 29 Canada Employment at Risk by Sector

Total Canada Employment at Risk



Employment at Risk: Summary Tables

Table 28 Employment at Risk: Toronto

Time period	Total Investment benefit	Amount at risk	Percentage of benefit at risk
2014-2023	29,379	7,913	27 per cent
2014-2043	40,135	11,285	28 per cent

Table 29 Employment at Risk: GTHA (inclusive of Toronto)

Time period	Total Investment benefit	Amount at risk	Percentage of benefit at risk
2014-2023	81,101	22,108	27 per cent
2014-2043	108,948	30,812	28 per cent

Table 30 Employment at Risk: Ontario (inclusive of the GTHA)

Time period	Total Investment benefit	Amount at risk	Percentage of benefit at risk
2014-2023	136,564	36,673	27 per cent
2014-2043	192,845	56,241	29 per cent

Table 31 Employment at Risk: Canada (inclusive of Ontario)

Time period	Total Investment benefit	Amount at risk	Percentage of benefit at risk
2014-2023	142,039	36,695	26 per cent
2014-2043	220,997	62,709	28 per cent

Regional Private Capital Investment - \$225 million at risk for Canada

The lower level of economic activity within Toronto and the GTHA relative to its potential strength under the fully-funded scenario means that fewer firms will find the areas attractive for private investment. Fewer opportunities for businesses to capitalize on the economic strength of a region will manifest as a lower additional benefits in terms of private capital investment.

- \$34 million in Toronto’s private capital investment is at risk over thirty years
- \$112 million in the GTHA’s (including Toronto) private capital investment is at risk over thirty years
- \$222 million in Ontario’s (including the GTHA) private capital investment is at risk over thirty years
- **\$225 million in Canada’s total private capital investment is at risk over thirty years**

Between 2014 and 2023, Toronto, as a result of incomplete funding, would draw approximately \$42 million less in private capital investment, while the ten-year risk to private capital investment for the GTHA overall sums to over \$106 million. For regions of Canada outside of the GTHA, the ten-year risk sums to approximately \$90 million.

Both Toronto and the GTHA face reduced risks over time because other economic activity in the city and region, respectively, will counteract (however, will not mitigate) these impacts. The low proportion of the total benefit at risk is driven by the fact that Revitalization efforts, already pledged, are responsible for attracting the vast majority of private capital investment benefits.

Revitalization also draws in the majority of provincial and national private capital investment totals. Nonetheless, both Ontario and Canada will experience slight decreases in private capital investment relative to the full funding scenario. Over the course of a decade, almost \$200 million in private investment will be forgone in Canada—a figure which rises to approximately \$225 million by 2043.

Private Capital Investment: Summary Tables

Table 32 Regional Private Capital Investment at Risk: Toronto

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$3,781.2	\$42.2	1 per cent
2014-2043	\$4,332.7	\$34.3 ²⁴	1 per cent

²⁴ This sum is smaller over the thirty year period as some positive net private capital investment is expected to enter Toronto after the initial ten year period. Therefore, the thirty year total loss is reduced by the positive net capital investment expected after 2023.

Table 33 Regional Private Capital Investment at Risk: GTHA (inclusive of Toronto)

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$4053.4	\$106.5	3 per cent
2014-2043	\$4625.8	\$112.5	2 per cent

Table 34 Private Capital Investment at Risk: Ontario (Inclusive of the GTHA)

Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$4,434.6	\$197.0	4 per cent
2014-2043	\$5,036.5	\$222.9	4 per cent

Table 35 Private Capital Investment at Risk: Canada (Inclusive of Ontario)

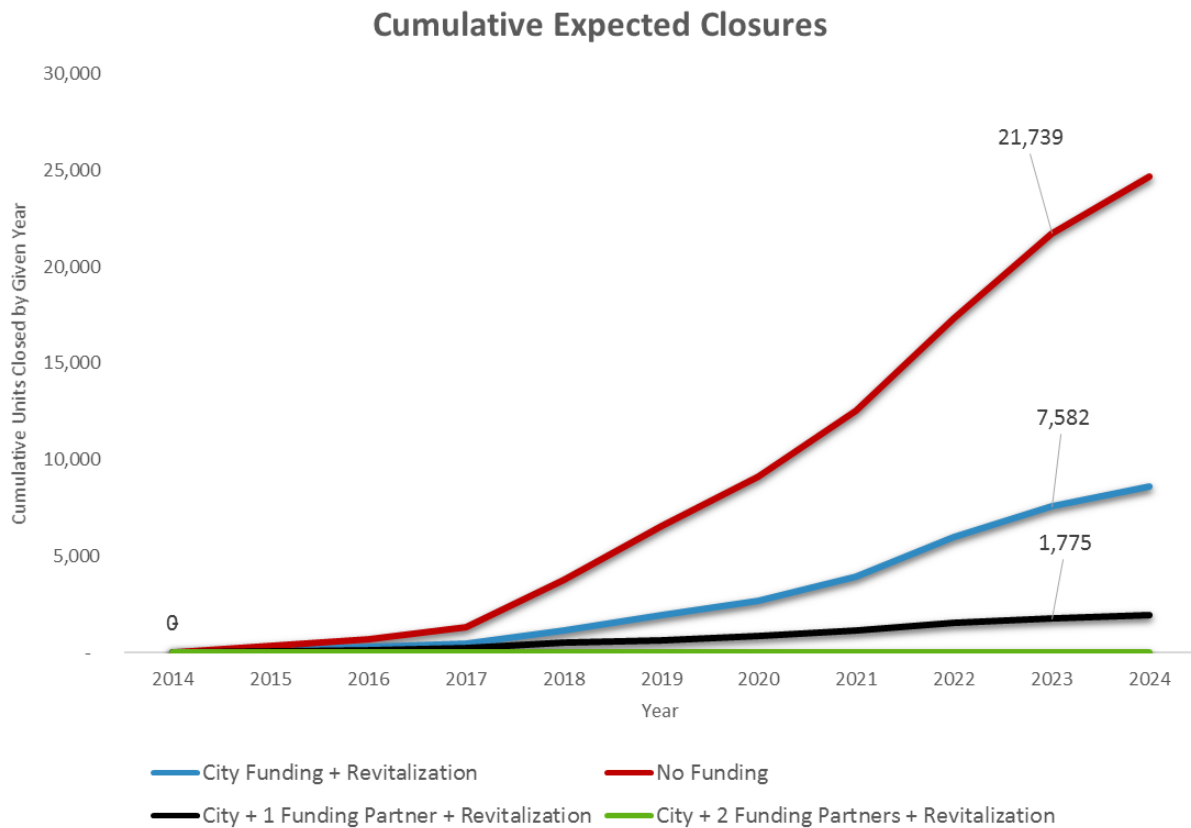
Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$4,447.3	\$199.7	4 per cent
2014-2043	\$5,064.0	\$225.4	4 per cent

3.2.2 RISKS TO TCHC PORTFOLIO

At the end of the third quarter of 2014, 91,750 households were on the waiting list to gain access to social housing, of which 41 per cent include children younger than 17 years of age and 20 per cent were single-parent families (Housing Connections, 2014). The backlog is likely to expand further as TCHC's resources shrink, suggesting that some of Toronto's most vulnerable groups will have to wait even longer to attain affordable housing.

