# Financing low-carbon resilience

## Options for the City of Toronto

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# Executive Summary

The following report was created for the City of Toronto's Environment and Energy Division (EED) for the purpose of identifying alternative financing mechanisms to fund low-carbon resilience initiatives, beyond tax and user fee-based financing mechanisms. The report answers the question: "recognizing the limitations associated with austerity, risk aversion, and the existing budget process, how can the City best leverage its position to attract investment from private capital to fund TransformTO initiatives that offer resilience co-benefits?" The report contextualizes the need for climate finance in Toronto and identifies three financing mechanisms that could be feasibly deployed for TransformTO, given the City's governance framework. The report describes the methodology used to analyze TransformTO objectives, then explains how Green Bonds, Public-Private Partnerships, and Community Bonds are used in other municipal jurisdictions to finance climate resilience projects. After laying out the benefits and drawbacks of each financing mechanism, the report concludes that these three are the best suited alternative financing mechanisms available to the EED, given the scope of our inquiry. The three financing mechanisms lend themselves well to different projects over different timelines and can effectively be deployed to fund the diverse portfolio of Transform TO initiatives. According to our analysis, effective implementation of the identified mechanisms can cover 100% of capital expenditures projected for these initiatives.

# Introduction: Low-Carbon Resilience and the City of Toronto

Toronto is top of its class in many respects: it is the most multicultural and one of the safest cities in the world.[1] It is one of Canada's cultural capitals – home to the world-renowned Toronto International Film Festival (TIFF), the Caribana festival, and Canada's basketball team – the Toronto Raptors – now in the playoffs for their fourth consecutive year.[2,3] Toronto is also Canada's financial centre.[4]

The City of Toronto's Environment and Energy Division (EED) works to ensure that the City is also top of its class when it comes to climate resilience. The EED's unofficial mission is to make Toronto one of the most sustainable cities in the world.[5] To that end, Toronto is a new member of 100 Resilient Cities (100 RC), a community of municipalities at the forefront of global urban resilience.[6] Recently, the City of Toronto presented TransformTO, its plan outlining mitigation, adaptation, and resilience strategies to address challenges imposed by climate change. Toronto is a leader in many respects – this is one of them. Not to be left unprepared in the face of ongoing stresses and increasingly common shocks of climate change, the City plans to reduce greenhouse gas (GHGs) emissions by 80% before 2050, on a 1990 baseline.[7]

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[1] Diversity - Toronto Facts - Your City | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=dbe867b42d853410VgnVCM10000071d60f89RCRD

[2] Toronto to be named a cultural capital of Canada. (n.d.). Retrieved March 27, 2017, from http://www.theglobeandmail.com/arts/toronto-to-be-named-a-cultural-capital-of-canada/article1113929/

[3] Raptors clinch playoff berth with win over Mavericks. (n.d.). Retrieved March 27, 2017, from http://www.cbc.ca/sports/basketball/nba/toronto-raptors-dallas-mavericks-recap-1.4041454

[4] Toronto | Financial Centre of Canada. (n.d.). Retrieved March 27, 2017, from http://www.tfsa.ca/financial-services/

[5] Environment & Energy - Living In Toronto | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=fd95ba2ae8b1e310VgnVCM10000071d60f89RCRD

[6] Overview - ResilientTO - Climate & Energy Goals | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=82270093ae9b4510VgnVCM10000071d60f89RCRD

[7] Overview - TransformTO - Climate & Energy Goals | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=ba07f60f4adaf410VgnVCM10000071d60f89RCRD

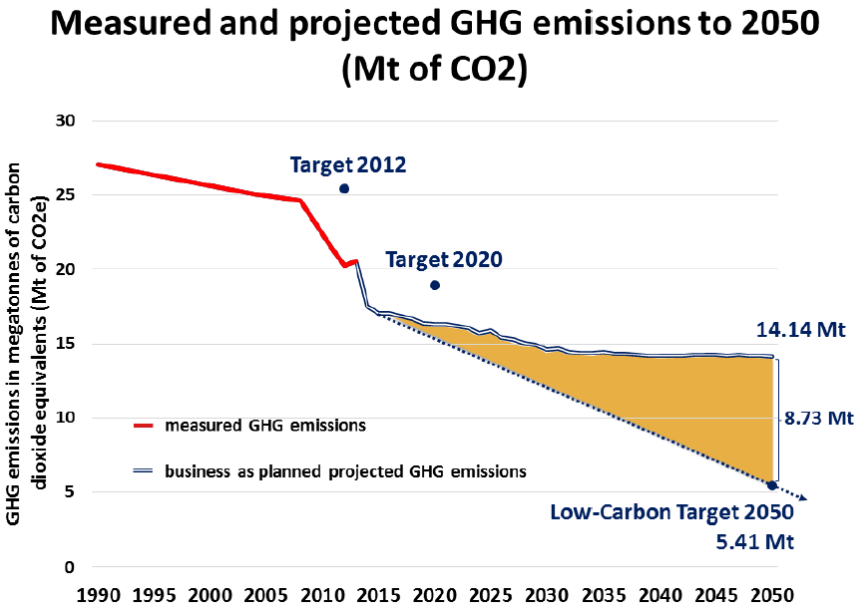


***Figure 1*** *TransformTO GHG emissions reductions to 2050 (Source: City of Toronto)*

Despite being one of the world's financial centres, financing for low-carbon resilience projects can be challenging in Toronto due to budgetary constraints. Toronto's City Council approved the short-term resilience strategies outlined in TransformTO. These include retrofitting industrial buildings and social housing, encouraging shifts away from reliance on single occupancy vehicles for transportation, and a push for a greater use of renewable energy.[8] One of the barriers standing in the way of implementation of these measures is the funding gap between what the EED currently has, and what it would need to fully implement these strategies. To meet its short-term targets, the City would need somewhere between $320 to $866 million by 2020 to achieve almost 1 million tonnes of GHG reductions.[9] At the time of writing, the financial cost estimates for the long-term strategies had not been completed.

The Munk School of Global Affairs' capstone group has been working with Stewart Dutfield from the City of Toronto's EED to identify the best financing mechanisms available to finance TransformTO strategies. Our problem statement is the following: recognizing the limitations associated with austerity, risk aversion, and the existing budget process, how can the City best leverage its position (low risk of natural disasters, high political stability) to attract investment from private capital to fund TransformTO initiatives that offer resilience co-benefits? This report seeks to answer this question and to understand how other jurisdictions have worked to access private capital and to scale solutions, while delivering financial, social and environmental returns. It provides an analysis of comparable jurisdictions and highlights the benefits and drawbacks of different financing mechanisms for climate resilience projects which are currently

[8] Ibid.
[9] Overview - TransformTO - Climate & Energy Goals | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=ba07f60f4adaf410VgnVCM10000071d60f89RCRD

not being deployed in Toronto.

This report outlines three main strategies the City of Toronto may choose to consider: Green Bonds, Community Bonds, and Public-Private Partnerships (P3s). It lays out how these strategies have been used either in Canada or elsewhere, and the necessary governance, financial, or other features that must be present for them to be operationalized in Toronto. Then, short-term and long-term TransformTO actions are paired with the identified financing mechanisms.

## Municipal Finance for Low-Carbon Resilience

The City of Toronto is not the only municipality acting on climate resilience issues. In fact, a growing number of cities and organizations are focusing on these challenges. Many cities in less developed countries (LDCs) are tackling the challenge of planning for the impacts of climate change. Multiple financing strategies exist depending on the type of project and jurisdiction.

There exist many different strategies to finance climate resilience, unfortunately, Canada is excluded from many available options because it is donor nation. Many climate financing options are backed or facilitated by international organizations like the United Nations (U.N.) or the World Bank (these include the Green Climate Fund and Sustainable Energy for All).[10,11] However, these are targeted to LDCs. Canada, being a developed country, does not have access to these types of financing.

In addition to the financing options that are unavailable to the City of Toronto, this project considered the following to be out of scope: taxes, user fees, and government grants/transfers. While these mechanisms may become available to EED and TransformTO, currently they are insufficient to fill the financing gap described above. Figure 1 is a graph of potential avenues for municipalities to finance their climate resilience initiatives. Under the constraints identified above, the only opportunities to finance these actions involves capital markets and private firms. Other options are backed by international organizations and Canada does not qualify for them, or require raising taxes, a non-starter.