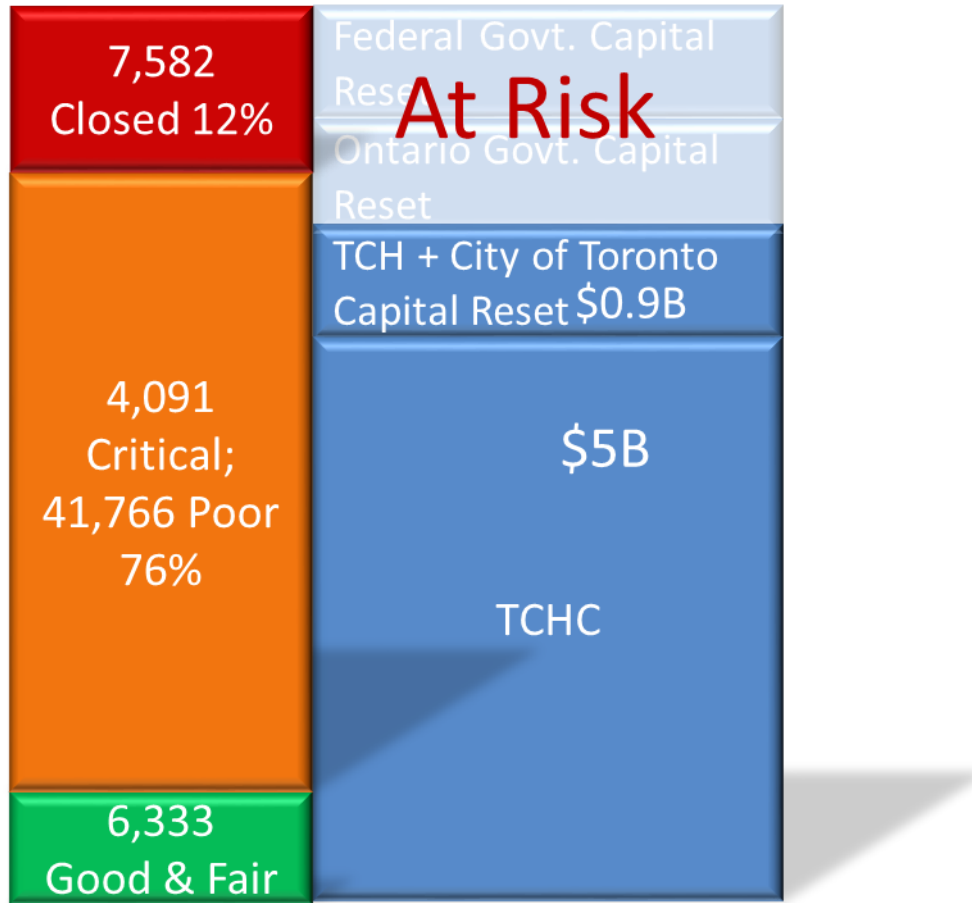
Without any investment in the repairs needed under the 10-Year Capital Financing Plan, TCHC's portfolio of approximately 59,700 dwellings would shrink in size units reach an unsafe condition and are forced to close. By 2023, TCHC could have expected to close over 21,700 units that could otherwise have been repaired with sufficient funding.

Figure 30 Cumulative Unit Closures



With support from the City of Toronto, TCHC was able to mitigate some of its risk by funding a portion of the necessary capital repairs and avoiding closure for some of the units that would otherwise fall into disrepair. However, if the federal and provincial funding prescribed by the 10-Year Capital Financing Plan is not provided, TCHC will still need to close over 7,500 units by 2023. Furthermore, the distribution of units that remain open will show a tendency towards worse states of repair. In fact, 76 per cent of units will be in critical or poor condition by 2023, with an additional 12 per cent closed, a stark contrast to the much lower figure of 24 per cent critical/poor in the scenario featuring tripartite investment. TCHC can expect 7.1 times fewer housing units that are in either good or fair condition after thirty years.

Figure 31 State of TCHC portfolio in 10 years with no provincial or federal participation



3.2.3 HEALTH RISKS

Numerous studies on the impacts of housing on health have conclusively shown that poor quality housing and homelessness places the affected individuals at an increased risk for health problems (Mikkonene & Raphael, 2010). A lack of affordable housing in the city implies that many individuals who are staying in RGI units are likely to continue to reside there as long as their economic situations do not improve. As conditions of units deteriorate, residents may still face no alternate options and will therefore be forced to risk homelessness, or live in sub-standard living conditions merely to retain shelter. Over time, enduring such conditions will begin to result in failing physical and mental health, along with an increase in drug or alcohol addictions (Boardman, Finch, Ellison, Williams, & Jackson, 2001).

Poor insulation or protection from structural condensation, water leakage, and poor ventilation in these poorer condition units will lead to dampness, which has been linked to a myriad of respiratory illnesses and conditions, including common afflictions such as the increased incidence of infections and rhinitis, as well as the exacerbation of asthma, hypersensitivity pneumonitis, and allergic alveolitis (World Health Organization, 2009). Not only does respiratory health suffer when air quality is poor, but mental health

does, as well (Shenassa, Daskalakis, Liebhaber, & Braubach, 2007). Children suffer patterns of poor social adaptation when housing amenities are poor (Davie, Butler, & Goldstein, 1972), while adults exhibit symptoms of neuroticism (Bagley, 1974) as a result of poor housing conditions. Poor living conditions are further associated with depression (Brown, Brolchain, & Harris, 1975), anxiety (Halpern, 1995), addiction (Bagley, 1974), and alcoholism (Bagley, Jacobson, & Palmer, 1973), among many others.

Without additional investment into repairing social housing from Ontario and the federal government, Toronto can expect to see an additional 26,000 prevalence years of mental illness afflict members of its population between present day and 2043, and over 82,969 prevalence years of respiratory illness, resulting in part from the poor living conditions caused by unfunded capital repairs.

Figure 32 Mental Illness Prevented Annually, by scenario

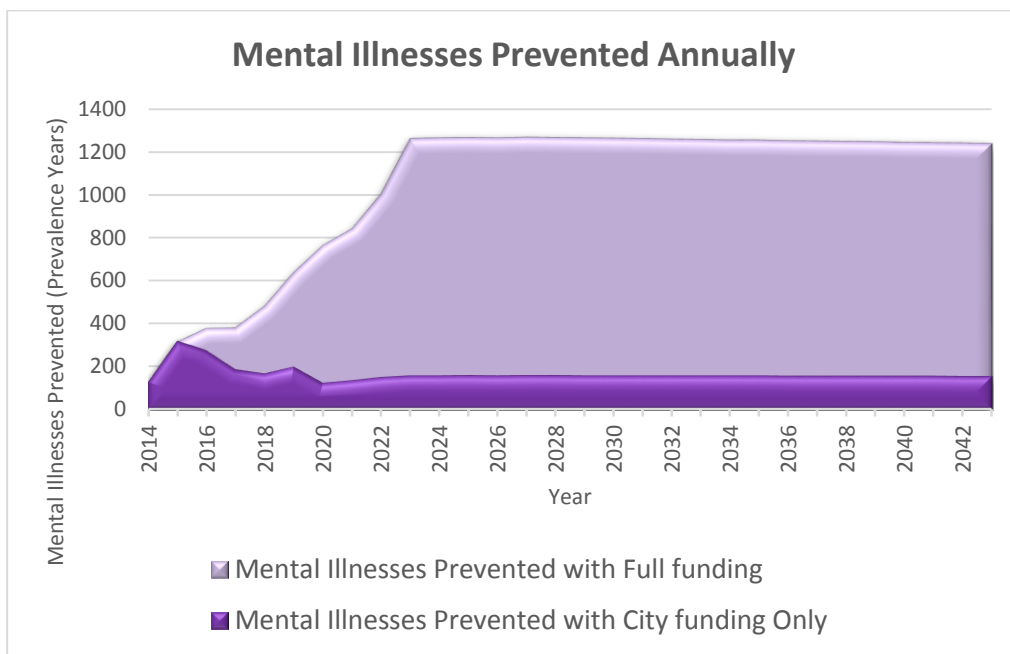
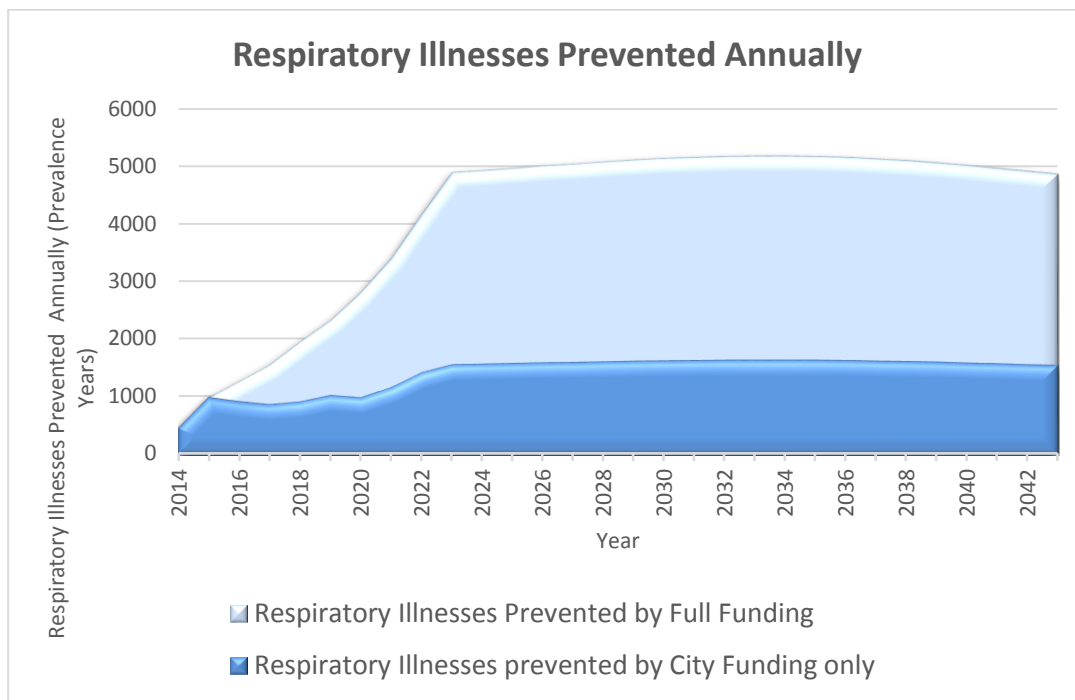


Figure 33 Respiratory Illnesses Prevented Annually, by scenario



Beyond the incidence of resident illness related to poor housing, homelessness and a lack of shelter will cause even greater detriments to health. An additional 1,547 individuals will experience homelessness by 2023 without funding from the provincial and federal governments. By 2043, the number of homeless individuals resulting from the closure of units will rise to 2,379. While the City of Toronto and TCHC’s investment into repairs is anticipated to prevent an additional 3,363 individuals from experiencing homelessness over the next thirty years, the remaining 2,379 individuals at risk of becoming homeless would increase the number of Toronto’s homeless individuals by approximately 50 per cent (Shapcott, 2013). This will impose additional healthcare costs which will offset any savings from not investing in capital repairs.

By 2043, individuals experiencing homelessness due to closures stand to cost the healthcare system over \$45 million dollars in emergency department visits, over \$4 million in GP visits, and approximately \$1.42 billion in hospital visits. It is important to consider that these costs reflect the healthcare burdens solely of the homeless population that will be caused by unit closures, and does not include the costs associated with existing homelessness nor with the additional resident illnesses that can reasonably be expected to result from deteriorating unit conditions. The total of all health expenditures that will be necessary to support the lives of these new individuals experiencing homelessness, as a result of closures, between present day and 2043 is an additional \$1.47 billion. In other words, the health costs associated with new homelessness alone are almost equal to the total requested contributions of the provincial and federal governments. Governments can choose, effectively, whether to invest taxpayer dollars in capital repairs today or to invest roughly the same amount just to address the health problems

of the individuals forced into homelessness over the course of the next thirty years as a result of inaction.

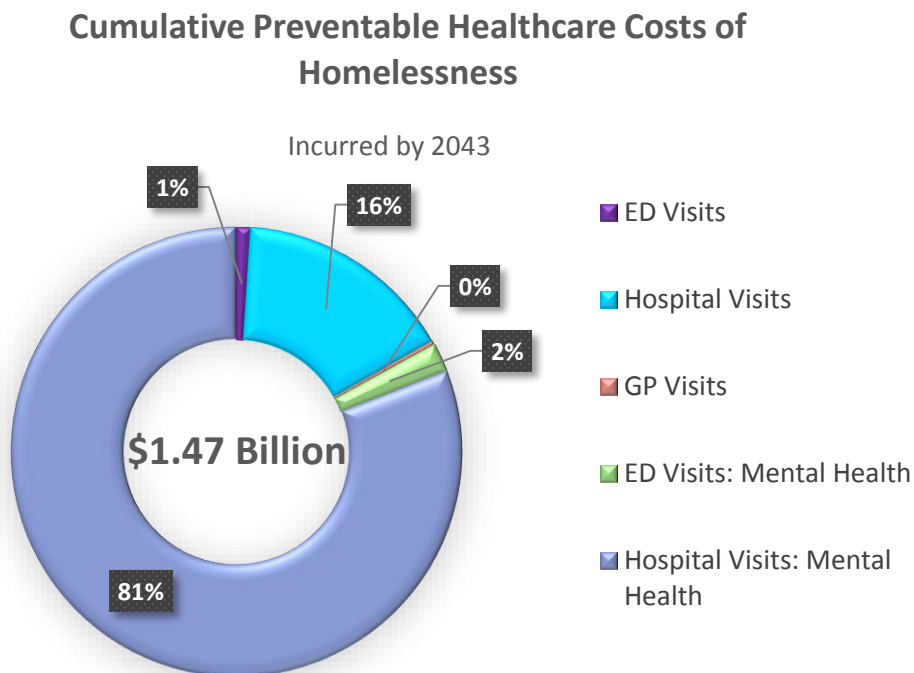
Without funding support from the provincial and federal governments, we can expect the following health benefits forgone relative to the reward scenario in terms of homeless visits to (EDs), general practitioners (GPs), and hospitals.

- Over 10 years, we can expect 5,300 additional visits to GPs, 7,900 additional visits to the ED and 6,000 additional visits to hospitals;
- Over 30 years, we can expect 55,600 additional visits to GPs, 83,400 additional visits to the ED and 62,900 additional visits to hospitals

These patterns of healthcare utilization lead to the following benefits forgone relative to the reward scenario in terms of healthcare costs related to homelessness.

- Over 10 years, we can expect \$290,800 in additional costs for GP visits, \$3,240,000 in additional costs for ED visits and \$101,430,000 in additional costs for hospital visits;
- Over 30 years, we can expect \$4,000,000 in additional costs for GP visits, \$45,600,000 in additional costs for ED visits and \$1,426,900,000 in additional costs for hospital visits;

Figure 34 Cumulative preventable healthcare costs of homelessness



Various types of illnesses and their associated burden on the healthcare system can be avoided if the federal and provincial governments agree to invest in TCHC capital repair. Failure to do so represents an additional 1.1 million healthcare utilization events and \$1.5 billion in associated healthcare expenditures

(summed over residents and individuals experiencing homelessness) over the next three decades, roughly \$113 million of which will be accrued over the next ten years. This means that 40 per cent of the total rewards of Revitalization and capital repair, in terms of health care savings, will be forgone without the participation of the federal and provincial governments.

In total, this represents:

- 1.1 million total additional healthcare utilization events (916,000 due to TCHC residents and 202,000 due to homelessness) with City of Toronto and TCHC funding only over thirty years
- \$1.5 billion total additional associated healthcare costs (\$75 million from TCHC residents and \$1.4 billion due to homelessness) over thirty years²⁵

3.2.4 ENERGY RISKS

While TCHC and the City have taken steps to reduce the consumption and energy intensity of units through a variety of dedicated initiatives, as well as the capital repair and Revitalization programs, the efforts put forth without the approximate \$1.7 billion joint contribution from the federal and provincial governments cannot mitigate the increasing costs and energy usage of aging units.

The scenario in which only the municipal government participates in funding the TCHC capital repair is characterized by fewer closures than would occur with no funding, but this is accompanied by an inability to completely keep pace with the depreciating conditions of units. As a result, a number of high-consumption critical units will be closed, reducing the demand for energy, but many more units in good condition will slowly decline to the fair or poor categories. This will increase the demand for energy, as these units consume moderately and emit moderate levels of greenhouse gases. The latter effect is stronger than the former, leading to an overall increase in the average yearly energy consumption per unit, as well as the associated greenhouse gas emissions. Specifically, the average yearly greenhouse gas emissions between present day and 2043 rises from 4,452 to 4,454kg per TCHC unit. Relative to no funding, attaining partial funding from the TCHC and the City of Toronto yields slightly higher average energy costs per unit at as well, from approximately \$2,435 to \$2,441.