[10] Sustainable Energy for all. (n.d.). Retrieved March 27, 2017, from http://www.se4all.org/
[11] Homepage. (n.d.). Retrieved March 27, 2017, from http://www.greenclimate.fund/home

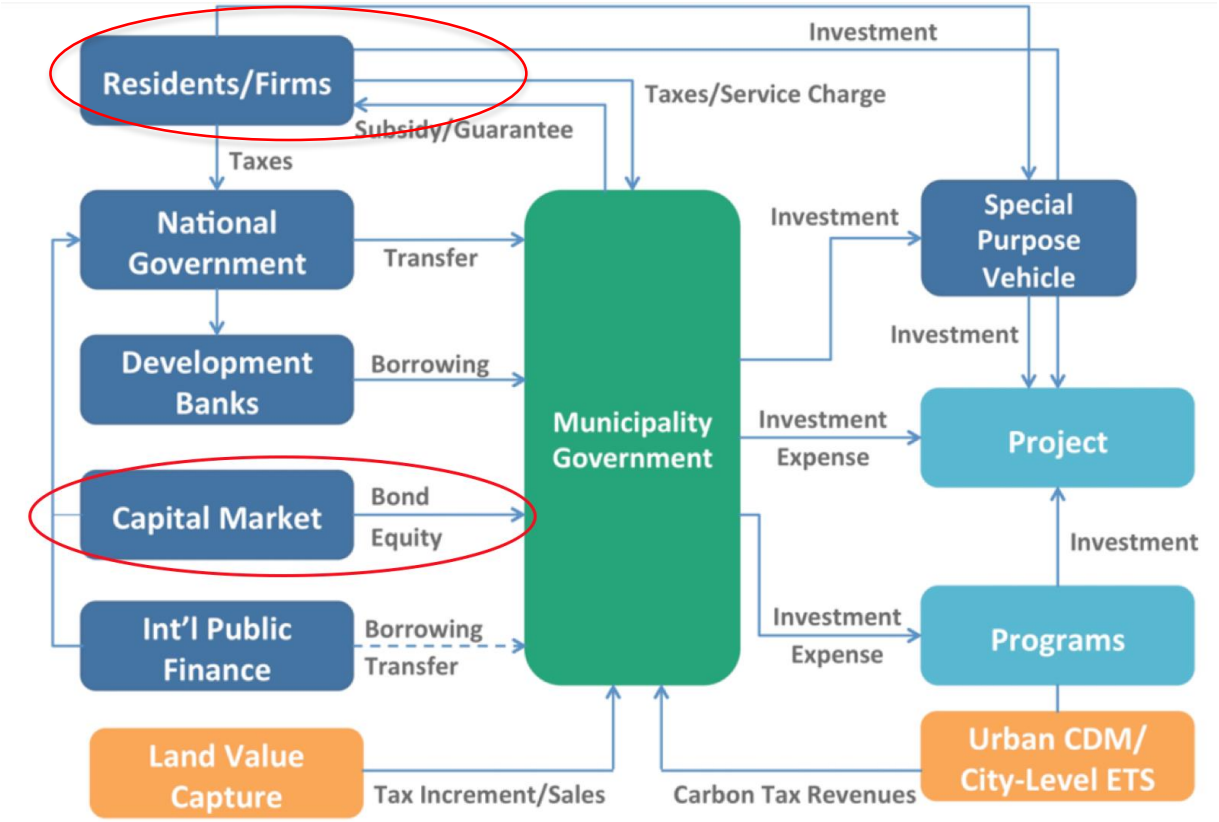


***Figure 2*** *Opportunities of climate finance for municipalities (Source: ICLEI)*

In short, the City of Toronto, prevented from receiving international climate resilience funding, has two options: government transfers or raising funds from private actors on the capital market. However, the EED is unable to tap into the City's budget for any more money than it already has, nor is it able to raise taxes. The latter option remains the only viable option within the scope of this project. This report identifies and analyzes the viability of alternative financing mechanisms that raise capital for TransformTO initiatives, relying primarily on private capital.

Toronto already uses financing strategies for ongoing climate resilience projects, such as Local Improvement Charges (LICs) for high rise retrofits,[12] and recoverable debt for the up-front costs of the Sustainable Energy Plan, which will be recovered in the form of energy savings.[13] Given that these strategies are already employed by the City, this report elected to analyze strategies not in place at the municipal level, to provide the EED with a more valuable analysis.

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[12] Hi-RIS Program - Tower & Neighbourhood Revitalization Unit - Neighbourhoods and Communities | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=ab3147e94c5b3410VgnVCM10000071d60f89RCRD

[13] Sustainable Energy Plan - Citizen Services - Programs and Services | City of Toronto. (n.d.). Retrieved March 27, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=02f109b0aac52410VgnVCM10000071d60f89RCRD

This report selected Green Bonds, Community Bonds and P3s because these strategies are used in other jurisdictions to finance the types of projects outlined in the TransformTO plan. They also have yet to be used at the municipal level in Toronto to finance climate resilient projects specifically. Drawing on best practices from other jurisdictions, the sections below identify ways in which these three financing mechanisms can be used in Toronto, keeping in mind its constraints and the objectives of TransformTO.

# Methodology

Our research was founded in publicly available resources on financing low-carbon resilience and TransformTO as well as the following internal EED resources:

- Sustainability Solutions Group, "Modelling Toronto's Low-Carbon Future, Technical Paper #3: 80x50 Low-Carbon Scenario (DRAFT)", January 27, 2017
- City of Toronto, "MAG Meeting #3: Multi-Criteria Analysis (MCA)", February 20, 2017

In addition, we consulted with a variety of City officials as part of our research for this project. We also interviewed two experts (notes from the conversation are found in Appendix A):

- Tim Stoate, Vice-President, Impact Investing at Toronto Atmospheric Fund
- Steve Rohacek, Senior Vice-President, Municipal Business Development and Lending at Infrastructure Ontario

From the public and internal resources, we developed a list of short- and long-term TransformTO actions and their detailed characteristics (capital requirements, environmental impacts, etc.) when available. We identified 23 short-term and 36 long-term actions, which are listed in Appendix B. For those actions that require operating expenditure only or no expenditures (such as policy shifts), we considered them to be out of scope for this project as they must be funded through internal budgeting processes, or in some cases require no funding at all. Once we established which actions required financing, we evaluated which financing mechanism was most appropriate for each action.

To compare financing mechanisms in a consistent, clear, and a comparable way, taking stock of initiatives already in place in Toronto and other jurisdictions, an evaluation framework was developed. The key considerations of the evaluation framework are as follows:

- Financial considerations (capital required, return on investment)
- Non-financial considerations (environmental and social impact)
- Flexibility of use of funds
- Costs
- Risks
- Precedents in Toronto and other jurisdictions
- Feasibility of implementation

In determining the feasibility of implementation, the framework identifies programs that already

exist in Toronto or that are similar to the TransformTO initiatives (e.g. the Better Building Partnerships and calls for its extension in TransformTO).

Initiatives that are extensions of current programs are analyzed to see if their current financing mechanism could be used, considering the constraints under which the EED is operating. If these initiatives were financed in ways that were compatible with the aforementioned constraints, the framework calls for the continuation of these methods of financing, as the *Short-term Strategies Business Cases* document does.

Initiatives that are similar to current programs but that could not be funded by their current financing mechanisms were matched with one of the three financing mechanisms. For example, TransformTO's short-term action number 1.5 calls for the retrofitting of residential buildings. The program is currently funded with a local improvement charge (LIC). Although the LIC model is a good one for the repayment of the retrofits, the initial capital cannot come from the budget nor from an increase in taxes. The evaluation framework thus calls for the use of a green bond. The following sections detail which different mechanisms lend themselves to which initiatives.

Finally, initiatives that the City of Toronto is not currently implementing were compared against initiatives in jurisdictions that are implementing them. These examples helped inform the financing mechanism suggested for the TransformTO strategies.

Details of the process and results of the evaluation framework are found in Appendix C, and limitations and conclusions of the analysis can be found in the Key Considerations section.