3.2.5 COMMUNITY RISKS

The communities encompassing TCHC residences and the surrounding areas are prime candidates for economic development. As discussed in the reward scenario, the areas have the potential to see an injection of capital and growth in business, industry, and investment. However, much of that potential is left untapped if TCHC is left without the full capacity to implement capital repair. This will lead to:

- 10.5 per cent more crime over thirty years

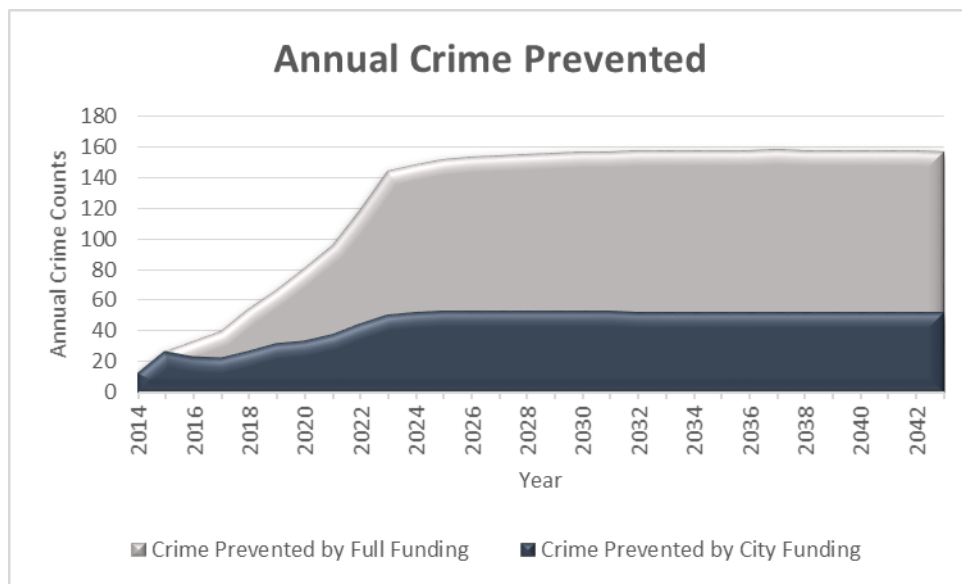
²⁵ Although the average costs of a hospital visit, GP visit, and ED visit by the homeless are conservatively assumed to be the same as those of the residents, the homeless visit the hospital proportionally more than they visit the GP relative to residents. As the average cost of a hospital visit is many times more expensive than the average GP visit, this causes healthcare costs associated with the homeless to be much higher than those of residents, despite having a fewer total number of utilization events.

- \$11 million more in associated crime costs over thirty years
- \$2.6 billion more in social assistance costs over thirty years
- \$2 billion in market rental income for adjacent neighbourhoods at risk over thirty years
- 49 per cent of benefit to the cumulative rental income of neighbourhoods adjacent to TCHC is forgone over thirty years

One phenomenon that will begin to emerge is the higher crime rates that will be driven by relatively poor housing quality (Brown, Perkins, Brown, & Graham, 2004). Revitalization efforts underway have been a strong influence on the reduction of crime in the focal areas (Smith, 2013), as well as allowing for greater community confidence in the safety of neighbourhoods (Wagner, 2013). These efforts stand to have their efficacy reduced if they are supported by an incomplete capital program.

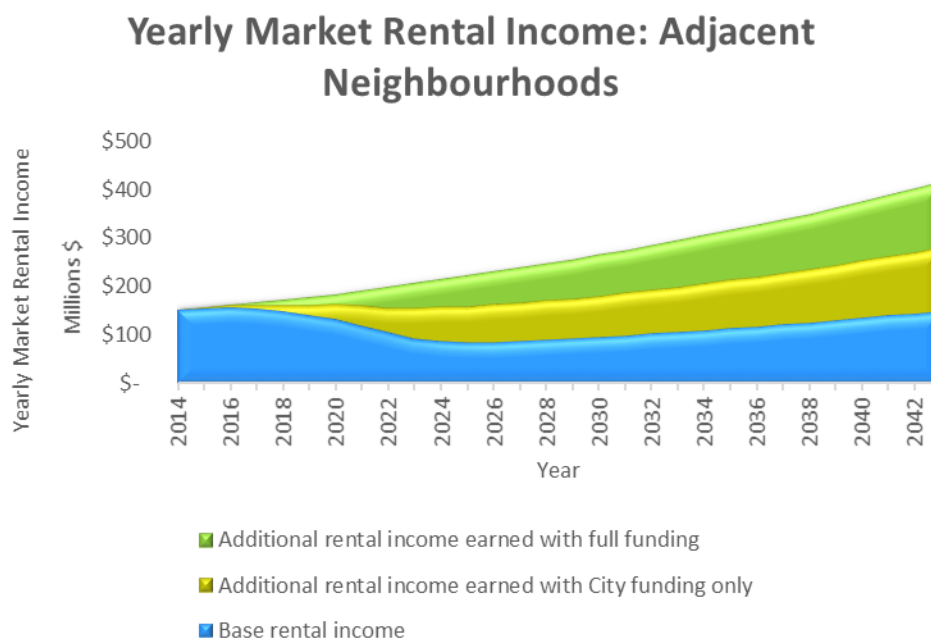
The appearance of an unkempt neighbourhood alone can incite the violation of other social norms (Keizer, Lindenberg, & Steg, 2008), leading to increases in crime. In fact, 65 per cent of the reduction in crime stands to be forgone if the federal and provincial governments do not participate. While community Revitalization and municipal participation in the 10-Year Capital Financing Plan will avoid a portion of the crime and associated costs that would have occurred otherwise, an additional \$1.39 million in crime costs will be incurred by 2023 if the necessary capital repairs receive only the funding they have to date. By 2043, the lack of participation of all levels of government will cause the total cost of crime to rise to over \$11 million.

Figure 35 Crime Prevented Annually



Neighbouring communities will also receive a far smaller benefit in terms of rental income. By 2023, over \$167 million in cumulative rental income stands to be forgone. Over the next thirty years, roughly \$2 billion in cumulative rental income of adjacent neighbourhoods is at risk without complete funding.

Figure 36 Annual Market Rental Income: Adjacent Neighbourhoods



Neighbourhoods surrounding TCHC dwellings can be expected to draw in a rental income of approximately \$157 million in 2023, adjusting for the composition of units in TCHC’s portfolio by FCI. By 2043, the adjusted rental income is expected to increase to \$280 million that year.

This means that within ten years, the 41 per cent of the rental income benefit to neighbourhoods surrounding TCHC will be forgone without full funding, which increases to 49 per cent by 2043.

Summary Tables: Adjacent Neighbourhood Values at Risk

Table 36 Rental Income at Risk

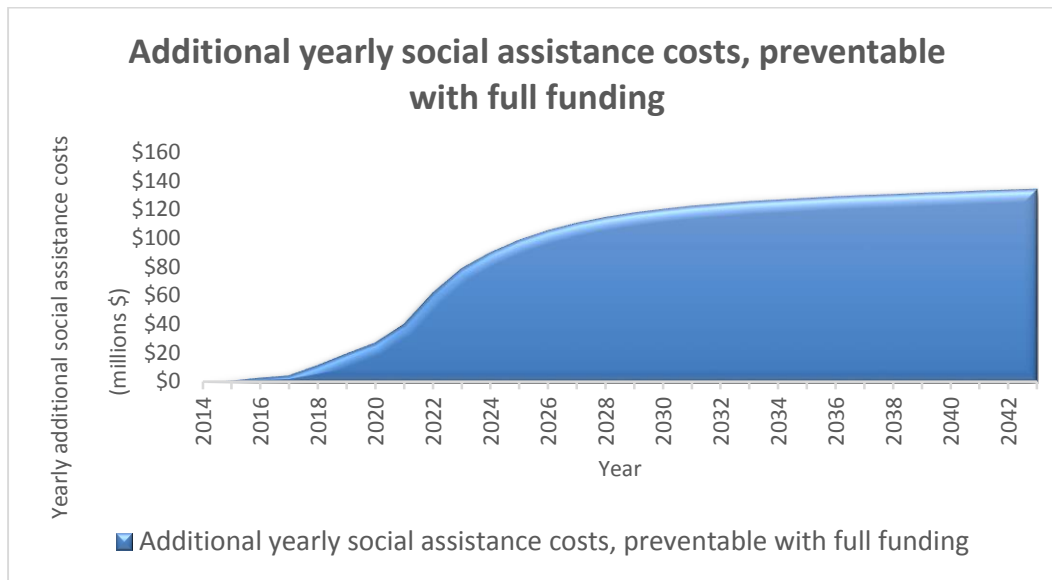
Time period	Total Investment benefit (millions)	Amount at risk (millions)	Percentage of benefit at risk
2014-2023	\$1,599 (\$1.6B)	\$167.6	41 per cent
2014-2043	\$5,778 (\$5.8B)	\$2,073 (\$2B)	49 per cent