# Green Bonds

Green municipal bonds are different from normal municipal bonds because they are used exclusively to fund green projects, assets or activities that have an environmental benefit (such as renewable energy and low-carbon transportation). Green bonds are referred to by different names that mean different things:

Green bonds: Third-party certified bonds that are issued for the financing of projects, assets or activities that have an environmental benefit

Climate-aligned bonds (also known as clean bonds): bonds that are issued for the financing of projects, assets or activities that have an environmental benefit and are *not* certified by a third-party

While there are currently no universal standards for green bond certification, the Green Bond Principles (GBP) are widely used. GBP recommends a certification process that includes third-party external review and periodic reporting on the use of proceeds of a green bond. The International Capital Market Association provides a detailed overview of GBP and the

recommended certification process (some details are provided in Appendix D).[14] The certification leads to additional costs, with the fee for external review and certification by a third party ranging from $15,000 to $30,000, and additional fees for the collection and reporting of data on projects funded by the green bond.

The green bond market has seen explosive growth in the past five years. In July 2016, USD 118 billion green bond issuances were outstanding, with an additional USD 576 billion in climate-aligned, but not green labelled, bond issuances outstanding.[15] Canada had the fifth-largest market at the time, with CAD 30 billion in climate-aligned and CAD 2.9 billion in green bond issuances outstanding.[16] Further issuances have occurred since these reports were released, including CAD 800 million from Ontario and CAD 500 million from Quebec.[17]

## Types of Green Bonds

There are four main types of green bonds that can be issued by municipalities, outlined below:

***Table 1*** *Types of municipal green bonds (Source: Climate Bonds Initiative)*

| Type | Proceeds Raised by Bond Sale | Debt Recourse | Example |
|---|---|---|---|
| General Obligation Bond | Earmarked for green projects | Full recourse to the issuer; therefore, same credit rating applies as to the issuer's other bonds | State of California issued $300 million in Aa3/A green bonds with final maturities in 2037. The September 2014 issuance was backed by the State's General Fund, 90% of which is derived from personal income tax, sales and use tax, and corporate tax. Proceeds went to fund a variety of projects across several categories, including air pollution, clean water and drinking water, and flood prevention. |
| Revenue Bond | Earmarked for green projects | Revenue streams from the issuer, such as taxes or user fees, provide repayment for the bond | Iowa Finance Authority issued $321.5 million of State Revolving Fund revenue bonds in February 2015, with 1- to 2-year tenors, 1-5% coupon, rated AAA. The green bonds were backed by water-related fees and taxes. Proceeds were earmarked for water and wastewater projects. |
| Project Bond | Ring-fenced for the | Recourse is only | No issuance seen in the market yet |

[14] International Capital Market Association, "Green Bond Principles", from http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/
[15] Climate Bonds Initiative, "Bonds and Climate Change: The State of the Market in 2016", from https://www.climatebonds.net/files/files/CBI%20State%20of%20the%20Market%202016%20A4.pdf
[16] Climate Bonds Initiative, "Bonds and Climate Change: The State of the Market, Canada Edition", from https://www.climatebonds.net/files/files/CB-HSBC-2016-Canada-Final-01A-1.pdf
[17] Climate Bonds Initiative, "Labelled green bonds data", from https://www.climatebonds.net/cbi/pub/data/bonds

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|---|---|---|---|
| | specific underlying green project(s) | to the project's assets and revenue | |
| Securitized Bond | Either 1) earmarked for green project(s), or 2) go directly into the underlying green project(s). | Recourse is to a group of financial assets that have been grouped together as collateral | Hawaii State Government issued $150 million, AAA-rated of green asset-backed securities in November 2014. The securities were issued in two tranches: $50 million, 8-year, 1.467% coupon and $100 million, 17-hear, 3.242% coupon. The bonds were backed by a Green Infrastructure Fee applied to the bills of the State Utility's electricity customers. Proceeds went to loans to install distributed solar panels, connectors, and storage. |

## Precedents from Other Jurisdictions

In addition to the US examples listed above under *Types of Green Bonds*, we identified several global precedents relevant to the City of Toronto due to projects the bond proceeds were used to fund, governance, investor type, and/or first national issuance examples.

***Table 2*** *Green bond precedents from other jurisdictions*

| Jurisdiction | Bond Details | Certification | Use of Proceeds | Relevance for City of Toronto |
|---|---|---|---|---|
| Mexico City[18] | CAD 67 million, issued in 2016 with a 5-year term, Baa1-rated bond. Yield of 7%. Oversubscribed by 2.5x. | Sustainalytics[19] Estimated cost of USD 150 million (Includes fee to certifier and internal costs). | Fund climate-resilient infrastructure and mobility projects. | First green bond in Latin America with similar projects being funded. |
| City of Johannesburg[20] | CAD 143 million, issued in 2014 for 10-year term, BBB-rated project bond. Yield of 1.85% above risk-free rate. | Implemented according to World Bank guidelines.[21] | Fund green initiatives including renewable energy and low-carbon | First green bond in South Africa with similar projects being funded. Did not |

[18] Citiscope, "Lessons from Mexico City's green bond, the first municipal issuance in Latin America", from http://citiscope.org/story/2017/lessons-mexico-citys-green-bond-first-municipal-issuance-latin-america
[19] Sustainalytics, "Ciudad de Mexico (CDMX) Green Bond Framework: Second Party Opinion by Sustainalytics", from http://www.sustainalytics.com///sites/default/files/green_bond_opinion_cdmx_11112016_final.pdf
[20] Climate Bonds Initiative, "City of Johannesburg green bond", from https://www.climatebonds.net/2014/06/just-out-first-emerging-market-green-city-bond-city-johannesburg-green-bond-approx-r15bn
[21] The World Bank, "Green Bond Process Implementation Guidelines", from http://treasury.worldbank.org/cmd/pdf/ImplementationGuidelines.pdf

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|---|---|---|---|---|
| | Oversubscribed by 1.5x. | | infrastructure. | certify. |
| City of New York MTA | CAD 786 million, issued in 2016 in 1-20 year tranches. A1/AA-/A rated revenue bond with a coupon of 2-5% depending on tranche. Oversubscribed which led to upsizing to over CAD 1 billion. | Sustainalytics[22] | Fund low-carbon transport. | Transportation key focus of investment. |
| Province of Ontario[23] | CAD 800 million, issued in 2017 for 6-year term, Aa2/AA-/AA rated with a 1.75% coupon. General obligation bond. | CICERO (Centre for International Climate and Environmental Research - Oslo)[24] | Fund energy efficiency and clean transportation projects. | Similar credit rating. 79% of investment came from Canada, demonstrating interest in domestic market. Similar investors may demand City of Toronto bonds. |

## Benefits and Drawbacks

In comparison to climate-aligned bonds, certified green bonds are more credible and provide a greater certainty that an investor's funds are going towards a "green" project, as opposed to any project the municipality chooses. This attracts more individual and institutional investors as they are increasingly seeking assets with a positive environmental impact in addition to financial return. As there are not many green bonds in the Canadian marketplace, they are in high demand and frequently trade above par.[25] Green bonds may attract a different set of investors from regular municipal bonds, including individual investors in the community that are keen to invest in low-carbon resilience. In addition, some trading platforms, such as the London Stock Exchange, only list green bonds if they are certified.[26] Not being certified may restrict the ability of the City of Toronto to take advantage of trends in impact investing.

An additional benefit of green bonds is that apart from the certification process, the issuance follows the same process as regular municipal bonds and the City would not have to invest in

[22] Sustainalytics, "Climate Bonds Standard Verification Letter", from https://www.climatebonds.net/files/files/Verification%20Letter_MTA%20Green%20Bond%202016-2.pdf
[23] Ontario Financing Authority, "Province of Ontario 6-year - $800 million global CAD green bond", from http://www.ofina.on.ca/pdf/Feb2_17_G72_R1_en.pdf
[24] Ontario Financing Authority, "Green Bonds: Assurance", from http://www.ofina.on.ca/greenbonds/verification.htm
[25] Triple Pundit, "Why are investors paying over market rates for green bonds?", from http://www.triplepundit.com/2015/09/investors-paying-market-rates-green-bonds/
[26] London Stock Exchange, "Green Bonds", from http://www.lseg.com/green

developing significant new capacities in corporate finance. For projects with a financial return, the interest paid to bondholders can be paid through the project funds. Otherwise the interest will be a cost to the City. Finally, as the green bond does not involve any private sector partners, any project funded through the bond will remain publicly-owned.

Perhaps the most significant drawback of using green bonds is the additional cost from the certification process. There is a range of costs depending on certifier and additional resources required to support ongoing verification and reporting. A drawback of issuing certified green bonds is that the proceeds are not fungible as they must be used for projects that provide clear environmental benefits. The City will not be able to transfer green bond funds to initiatives that do not have demonstrable positive environmental impact. However, this could also be seen as a benefit. A green bond that is issued for TransformTO projects and limited to that scope will commit those funds to the initiative and could prevent the City from shifting those funds to other priority areas.

An additional drawback is that issuing green bonds will increase the City's debt, which is restricted by the debt ceiling and other governance factors. Proceeds will be restricted to capital investments and cannot go toward operating expenses.

## Challenges to Implementation

Issuing green bonds will require a similar implementation process to regular municipal bond. In addition, the decision will need to be made whether to certify the green bond, or simply to issue it as a climate-aligned bond. The certification process requires additional time and resources (both financial and human), which as stated above will vary according to certifier (a general outline of the process is found in Appendix D).

One of the key challenges to issuing a green bond in Toronto is that it will increase the City's debt, which is restricted by the debt ceiling and other governance factors. Political will to either raise the debt ceiling and/or decide that new debt should be issued through green bonds will be required. In relation to this challenge is the cost of debt, which will vary depending on the structure of the bond (such as whether or not it has a coupon), as well as the City's credit rating. Toronto has a strong credit rating of AA/Aa1 with a stable outlook which should result in a favourable cost of debt.[27] As mentioned above, this cost can be mitigated by green projects that produce a financial return, such as energy projects.

## Which TransformTO Strategies could be financed?

Green bonds are perhaps the most flexible financing mechanism with regards to scale as the funds from a green bond can be used for both small and large projects. However, the results of our evaluation framework suggest that they are best suited for large-scale projects of more than

[27] City of Toronto, "2015 City of Toronto Financial Report: Financial Condition & Performance", from https://www1.toronto.ca/City%20Of%20Toronto/Accounting%20Services/Financial%20Reports/Files/pdf/2015/2015FAR_financial_condition.pdf

$50 million. They are also suited for projects that the private sector does not want to invest in, limiting the opportunity for a public-private partnership. As discussed above, the projects must have measurable environmental benefits. Finally, projects with a financial return may be suitable for green bonds as the returns may be able to cover the cost of debt. Below is a table summary of our evaluation framework applied to green bonds.

***Table 3*** *Evaluation of green bonds for the City*

| | Green Bonds |
|---|---|
| **Financial** | • Limits on amount of capital raised due to City's debt ceiling and other municipal bond considerations, otherwise no min/max<br>• ROI based on project funded |
| **Non-financial** | • Positive environmental impact required |
| **Costs** | • Cost of debt borne by the City<br>• Additional costs for certification process, minimum $15,000<br>• Revenue-generating projects reduce costs |
| **Flexibility of use of funds** | • Limited to projects that provide measurable environmental benefit |
| **Risks** | • Lack of investor demand results in disappointing capital raise<br>• Required to demonstrate environmental impact of projects funded<br>• Requirements of certification process too onerous or costly<br>• Risk of raising debt ceiling or general risk of taking on more debt (particularly if projects do not generate financial return expected) |
| **Feasibility** | • Demand for green bonds in financial markets is high, as demonstrated by recent Ontario green bonds<br>• City's ability to deploy is limited by debt ceiling and cost of debt |
| **Conclusion** | • Most suitable for large-scale green projects (> $50 mil)<br>• Timeline of projects can vary, but if it is a revenue bond, financial returns from project should match interest/coupon payments of bond<br>• Suitable for environmentally-focused projects |

Given these results, we determined that the following short-term (ST) and long-term (LT) actions could be funded by proceeds from green bonds. Due to the various types of green bonds, the most suitable type of green bond will vary according to project(s) that require funding and should be determined by the City.

***Table 4*** *List of TransformTO actions that can be financed by green bonds*

| Actions | Description |
|---|---|
| ST 1.1 | Enhance the Better Buildings Partnership (BBP): Retrofit up to 50 million square feet of commercial and institutional buildings by 2020 |
| ST 2.3 | Advance low-carbon/renewable thermal energy networks (district energy) |
| ST 4.1 | Expand energy retrofits at City facilities |

| | |
|---|---|
| ST 4.2 | Scale-up renewable energy installations |
| LT 10 | Retrofits for commercial and office buildings (BBP+) |
| LT 12 | Re-commissioning of commercial buildings on an ongoing basis. |
| LT 13 | Incorporate solar PV systems into new construction |
| LT 14 | Incorporate solar PV systems on roofs of existing buildings |
| LT 16 | Apply integrated solar thermal and solar PV systems to facades |
| LT 17 | Expand zero carbon district energy systems |
| LT 19 | Install distributed energy storage |
| LT 25 | Personal transportation planning (Smart Commute+) |
| LT 28 | Electrify transit fleet |
| LT 34 | Electrify the City vehicle fleet |
| LT 35 | Increase waste diversion rates |

# Public-Private Partnerships

A public-private partnership, also referred to as a P3 or PPP, is a term used to broadly define a method by which the public sector can connect with private sector organizations to finance and construct public works projects. While a P3 can take on varying forms and each contract can have a differently structured arrangement, they are projects that are no totally private or entirely public procurement. A common facet of P3s is the fact that “the private party bears significant risk and management responsibility, and remuneration is linked to performance." This can be a huge benefit to governments, as they can sustainably develop infrastructure and meet the demands of growing populations without bearing the up-front costs. P3s are a way to receive valuable input from private sector companies and to take advantage of their specialized experience and financing knowledge. In theory, P3s help bolster both the quantity and quality of public infrastructure. They can be particularly useful method of financing when there are political or fiscal obstacles to raising revenue from the public to infrastructure projects, and in this case funding the much-needed TransformTO strategies.

## Precedents from Other Jurisdictions

There are real-world cases by which P3s can be judged based on their cost-effectiveness and efficiency. P3s have become a more common in recent years due to constraints on public finances, and many jurisdictions have experience engaging in P3 projects and can serve either as examples or cautionary tales to the city of Toronto. Through a jurisdictional scan, we have identified several examples of green projects financed through a P3 arrangement. The table

below may be useful to glean the positives, drawbacks, and potential lessons that could apply to implementation of P3 projects in Toronto that accomplish the objectives of the TransformTO objectives.

***Table 5*** *P3 precedents from other jurisdictions*

| Jurisdiction | P3 Details | Amount Raised | Result | Relevance for City of Toronto |
|---|---|---|---|---|
| Fayette County, Indiana | Whitewater Wind Farm. | Private partner estimates investment between $120 to $141 million USD. City officials estimate $20 million in taxes collected from the project over a projected 30-year lifespan.[28] | Project approved in 2015 to build 43 wind turbines and increase production of wind energy. Construction has been stalled by community groups opposing the proximity of the turbines and the private company (NextEra Energy) receiving a tax abatement.[29] | Developing off-shore wind turbines is a stated goal (Long-Term Action Item #15). Could be re-created in Lake Ontario. |
| Madrid, Spain | Expansion of the subway system to connect to Madrid-Barajas International Airport. | Government of Madrid received 9% of profits made by the contractor, but no public information on the exact amount this has totaled. | Ridership is in the projected range and construction was completed in the 9-month time frame. The contractor had cost overruns due to unexpected construction at the airport (63 million euros, approx. 20% more than estimated).[30] | Comparable population size to the city of Toronto. Talks of expanding railway service to airports and integrating it into the subway system (such as the Union-Pearson Express). |

[28] Sprague, James. Fight Not Over on Wind Farm. February 15, 2015. http://www.newsexaminer.com/news/local/fight-not-over-on-wind-farm/article_b60bf0ab-ef93-5135-9db3-6b049fd9c480.html

[29] Ibid.