Residents forced to relocate as a result of a closure may also be forced to dedicate a greater share of income to shelter, imposing greater financial constraints on necessities such as food. In addition, studies have shown that even problems with housing quality (rather than only access to housing) are linked to food insecurity (Kirkpatrick & Tarasuk, 2011). This implies that there will be a large, albeit invisible, cohort of households with declining food security, putting an increased strain on community services in the region as some units close, and as others worsen in condition.

Adults facing a less favourable array of economic opportunities will also access social assistance with increasing intensity, introducing an additional burden of over \$249 million in social assistance costs

alone by 2023, and over \$2.6 billion by 2043. That is to say, ensuring that units stay open and remain in good repair by means of full funding will completely eliminate these costs. These figures rest on the conservative assumption that only individuals whose units underwent closure will present new cases requiring social assistance, and that the proportion of the TCHC population currently accessing social assistance will not increase. While social assistance costs do not manifest immediately, and therefore may seem like a relatively small amount over the course of ten years, it is important to note that these costs will accumulate slowly over time, as more and more units are left unrepaired and driven to closure.

Figure 37 Additional yearly social assistance costs without provincial or federal funding



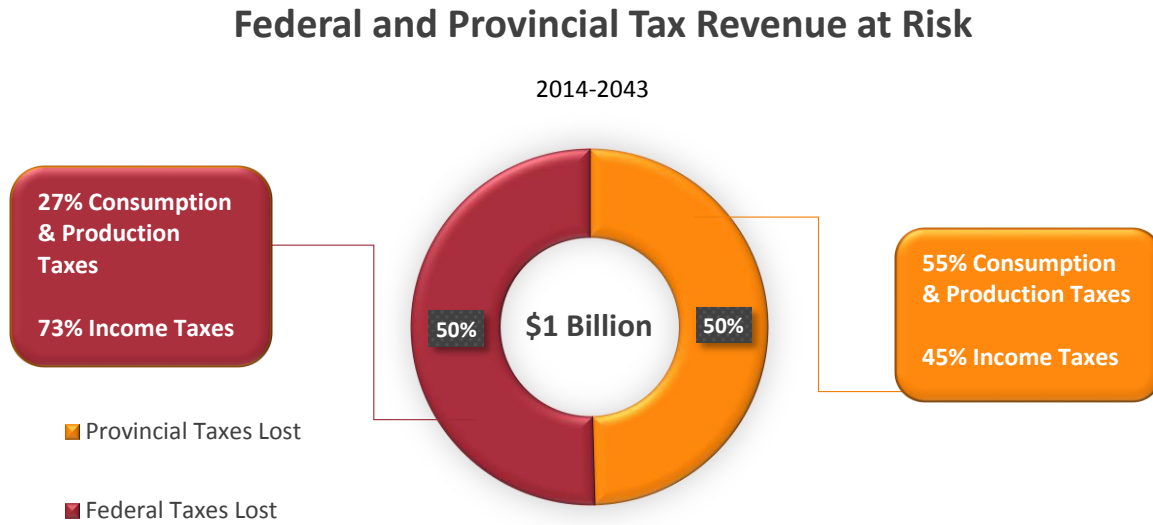
3.2.6 FEDERAL AND PROVINCIAL INCOME RISKS

The federal and provincial governments generate additional tax revenue through augmented economic activity, which leads to increases in individual and corporate purchasing power, as well as an increase in the productive capacity of private industries.

- \$502 million of the provincial government’s tax revenue benefit from this investment is at risk over thirty years
- \$511 million of the federal government’s tax revenue benefit from this investment is at risk over thirty years

In the absence of tripartite investment, the provincial government stands to forfeit approximately \$275 million in consumption and production taxes and over \$227 million in income taxes. In total, over thirty years, the Province will miss out on over \$502 million in tax revenues, representing 22 per cent of its total potential benefit from the 10-Year Capital Financing Plan forgone.

Figure 38 Provincial and Federal Tax Revenue at Risk



The federal government stands to forgo slightly more in tax revenues, approximately \$511 million, of which approximately \$373 million is as a result of a reduction in income tax revenues relative to the full investment scenario, and the remaining approximate \$137 million from consumption and production taxes. In all, the tax revenue to the provincial and federal governments which will not be collected without full investment is approximately \$1 billion. However, these figures represent reductions in tax revenue alone, on top of the additional costs that stand to be incurred through the other avenues listed above. This implies that, notwithstanding other cost savings that would allow the government more flexibility in scarce resource allocations, and cost preventions that further strengthen balance sheets, the provincial and federal governments could stand to generate over 58 per cent of their total, joint investment in tax revenue alone by participating in the investment, while recovering more than their cost of investment through other savings.

4.0 CONCLUSIONS

To understand the economic, social, and physical health of the whole economy, as well as of TCHC and the levels of government as constituent entities of the system, agent-based modeling was employed. The benefits of the fully-funded 10-Year Capital Financing Plan were evident after the model was used to generate forecasts for ten years into the future, but their magnitude was more fully captured by the thirty year simulations. These benefits were apparent in a number of areas.

First, at the purely economic level, the value of the investment increases resource allocation into the system and leads to an \$18.5 billion improvement to GDP. A stronger economy in terms of its GDP can afford to bear additional employment, increasing the number of jobs available, not just for Toronto or Ontario, but for all of Canada by over 220,000 more employment years.

Locally, the condition of social housing units provided by TCHC is improved, as is its ability to foster stronger, more vibrant communities. In terms of FCI, 8.6 times more good and fair quality units are made available to existing and future TCHC tenants through these investments. TCHC is also able to perform major repairs on units that are at risk of closure, ensuring that no tenants are forced out of their homes as a result of units falling into states of uninhabitable disrepair. This prevents Toronto, a city in which approximately 5,000 individuals are currently homeless (Shapcott, 2013), from doubling its homeless population.

The improvement in the quantity and quality of housing available to Toronto's most in-need populations also reduces the number of illnesses experienced by TCHC residents, and caused by housing quality alone, by over 500,000. This will relieve an already overburdened healthcare system of \$3.8 billion in costs, while reducing the strain on GPs and emergency rooms. The communities in which TCHC buildings are located also begin to see a trajectory of social and economic development, complete with a significant decline in criminal activity, improved community wealth and investment, and spillover benefits in terms of increased rental incomes. TCHC will also face lower energy costs associated with its units, as their energy efficiency improves. Lower greenhouse gas emissions of TCHC units will further reinforce the community benefits.

As well, private capital investment will find lucrative opportunities as a result of the cycle of growth, spurring an additional \$5 billion in investment. The federal and provincial governments will enjoy tax revenues totalling \$4.5 billion over thirty years. Of this revenue, \$3.5 billion will accrue to the provincial and federal governments as a result of the participation of TCHC and the City of Toronto in funding capital repair and revitalization efforts. The additional \$1 billion in tax revenue can be generated as a result of the participation of the provincial and federal governments, through their joint investment of \$1.7 billion, which represents a re-investment of less than half of the revenues that accrue to the provincial and federal governments solely due to the participation of the City and TCHC. Both the provincial and federal governments will be better suited to meet their mandates, by not only recovering the costs of the investment within the investment schedule's timeline, but by netting a total of over \$2.7 billion in tax revenues over thirty years.