[30] Antonio Sánchez Soliño and José M. Vassallo, 7, http://campusmedia.eurist.info/images/8/88/Sanchez-Solino_Vassallo_PPPs_in_Urban_Rail_Projects_2009.pdf

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| State of Colorado | "US 36" Express Lanes (Plenary Roads Project) | $312 million USD cost is covered by private company Plenary Roads, in exchange for 50 years of right to operate and maintain the road system. | State government received money up front, the investors received a share of the toll revenue, and commuters were able to use an improved and modernized road path 20 years ahead of schedule. Privatization of new roads and toll increases has been met with pushback and protests from the public. | The Province of Ontario has already privatized roads and installed tolls on them. There has been pushback and criticism from the public, so there must be political sensitivity in the way privatization is implemented. |

There a few lessons that can be learned about how to implement P3s most effectively, ranging from economic, political, and implementation considerations, which encapsulate the three basic criteria that result in success or failure of a P3 project.[31]

First, begin by focusing on realistic and feasible projects. There are many examples of jurisdictions aiming to develop multi-billion-dollar infrastructure projects only to run into financing delays that lead the project to be perceived negatively by the public.

Second, “maintain the vision [of the project and its objectives] while remaining practical.”[32] Several jurisdictions with successful P3 projects based their decision on a framework and evaluation a wide variety of potential P3 projects.[33] In some instances, this extended into passing a city law governing elements of P3 projects as well as creating a specific division to work on P3 issues. This allowed for dedicated groups of public officials to consistently gain experience and build up area knowledge.[34]

Third, pursue the most attractive financing sources. In the U.K., India, Russia, and several other countries, federal governments have created funds dedicated to supporting infrastructure projects and a variety of economic factors can make them suitable options, such as no foreign exchange risk and the fluctuations of international markets.[35] This analysis identifies these methods as tools the city can use to notice and avoid red flags early in the process of engaging in a P3 agreement.

[31] World Bank, Overcoming Constraints to the Financing of Infrastructure, 13, http://www.g20.utoronto.ca/2014/WBG_IIWG_Success_Stories_Overcoming_Constraints_to_the_Financing_of_Infrastructure.pdf
[32] Ibid, 11.
[33] Ibid, 12.
[34] Ibid, 12.
[35] Ibid, 12.

## Benefits and Drawbacks

Using a P3 to implement a project is beneficial for the city. Benefits include the "delivery of value for money" by laying risks onto the private actor, drawing on the private sector for innovative designs and construction methods, receiving the money for up-front and capital costs of infrastructure projects, and allowing for competition to boost efficiency at a lower cost.[36]

There are also several significant drawbacks for the city to consider when considering whether to enter a P3 agreement. These drawbacks include: the policy rigidity of contractual obligations; insufficient public consultation due to privacy and concerns over confidentiality; lower wages and fewer benefits for workers resulting in a costlier endeavor than a publically financed project; and the potential inclusion of non-competition clauses that can stand in the way of planning and integration into existing systems.[37]

## Challenges to Implementation

When the city of Toronto considers using a P3 agreement to finance green infrastructure, there are some potential barriers and challenges that may complicate the process. For instance, there can be difficulty in getting private actors on board and enticing them to fund projects and take on risk. This can be due to a variety of reasons, ranging from concerns about lack of revenue, aversion to strict rules mandated by the public partner, or simply disinterest in the specific project in question. Another potential challenge is gaining approval from all the stakeholders involved in a P3 project. There is of course the need for support among all the level of governments involved, securing private partners (there is often a private sector consortium to build the project), as well as potentially approval from city council, and nearby communities impacted by construction. In order to mitigate and avoid unnecessary obstacles, the city must address certain questions in advance. These questions include some basic fiscal aspects of a project, such as figuring out whether the project will likely have a positive rate of return and the creditworthiness of all partners involved. There are also some crucial political questions to consider, like if there is a wide range of stakeholders, if sufficient public consultation has taken place, if the project needs additional approval from legislatures (city council, Queen's Park, or the House of Commons), the expected amount of time until the next election or a new government, and if any support exists among key political figures, such as Mayor, Premier or relevant Ministers. Finally, there are a host of important questions about the execution of the project, including the reputation of companies involved and whether there has been sufficient research into economic and social feasibility for the project.[38]

## Which TransformTO Strategies could be financed?

There are certain characteristics of a project that make it suitable for P3. They are projects that

[36] Matti Siemiatycki, *Public Private Partnerships in Canada Definitions and* Debates, 8, http://munkschool.utoronto.ca/imfg/uploads/232/siemiatycki.pdf
[37] Ibid, 8.
[38] World Bank, Overcoming Constraints to the Financing of Infrastructure, 17, http://www.g20.utoronto.ca/2014/WBG_IIWG_Success_Stories_Overcoming_Constraints_to_the_Financing_of_Infrastructure.pdf

require extensive financing, as well as projects that could benefit from the skills and specified knowledge of private sector firms. A P3 approach may be beneficial for funding several TransformTO strategies. This financing method if often quite complex and has many moving parts. There are risks of delays or cost overruns. An effective approach to P3 financing requires focus, knowledge, and vigilance from public sector officials. The public partner (in this case the City of Toronto) must rely on overseers that have knowledge of this process. To increase chances of success, there should be consideration of the vital categories of *economy, execution,* and *politics*. This translates into diligently assessing whether the economic foundations of the project are sound, knowledge of the existing rules and regulations and adhering to them, while also ensuring that there is political commitment throughout the process.[39] Below is a table summary of our evaluation framework applied to P3s.

***Table 6*** *Evaluation of P3s for the City*

| | **Public-Private Partnerships** |
|---|---|
| **Financial** | • Most suitable for large-scale projects (more than $100 million)<br>• Should reduce costs of project for City |
| **Non-financial** | • No explicit requirement for positive social and/or environmental impacts |
| **Costs** | • Some costs transferred to private partner<br>• Revenue-generating projects reduce costs |
| **Flexibility of use of funds** | • Limited to scope of project as determined with private sector partner |
| **Risks** | • Cost overruns<br>• Loss of control over project<br>• Lack of public consultation can result in negative public opinion or demonstrations<br>• Difficulty with integration into other projects |
| **Feasibility** | • Identifying the appropriate partner is critical to success and transferrence of risk<br>• Ability to deploy limited by political will and anti-privatization sentiments |
| **Conclusion** | • Most suitable for individual large-scale infrastructure projects (> $100 mil)<br>• Timeline of projects can vary according to P3 agreement<br>• Suitable for both environmental and social projects |

Given these results, we determined that the following short-term (ST) and long-term (LT) actions could be funded by proceeds from P3s.

[39] World Bank, Overcoming Constraints to the Financing of Infrastructure, 16, http://www.g20.utoronto.ca/2014/WBG_IIWG_Success_Stories_Overcoming_Constraints_to_the_Financing_of_Infrastructure.pdf

***Table 7*** *List of TransformTO actions that can be financed by P3s*

| Action | Description |
|---|---|
| ST 3.4 | Developing a low-carbon freight strategy |
| ST 3.5 | Support Safe Cycling and Walking |
| LT 15 | Develop offshore wind turbines |
| LT 17 | Expanding zero carbon district energy systems |
| LT 19 | Installing distributed energy storage |
| LT 22 | Integrated transit improvements |
| LT 23 | Introducing transit in areas with high density and insufficient transit |
| LT 25 | Personal transportation planning |
| LT 35 | Increasing waste diversion rates |

## Community Bonds & Civic Crowdfunding

This section will encompass two different kinds of financing mechanisms, both with a focus on community engagement. The first financing mechanism, mini-municipal bonds, or “community bonds”, is based on the idea of miniature municipal bonds, in which a municipality offers “mini bonds” in increments—usually in the range of $500 to $5000 dollars—which are more accessible to the average citizen than the usual municipal bonds, which sell for hundreds of thousands, or millions of dollars. These mini bonds raise money for a variety of municipal projects; ones that would be of interest to the average citizen, such as those focused on transportation.

The US-based startup Neighborly has begun to tap into the market of those who wish to invest in municipal bonds but only have a few hundred or thousand dollars to do so. Through Neighborly’s website, potential investors can buy small portions of a municipal bond rather than larger sections that would be too expensive for the average investor, and they can pick and choose the types of projects they are most interested in, whether through the focus of the projects or their locations.[40] These bonds typically have a market rate of return for municipal bonds. The added benefit of community improvement is not a large enough incentive to reduce the rate of return. Indeed, there are costs associated with investing in these costs, even if these only take the form of investing with an entity other than citizens’ usual investment manager.

The second type of financing mechanism is often referred to as civic crowdfunding, the idea

[40] Neighborly, https://neighborly.com

behind which is that civic-minded citizens would crowdfund the money for certain projects, while expecting no eventual return on their investment. The money raised would go directly towards the project, and the return would be the improvement in the city or a certain neighborhood where the project was implemented. Through websites like IOBY (In Our Back Yard) and Spacehive, citizens have been able to raise the money, usually under USD $100,000, for smaller projects that were popular enough with communities to gather the enthusiasm for this type of crowdfunding.

## Precedents from Other Jurisdictions

***Table 8*** *Community bond precedents from other jurisdictions*

| Jurisdiction | Finance Mechanism Details | Amount Raised | Result | Relevance for City of Toronto |
|---|---|---|---|---|
| Denver, Colorado | Downtown Denver Partnership | USD $36,000 | The Downtown Denver Partnership used IOBY (a civic crowdfunding website) to raise $36,085 for a protected bike lane, with help from some private contributors in Denver as well | Potential example for ST 3.2, to support walking and cycling. Could be deployed in smaller sections first and then later expanded. |
| Denver, Colorado | Denver Mini-Bond Program | $12 million worth of mini-bonds | The money was invested in "restoring, refurbishing, and replacing city infrastructure" in Denver, while increasing community engagement | These bonds' focus on city infrastructure could be replicated in Toronto for various infrastructure projects to cover part of the costs. |
| Cambridge, MA | Cambridge Minibonds (partnered with Neighborly) | $2 million | This only took place in February 2017, but the bonds sold out quickly and will be used to fund capital projects such as school building renovations and municipal facility upgrades | Projects that are more interesting to the average citizen, like school building renovations in MA, could be targeted by Toronto, as in ST 3.2 and 3.3 and LT 26 and 27 |
| Toronto | Zooshare Biogas Co-op | Raised 2.2 million | Selling bonds to recycle manure from the Toronto Zoo and local food waste into renewable power for the Ontario grid, reducing greenhouse gas emissions | This provides a good example for ST 4.3 and LT 36, focusing on utilizing landfill gas and biogas. |

## Benefits and Drawbacks

One of the most important benefits of community bonds and civic crowdfunding is the associated community engagement. These finance mechanisms will only succeed if local citizens are engaged with their city and the projects associated with the bonds, and, once citizens have bought bonds, or even just heard about them through word-of-mouth, they will become even more interested and involved in the associated projects. Community engagement is an important aspect of TransformTO. The more engaged the Toronto community is in TransformTO projects, the easier it will be for all these projects to succeed, regardless of how they are funded.

One of the drawbacks of community bonds is that it is difficult to raise larger amounts of funding, above the $1-2 million range. It is possible for community bonds to potentially raise more than that value, or even for a civic crowdfunding project to do so, but it would be difficult to generate the interest and enthusiasm necessary to raise this amount. The process for raising this amount of money, or more than a few million dollars, could get quite complicated because this would require many small investors.

Other risks include political risk and the risk presented by a variability in demand. There is political risk involved, especially in the case of civic crowdfunding, where citizens could feel as though the government is offloading its own obligations and projects onto citizens. There is also the possibility that demand for these bonds will not be high enough to raise the funds necessary.

## Challenges to Implementation

The main challenge to deploying these types of financial mechanisms is in developing the method to distribute and sell these bonds, as types of municipal bonds are not yet common in Canada. Neighborly is currently a US-based startup, and will not be expanding into Canada anytime soon. This means that the City of Toronto would have to build up its own method of deployment for these mini-municipal bonds, which could prove to be a challenge, and potentially costly.

## Which TransformTO Strategies could be financed?

There are certain qualities in a project that make it better for community bonds or civic crowdfunding. Community bonds are best used on smaller projects, usually no larger than $15 million USD. While hypothetically there is no limit to the amount that could be raised by community bonds, it becomes increasingly difficult to raise more than a few million dollars due to lack of demand and complications due to the number of investors. Civic crowdfunding is even more limited than community bonds, as people expect no return on their money when they invest. It would be difficult to find multiple million dollars' worth of capital with investors not expecting a return. These types of projects are usually limited to just a few hundred thousand dollars at most. Once again, hypothetically there is no limit to the amount that could be raised, but due to numerous factors raising large amounts of funding with civic crowdfunding is unlikely.

None of the TransformTO actions are small projects, and if any were to be funded through community bonds they would likely need to be paired with another type of mechanism that has greater potential to raise most of the funding, such as a P3 or green bond. Below is a table summary of our evaluation framework applied to community bonds.

***Table 9*** *Evaluation of community bonds for the City*

| | **Community Bonds** |
|---|---|
| **Financial** | • Most suitable for small-scale projects (< $50 million) as funds raised through smaller tranches |
| **Non-financial** | • Positive social and/or environmental impact expected, but not required |
| **Costs** | • Cost of debt borne by the City (community bonds)<br>• Revenue-generating projects reduce costs<br>• Crowd-funding can be organized at very little costs (only administrative) |
| **Flexibility of use of funds** | • Unlimited within municipal bond framework, though investors may require transparency for allocation of funds |
| **Risks** | • Lack of investor demand results in disappointing capital rise<br>• Complications and unforeseen costs arise from large number of investors<br>• Success of initial project will impact future raises<br>• Public opinion may not favour crowd-funding for City initiatives |
| **Feasibility** | • City's ability to deploy is limited by debt ceiling and cost of debt |
| **Conclusion** | • Most suitable for small-scale projects with demonstrable community impact<br>• Timeline of projects can vary, but if it is a revenue bond, financial returns from project should match interest/coupon payments of bond<br>• Suitable for both environmental and social projects |

Both community bonds and civic crowdfunding are ideal financial mechanisms for projects that are interesting to the average citizen, and in general are projects that people get excited about and are moved to become further engaged in. Below are a few of the actions we believe have the most potential to be funded by community bonds, all due to high community interest in these projects. High community interest is the key quality necessary in these types of projects, as it is only through community interest that the average person will go out of their way to become more engaged in these projects and invest their money in them.

***Table 10*** *List of TransformTO actions that can be financed by community bonds*

| **Action** | **Description** |
|---|---|
| ST 3.2 | Support Safe Cycling and Walking |
| ST 3.3 | Enhance Transit Service |
| ST 4.3 | Utilize landfill gas and biogas |
| LT 24 | Car free areas |

| | |
|---|---|
| LT 26 | Increased cycling mode share (Action 26) |
| LT 27 | Increased walking mode share (Action 27) |
| LT 36 | Utilize landfill gas and biogas (Action 36) |

# Recommendation: Pathways to financing low-carbon resilience in Toronto

## Key Considerations

This report has outlined how Green Bonds, P3s and Community Bonds have been used to finance climate resilient projects. The three sections outlined the benefits and drawbacks of each financing mechanism and suggested to which TransformTO objective each mechanism would lend itself well. The table below summarizes the three financing mechanisms, key considerations and an archetype of a project for which they would be effective.

***Table 11*** *Summary of results of evaluation framework*

| | Green Bonds | Public-Private Partnerships | Community Bonds |
|---|---|---|---|
| **Financial** | • Limits on amount of capital raised due to City's debt ceiling and other municipal bond considerations, otherwise no min/max<br>• ROI based on project funded | • Most suitable for large-scale projects (more than $100 million)<br>• Should reduce projects costs | • Most suitable for small-scale projects (< $50 million) as funds raised through smaller tranches |
| **Non-financial** | • Positive environmental impact required | • No explicit requirement for positive social and/or environmental impacts | • Positive social and/or environmental impact expected, but not required |
| **Costs** | • Cost of debt borne by the City<br>• Additional costs for certification process, minimum $15,000<br>• Revenue-generating projects reduce costs | • Some costs transferred to private partner<br>• Revenue-generating projects reduce costs | • Cost of debt borne by the City (community bonds)<br>• Revenue-generating projects reduce costs<br>• Crowd-funding can be organized at very little costs (only administrative) |
| **Flexibility of use of funds** | • Limited to projects that provide measurable environmental benefit | • Limited to scope of project as determined with private sector partner | • Unlimited within municipal bond framework, though investors may require transparency for allocation of funds |