While the benefits of investing in the 10-Year Capital Financing Plan are strong, it is important to understand that declining to invest does not mean that the status quo will persist into the future. Decision-makers do not simply face an option between the benefits of investment that accrue in the future and a future similar to the current status quo. On the contrary, abstaining from this project is a tacit acceptance of a series of risks that are amplified over time.

Even with the investment of money from TCHC and the City of Toronto, the condition of TCHC units continues to deteriorate over time due to age and unfunded repairs, 7.1 times fewer units in good or fair condition will be available to existing and prospective TCHC residents. In addition, over 7,500 homes will be closed by 2023, leaving those households with nowhere to turn, and increasing pressures on shelters and other agencies through an increase in homelessness. As social housing is already undersupplied relative to the waitlist, this will also lead to even more congestion. TCHC properties will also generate higher energy costs and greenhouse gas emissions, as the units remaining open demand more energy in order to overcome inefficiencies created by their deteriorating conditions.

Residents will begin to develop illnesses as a result of poor quality, and sometimes unsafe, housing. The lack of participation from the federal and provincial governments will lead to over \$1.5 billion in avoidable health costs, created by an additional 1.1 million healthcare utilization events. The healthcare system, often suffering from greater demand than its capacity, may struggle to accommodate these needs. Communities will also suffer from higher crime rates and lower levels of private investment. Finally, the provincial and federal governments will forgo \$1 billion in taxation revenue, while also seeing a reduction of over 62,709 employment years, and \$4.2 billion in GDP for Canada compared to the fully-funded scenario, leading to relatively depressed economic activity.

Regardless of their decision on investment, the provincial and federal governments stand to gain over 60 per cent of their respective tax receipts over thirty years as a result of TCHC's existing investment in Revitalization. However, a failure to provide the provincial and federal shares of the total capital investment, which is approximately 19.5 per cent of the total investment value, will reduce employment and GDP locally, provincially, and nationally by between 20 and 29 per cent. In addition, increased health care costs and other impacts will more than outweigh any initial cost savings from not making the investment.

The question of investing in subsidized housing, therefore, becomes a question of whether to invest in health, communities, and growth. As the infrastructure put in place to support previous population cohorts approaches the end of its useful life, it will become a greater problem over time. While TCHC and the City of Toronto are prepared to continue with the Revitalization program and have put together a plan through the 10-Year Capital Financing Plan to undertake capital repairs, without the support of the provincial and federal governments those efforts will not be sufficient to ensure adequate housing is available, nor that the full benefits and risk profiles of these investments will be dispersed equitably to the investors and stakeholders. On the other hand, by providing just a portion of the tax revenue already generated for the provincial and federal government by the City and TCHC's share of the plan, the federal and provincial governments have an opportunity to restore the existing social housing

portfolio, while generating cost savings for themselves and spurring economic and job growth across the region.

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B. DATA SOURCES

Data obtained from the Literature Review

Variable	Inclusion Criteria	Data	Literature Source	Odds ratio link to FCI
Depression	Poor quality households = Increased likelihood for dampness = Increased risk of depression	Odds Ratio (OR) = 1.34, and 1.39 and 1.44 for minimal moderate and extensive exposure	Shenassa et al., 2007.	Good condition: 1 Fair condition: 1 Poor condition: 1.34 Critical condition: 1.44 Closure criteria: 1.44
Asthma	Poor quality households = Increased likelihood for dampness and mold = Increased risk of asthma	OR = 1.10, 1.90 and 2.80 for children between 6-16 years OR = 1.02, 1.29 and 1.56 for adults	Bornehag et al., 2001.	For children between ages 6 and 16: Good condition: 1 Fair condition: 1.1 Poor condition: 1.9 Critical condition: 2.8 Closure criteria: 2.8 For individuals above 16 years of age: Good condition: 1 Fair condition: 1.15 Poor condition: 1.29 Critical condition: 1.56 Closure criteria: 1.56
Stress	Poor quality households = Increased risk of stress	OR: 1.61 (1.06, 2.44)	Hoppon et al., 1996	Good condition: 1 Fair condition: 1.05 Poor condition: 1.29 Critical condition: 1.61 Closure criteria: 2.44
Energy Costs	Poor quality households = Higher energy consumption = High energy costs	Based on cost per FCI level. Cost data provided by TCHCC	Tsenkova et al., 2013	Average annual cost per FCI level [2012\$]: Good condition: \$1,377.64 Fair condition: \$2,280.97 Poor condition: \$2,593.15 Critical condition: \$2,859.59

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Greenhouse gas energy emissions	Poor quality households = Higher energy consumption = High greenhouse gas emissions	Based on emissions per unit under each FCI scenario. Emissions data	Tsenkova et al., 2013	Average annual GHG emissions per FCI level: Good condition: 3,759.96 kg Fair condition: 3,824.55 kg Poor condition: 4,622.48 kg Critical condition: 4,893.63 kg
Crime	Poor quality housing = low quality neighbourhoods = higher crime rates	Violent Crime – 49.9 per cent Property Crime – 13.4 per cent.	Rigakos G, 2006	Assumed the 49.9 per cent for violent crime and 13.4 per cent for property crime were the maximum possible benefits of improved FCI, occurring at an FCI of 0. Given this assumption and the current average FCI along with the current, known crime rate, a logarithmic curve was fit to model crime rates relative to FCI

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Data Provided by TCHC and Subject Matter Experts

Variable	Data Description	Source
Crime Counts	Data by type of violation and by TCHC neighbourhoods and adjacent TCHC neighbourhoods	Toronto Community Housing
Crime costs	Crime Costs by type of violation	Statistics Canada
Current Value Assessment	CVA data for Toronto and Revitalization development areas	City of Toronto
Energy Costs by FCI building condition	Average Gas and Hydro Costs by FCI building condition	Toronto Community Housing
Facility Condition Index	Average FCI level, and number of TCHC units under each FCI level	Toronto Community Housing
Greenhouse Gas Emissions by FCI building Condition	Average Greenhouse Gas Emissions by FCI building Condition	Toronto Community Housing
Healthcare Utilization Data	ED and hospital Utilization rates of TCHC residents, by age, sex and disease	Toronto Local Health Integration Network
Prevalence Years data (Illness events)	Data on prevalence years by age and sex	RiskAnalytica
Social Assistance Costs	Average Monthly Allowance paid out by family type	Ontario Works - Ministry of Community and Social Services

Interviewees

Developer	Company	Position
Martin Blake	The Daniels Corporation	Vice President
Steve Daniels	Tridel Corporation	Senior Development Manager
Howard Cohen	Context	President
Sean Fleming	Metropia	Vice President, Planning and Development
Jim Dunn	McMaster University	Professor, Department of Health, Aging and Society

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Economic and Demographic Data used in Prosperity at Risk

Quantity	Description	CANSIM Table
DEMOGRAPHIC TABLES		
Population	The population of Canada by age and sex	051-0001
Births	The number of births in Canada by sex	051-0013
Deaths	Number of deaths in Canada by age and sex	051-0002
Immigration	Immigration into Canada by age and sex	051-0012
Emigration	Emigration from Canada by age and sex	051-0012
ECONOMIC TABLES		
National Balance Sheet Accounts	National Balance Sheet Accounts quarterly	378-0121
Current and Capital Accounts	Current and capital accounts - Households (quarterly)	380-0072
	Current accounts - Households, provincial and territorial (annual)	384-0040
	Provincial and territorial consumption of fixed capital at replacement cost, by sector (annual)	384-0043
	Current and capital accounts - Non-profit institutions serving households (quarterly)	380-0075
	Current and capital accounts - Corporations (quarterly)	380-0076
	Current and capital accounts - General governments (quarterly)	380-0079
	Current and capital accounts - Non-residents (quarterly)	380-0082
Financial Flow Tables	Financial Flow Accounts (quarterly)	378-0119
	Financial Flow Accounts (quarterly)	378-0119
	Flows and stocks of fixed residential capital (annual)	030-0002
	Flows and stocks of fixed non-residential capital, by North American Industry Classification System (NAICS) and asset, Canada, provinces and territories (annual)	031-0002
	Flows and stocks of fixed residential capital (annual)	030-0002
Balance of International Payments	Balance of international payments, current account, investment income, by type and sector (quarterly) (dollars x 1,000,000)	376-0013
Income Tables	Income of individuals, by sex, age group and income source, 2011 constant dollars (annual)	202-0407
	Property income of households (quarterly)	380-0087
	Property income of households, provincial and territorial (annual)	384-0044
Input-Output Tables	Input-output tables, inputs and outputs, detailed level, basic prices	381-0022
	Provincial gross domestic product (GDP) at basic prices, by sector and industry (annual)	381-0030

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	Provincial input-output tables, inputs and outputs, summary level, basic prices (annual)	381-0028
	Input-output tables, final demand, detailed level, basic prices (annual)	381-0023
	Provincial input-output tables, final demand, summary level, basic prices (annual)	381-0029
	Provincial input-output tables, international and interprovincial trade flows, summary level, basic prices (annual)	386-0003
	Inputs and outputs, by industry and commodity, S-level aggregation and North American Industry Classification System (NAICS) (annual)	381-0013
Labour Force Statistics	Labour force survey estimates (LFS), by sex and detailed age group (annual)	282-0002
	Labour force survey estimates (LFS), by North American Industry Classification System (NAICS), sex and age group (annual)	282-0008
	Labour force survey estimates (LFS), by provinces, territories and economic regions based on 2006 Census boundaries (annual)	282-0055
	Labour statistics consistent with the System of National Accounts (SNA), by province and territory, job category and North American Industry Classification System (NAICS) (annual)	383-0031
	Labour force survey estimates (LFS), retirement age by class of worker and sex (annual)	282-0051
	Labour force survey estimates (LFS), retirement age by class of worker and sex (annual)	282-0051
Other	Capital and repair expenditures, by sector and province (annual)	029-0005
	Consolidated federal, provincial, territorial and local government revenue and expenditures (annual)	385-0001

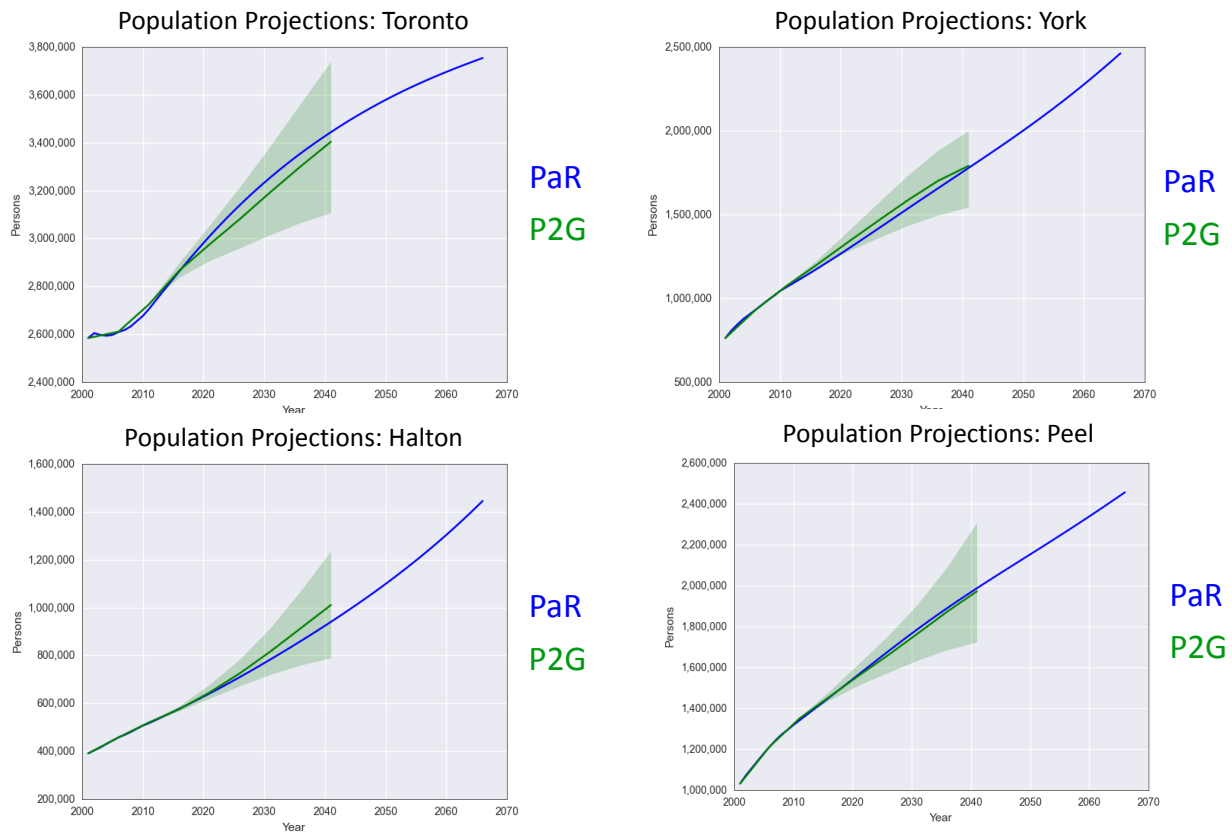
C. PROSPERITY AT RISK MODEL VALIDATION

The PaR platform has been subject to stress testing and validation practices to ensure it can reproduce results that are consistent with various other projections, such as those produced by provincial ministries and Statistics Canada.

Places to Grow

Places to Grow is a growth initiative, offering Ontario opportunities to plan for economic prosperity and sustainability. Part of the initiative is providing projections for population growth in various regions. Demonstrated in the figures below, PaR is able to recover the growth trends anticipated by Places to Grow for different regions in Ontario, falling well within the upper and lower projection bounds. Below are examples of Places to Grow population projections as compared to PaR population projections.

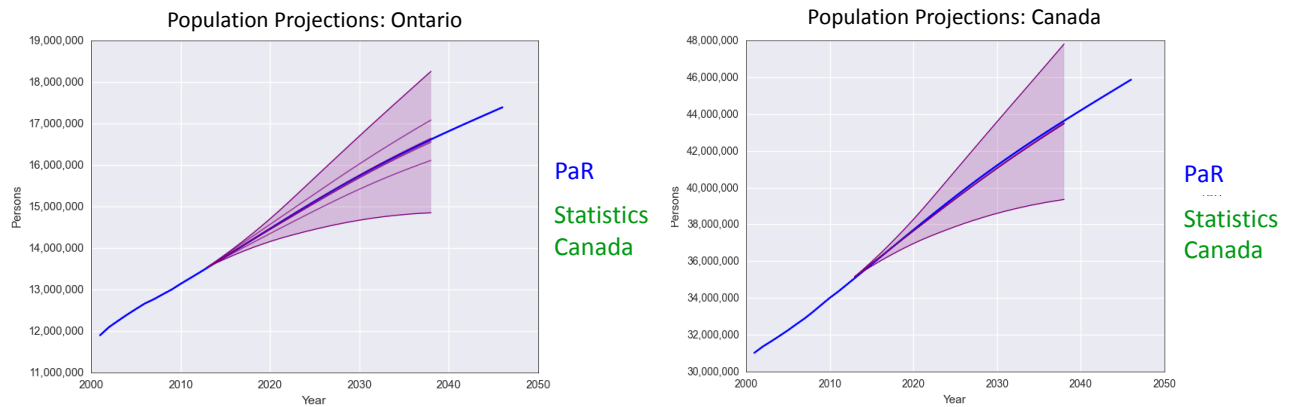
Figure 39 Population Projections for select regions (PaR and Places to Grow)



Statistics Canada

Because PaR is calibrated to Statistics Canada's immigration assumptions, its macro-economic population projections also follow the same trends predicted by Statistics Canada for Ontario and Canada. PaR is therefore able to not only drill down to a small region, but also offers realistic, validated projections on the macro level.