| | | | |
|---|---|---|---|
| **Risks** | • Lack of investor demand results in disappointing capital raise<br>• Required to demonstrate environmental impact of projects funded<br>• Requirements of certification process too onerous or costly<br>• Risk of raising debt ceiling or general risk of taking on more debt (particularly if projects do not generate financial return expected) | • Cost overruns<br>• Loss of control over project<br>• Lack of public consultation can result in negative public opinion or demonstrations<br>• Difficulty with integration into other projects<br>• Transfers some risk to private partner | • Lack of investor demand results in disappointing capital rise<br>• Complications and unforeseen costs arise from large number of investors<br>• Success of initial project will impact future raises<br>• Public opinion may not favour crowd-funding for City initiatives |
| **Feasibility** | • Demand for green bonds in financial markets is high, as demonstrated by recent Ontario green bonds<br>• City's ability to deploy is limited by debt ceiling and cost of debt | • Identifying the appropriate partner is critical to success and transfer of risk<br>• Ability to implement potentially limited by political will and anti-privatization sentiments | • City's ability to deploy is limited by debt ceiling and cost of debt |
| **Conclusion** | • Most suitable for large-scale green projects (> $50 mil)<br>• Timeline of projects can vary, but if it is a revenue bond, financial returns from project should match interest/coupon payments of bond<br>• Suitable for environmentally-focused projects<br>• **Example:** Install distributed energy storage | • Most suitable for individual large-scale infrastructure projects (> $100 mil)<br>• Timeline of projects can vary according to P3 agreement<br>• Suitable for both environmental and social projects<br>• **Example:** develop offshore wind | • Most suitable for small-scale projects with demonstrable community impact<br>• Timeline of projects can vary, but if it is a revenue bond, financial returns from project should match interest/coupon payments of bond<br>• Suitable for both environmental and social projects<br>• **Example:** Support safe cycling and walking |

Based on available financial information, short term TransformTO strategies could be paired more effectively to financing mechanisms than some longer-term strategies. Moving forward, the city of Toronto should review long-term programs in the way it did in the creation of its short-term strategies business cases. This would give the city a better idea of funds needed over the long-term to fully implement TransformTO into 2050. In doing so, the City will be able to take the analysis given in this report to verify whether the identified financing mechanisms would be applicable.

The results of our evaluation framework informed our analysis presented in preceding sections.

In addition to these considerations, we have identified the following issues to be flagged:

- **Timelines.** Different financing mechanisms can be used to finance different plans over varying timelines, when selecting which mechanism to use, City decision makers should take into consideration both short and long term financial requirements and repayment periods for the selected mechanism, if applicable.

- **Type of strategy.** One challenge in selecting financing mechanisms for TransformTO, regardless of the timeframe were “enabler” commitments, which involve hiring personnel to facilitate ongoing programs or engagement. These have a direct cost associated with them yet have very diffuse benefits, that are not manifested in emissions reductions nor energy savings and thus do not lend themselves well to the identified financing strategies. Financing mechanisms were paired with initiatives requiring capital expenditure, as initiatives calling for policy shifts and with only operating expenses were not funded

## Timelines

Green bonds, community bonds and P3s are appropriate for different timelines and scales. Community bonds need community buy-in and ideally operate on smaller timelines. Funders are more likely to contribute if they can see the returns in their community and over a shorter timeline. As a result, shorter timelines and more concentrated geographic areas may be more desirable for community-bond funded actions.

Public-private partnerships require a minimum scale to attract a private partner - for the deal to be interesting for them - and tend to take place over longer time frames. Steve Rohacek from Infrastructure Ontario roughly estimated that PPPs should be require at least $100 million, in order to draw private investment. PPPs are more capital intensive and tend to last for long periods of time.

Green bonds lend themselves to a variety of different initiatives and can likely be deployed more rapidly than PPPs.

The mock timeline below demonstrates the variability of timeframes over which these financing mechanisms can be deployed. This variety enables the City to fund initiatives across various timeframes.

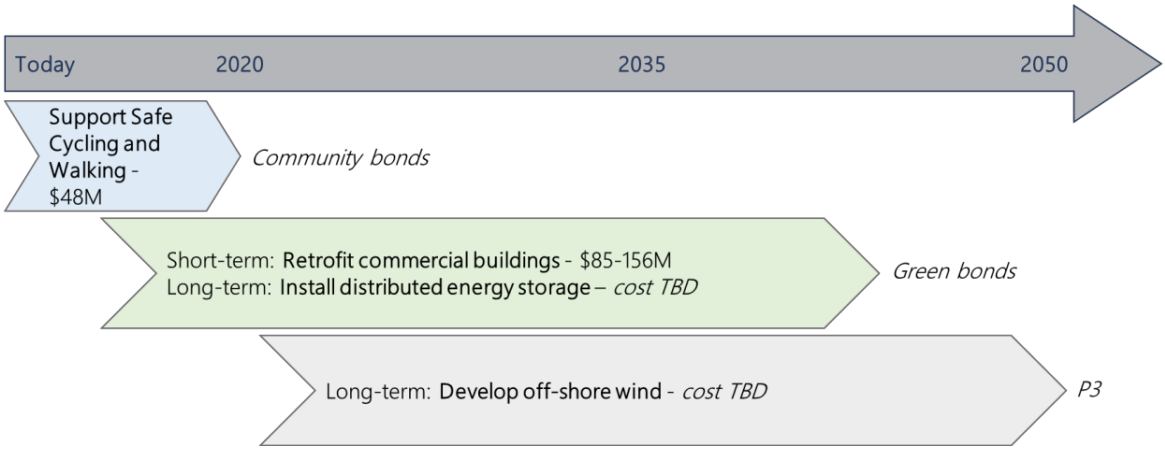


***Figure 3*** *Sample timeline of TransformTO initiatives and how they are financed*

### Type of Strategy

The strategies that can be funded by the identified financing mechanisms are those that have capital expenditures. If the City choose to use these ways to finance TransformTO projects, it should be aware that initiatives calling for policy shifts or that have operating costs may not be eligible for funding by these mechanisms.

In total, the actions identified in this report that can be funded by green bonds, community bonds and P3s equate to 58% of all TransformTO actions identified in the resources we referenced. These actions account for 100% of actions that required capital expenditures. For those that require operating expenditure only or no expenditures (such as policy shifts), we considered them to be out of scope for this project as they must be funded through internal budgeting processes. A list of these actions can be found in Appendix B.

## Conclusion

This report started by asking the following question: “Recognizing the limitations associated with austerity, risk aversion, and the existing budget process, how can the City best leverage its position (low risk of natural disasters, high political stability) to attract investment from private capital to fund TransformTO initiatives that offer resilience co-benefits?”

Toronto’s EED is tasked with the very important work of finding a way to implement TransformTO strategies. Successful implementation of these strategies will ensure that by 2050, 80% of the city’s emissions have been reduced (from a 1990) baseline. They matter on a global and a local scale as they will help global efforts to reduce GHG emissions and ensure infrastructure and residents are well adapted to the impacts of climate change, respectively. The EED must find a way to implement TransformTO through raising capital in alternative ways. This report listed LICs and other financial mechanisms currently used by the city to fund ongoing

climate resilience projects (full list in Appendix E). More importantly, it outlined how green bonds, P3s and community bonds have been implemented at the city level and the benefits and drawbacks of using these methods of climate finance.

When choosing which projects to finance and how to finance them, certain things must be taken into consideration, namely: capital required, return on investment, the environmental and social impacts of certain projects, the flexibility of the use of funds, the costs of using financial mechanism, risks associated with the use of a specific financial mechanism, precedent in Toronto and other jurisdictions, and finally, the feasibility of the implementation of the financial mechanism.

This report found that certified green bonds, community bonds or community crowdsourcing, and public-private partnerships (PPPs) are good alternative financing mechanisms for the EED to use to finance TransformTO. They have been used in multiple jurisdictions around the world and enable a municipality to effectively channel capital to projects with capital expenditure requirements. Certified green bonds have been oversubscribed in Ontario and when issued by cities such as New York - there is commonly greater demand than supply, these could be used to finance a sizeable portion TransformTO initiatives. Similarly, PPPs work on large scales and long timelines, and have already been used in Canada. Together with community bonds, these financing mechanisms enable the city to fund varying levels of funds for different initiatives over different timelines. Community bonds can be deployed more rapidly and for lower cost than green bonds or PPPs, for example. The correct use of these three financing mechanisms would enable to financing of 100% of the capital expenditure called for in TransformTO.