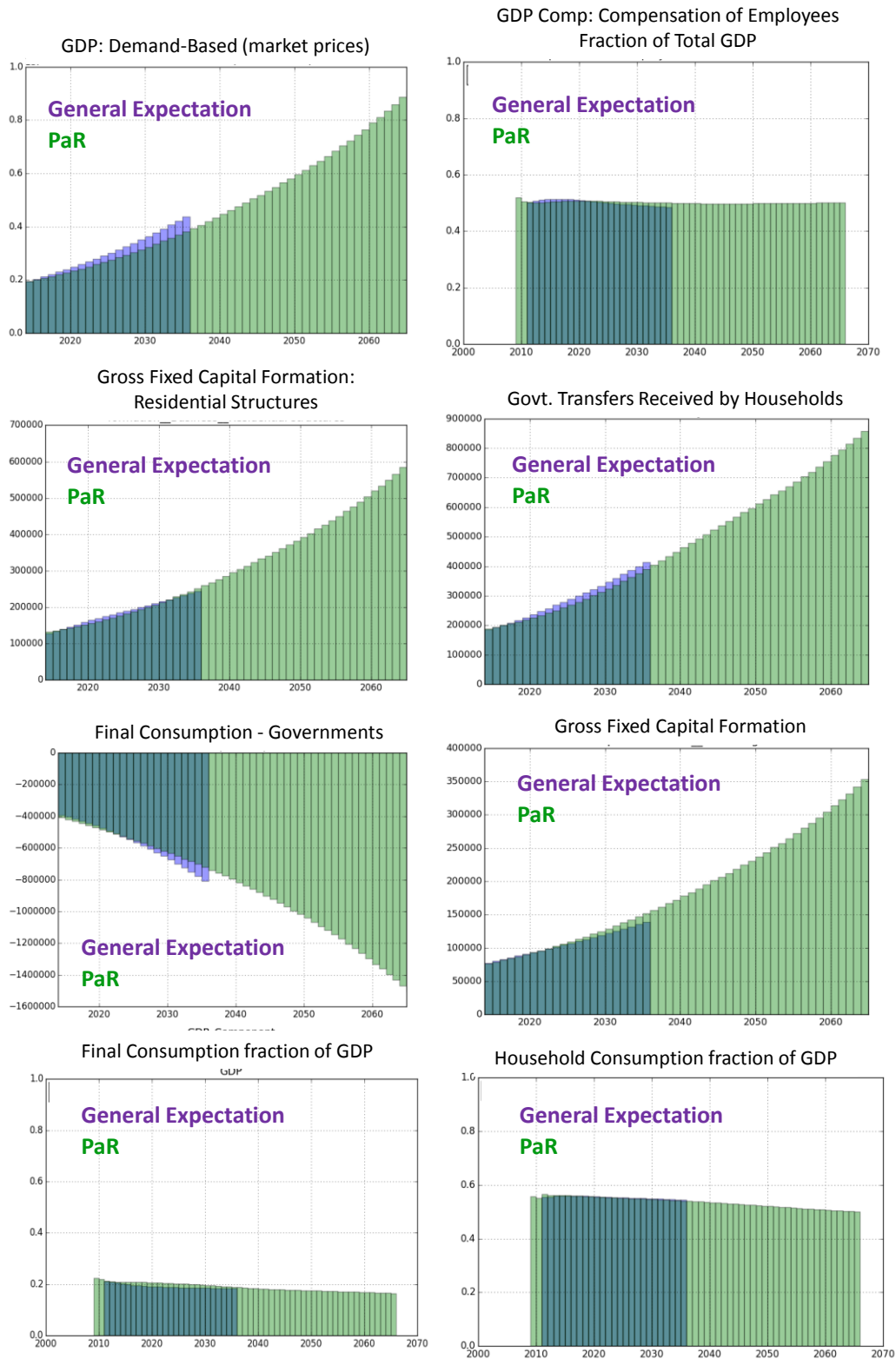
Figure 40 Population Projections for Ontario & Canada (PaR and Statistics Canada)



Economic Long term trends

A variety of economic long term trends are provided by various organizations such as TD Bank, RBC, Conference Board of Canada, BMO. What follows is a sample of the long term projections provided by PaR agent-based microsimulation and general market economic expectations.

Figure 41 PaR agent-based microsimulation and general market economic expectations



D. TCHC PORTFOLIO PROJECTIONS BY FCI

Figure 42 TCHC Portfolio by FCI: No Capital Funding + Past Revitalization

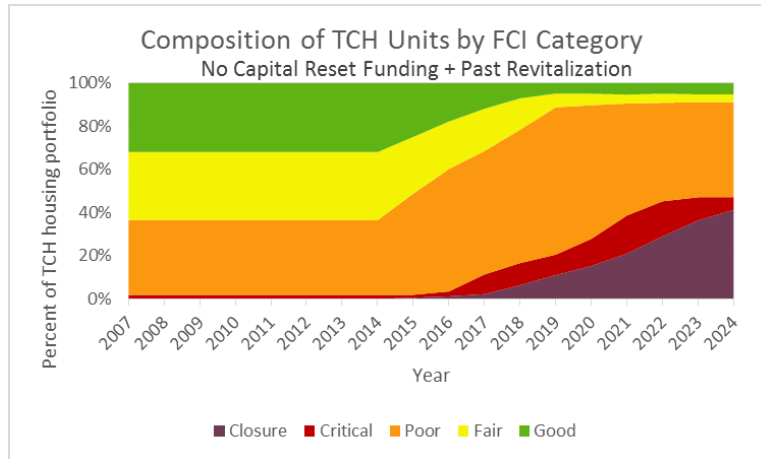


Figure 43 TCHC Portfolio by FCI: City and TCHC Funding Only + Revitalization

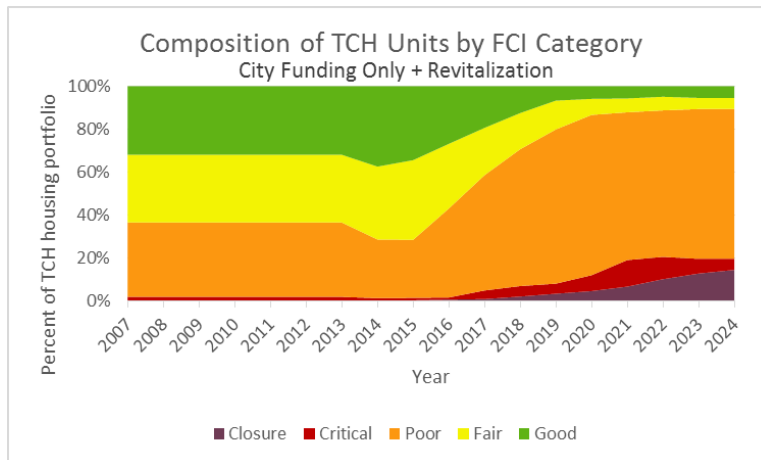


Figure 44 TCHC Portfolio by FCI: City and TCHC Funding + 1 Funding Partner + Revitalization

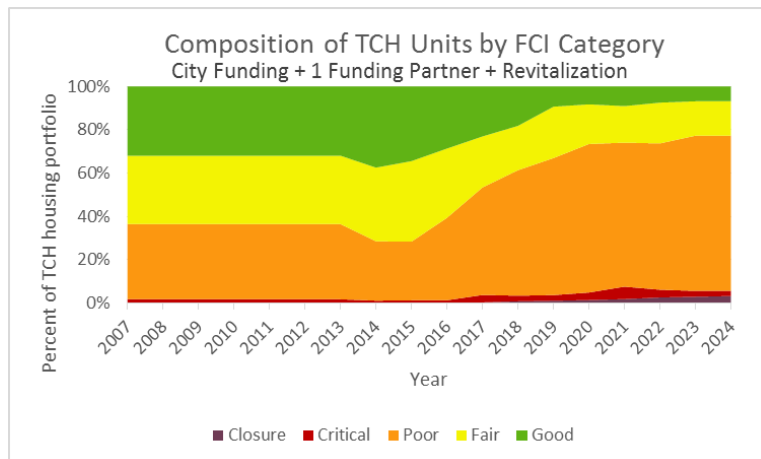


Figure 45 TCHC Portfolio by FCI: Full Capital Funding + Revitalization