# Appendix

## Appendix A: Notes from calls with industry experts

Steve Rohacek, IO – March 22, 2017

- Assets that are P3 are ALWAYS public sector, never privatized → there is NO privatization
- What role do private actors play? Design, build, maintain, and they have equity stake in the SVP, they get a return on equity as part of mechanism
- But, it is not like the DVP
- How does revenue sharing go? In the provincial context, the road will be available for use, and they don't take the tolling risk but have to maintain
- Benefit to public actor is sharing the risk of the build and design, in AFP/P3 the private sector does all of that part and gets instruction on what is needed to build but not how to build it
- Private actor is given important info on aspects of the needs and challenges, plus they have to guarantee the price for a number of years
- Minimum of $100 million is needed to build it
- Design coordination issues and risk is taken on by the company
- Within the SPV, there is traditional financing model, with bank providing funds to the contractor
- How you calculate greenhouse gas emissions beyond the LEED standard
- Equity, debt, and operation & maintenance costs
- Equity helps anchor the risk into the SPV
- Has there been a large political appetite for these arrangements?
- Several provinces have done a number of these sorts of projects, and it is accepted as a good business tool, but not so much on the municipal level in Ontario largely due to politics
- According to him, a big reason has to do with risk transfer and how you quantify it
- The bigger the project, the bigger the issues that will arise
- There's also the cost of the theoretical project, and that number can look big and the ensuing debate over that
- There's a view that if somebody comes from offshore they will have new ideas or new technology, but they need local partners to actually build the projects
- All foreign bidders have to partner with local people, but this doesn't restrict options too much
- Also, the premise of P3 meets resistance from conservative analysts
- When public sector projects have overrun costs, it can quickly go off the rails
- Ultimately, the municipality has the final call, but there needs to be the right signals from council that they will award the contract and if not at least the bidders will be compensated
- Usually, if an NPV number is in a certain range they get approval to sign agreement with a private sector consortium
- Hard to expect private sector to take tolling and revenue risk (if you only get 5,000 cars per day instead of 10,000)

    - They would respond by asking how the municipality will do to ensure revenue
    - Some may be willing to do so in exchange for an equity stake

- Can specify an environmental standard for construction of asset → e.g. LEED certification, not sure about GHG emissions or other environmental metrics
- Social infrastructure has more strict impact assessments and subsequent payments (for up to 30 years)
- Foreign companies will often not come in for one project → you need to publish your pipeline or sell a group of projects which makes it more cost effective for them
- District energy → one way to incentivize the P3 would be through reducing revenue risk – by requiring all buildings to plug into the system (guaranteed customers); usually takes these companies about 10 years to make money, but if you have a big anchor customer (like IBM), you have cash flow right from day 1; but you need that cash flow advance to convince other customers to retrofit
    - Unlikely private sector would take all the revenue risk – might be shared with municipality
    - But also depends on requirement → what municipality is able to require (policy shift/mechanisms in place that require people to connect)

- Procurement process:
    - Municipalities can't give approval upfront for how much they're willing to pay (Maximum cost or minimum NPV); only post-RFP process will council decide. That increases risk for private consortium that pays all this money just to bid
        - Province approves upfront, so by bidding you know you have a 1/3 chance
        - Needs to be some certainty/right signals coming from council that if the RFP makes it to council that they will award or at the very least the bidders will be compensated
- IO is willing to back-stop loans → LICs are eligible

Tim Stoate, TAF – March 27, 2017

Call between:

- Munk Capstone group
- Tim Stoate, VP Impact Investing at TAF
    - Focus: retrofit financing in condos and public buildings, investment in low-carbon firms
- Stewart Dutfield (client)

- Introduction of Munk project with City of Toronto EED (Stewart, Students)
- Tim – Been at TAF for 10 years, previously banker, then went into financial advisory services, worked for recycling company, at TAF understood energy efficiency is the best approach for reducing greenhouse gas emissions, working with electric vehicle financing

Questions about feasibility of using Energy Saving Performance Agreement (EPSA) model for TransformTO Strategies (Students)

- ESPA is an approach to provide peace of mind to organizations before they embark on retrofit bc there's a lot of confusion surrounding how energy retrofits work
- Bigger companies (like Honeywell) not very transparent and don't provide control to building owner themselves, TAF wanted to change that
- ESPA tries to say to somebody we do all the complicated stuff for you and we deliver what you want, and if they don't than you can stop paying
- ESPA does comprehensive energy retrofits, comes at it from the business side
- audited and vetted by insurance company, and customers can have it audited by a 3rd party at any time

Lack of credibility? Are people skeptical?

- Barriers
    - Lack of credibility—people just don't believe that energy efficiency investment would create a return, they have preconceived notions and ideas especially regarding the companies involved like Honeywell, people don't trust them
    - Lack of money that understands energy efficiency financing, don't see this problem as much anymore
    - Because it's a volume based reduction and multiplied by a price people don't always see the savings
- City of Toronto – credibility depends on head of building department

How do ESPA's differ from the City of Toronto's current financing model for retrofits, local improvement charge (LIC)

- Are epsa and lic applicable for same projects? There is overlap. They do a lot of work in nonprofit who have tax breaks. LIC can stay with the building and can finance over 20 years, while ESPAs are usually last around 15 years. LICs crucial for sustainability, which provides significant long term benefits but not as many big immediate reductions. Every building has its own DNA and it depends as to what would work best for that specific building. LIC has lots of use for long-term sustainability and energy efficiency as well.

What other types of climate financing do you think would be appropriate for these strategies? In

your opinion, what are the key factors for determining which financing mechanisms are the most appropriate for the City of Toronto and the TransformTO strategies? (Students)

- What about projects that don't have much of a return? Green bonds, P3, community bonds, does anything else seem like a good idea?
    - Electric vehicle is just a car
    - Rolling together charging station and battery and charging separate from the car, prepaying energy costs which makes car more expensive-> car is cheaper without the charging/battery, how to level playing field.
    - LIC could be used for charging station at someone's house, LIC can be used for any kind of asset purchase including more insulation etc. but when you're thinking about sustainability LIC work well
    - He thinks all these mechanisms have value, but how many mechanisms do you need and why -> will there be 2/3 that will capture 85% of the market, what do you need to do to capture the rest of the market
    - You have to look at flexibility, risk, cost and timing (FRCT)
    - As a homeowner what are my challenges and what do I really need; they need a peace of mind
    - New York state has a lot of interesting financing mechanisms, usually financed through a revenue bond, check out NYSERTA https://www.nyserda.ny.gov
    - Check out Gustavo Carvalho at U of T – post doc at IMFG who's reviewing financing appropriate for municipality

- Stewart – scale and pace, where can we see the market move
    - Difficult question, figure out where the greatest demand is and where a financing mechanism can meet this demand
    - Create scale by giving money away with terms and conditions or long-term opportunities
    - 6 different markets doesn't necessarily mean 6 different mechanisms
    - There's significant financial incentive for energy efficiency
    - There's no silver bullet
- Pathways to maximize the city's abilities to fund these actions?
    - They all make sense, what market will we target
    - Flexibility is important

## Appendix B: List of TransformTO Actions

Note: “n/a” was used when action was out of scope (no capital expenditures or action required policy shift only)

| Short-term action | Description | Recommended financing mechanism |
|---|---|---|
| ST 1.1 | Enhance the Better Buildings Partnership (BBP): Retrofit up to 50 million square feet of commercial and institutional buildings by 2020 | Green Bond |
| ST 1.2 | Innovative financing mechanisms | n/a |
| ST 1.3 | Dedicate funding for community-based climate action | n/a |
| ST 1.4 | Improve energy efficiency of social housing | Green Bond |
| ST 1.5 | Continue support for residential property owners: Retrofit residential buildings at a scaled-up rate of up to 5,000 homes and 10 buildings per year by 2020 | Green Bond |
| ST 2.1 | Advance leading-edge new construction standard | n/a |
| ST 2.2 | Advance community energy planning | n/a |
| ST 2.3 | Advance low-carbon/renewable thermal energy networks (district energy) | Green Bond |
| ST 2.4 | Create renewable energy strategy | n/a |
| ST 3.1 | Explore Road Pricing (Work Still Underway) | n/a |
| ST 3.2 | Support Safe Cycling and Walking | Community Bond |
| ST 3.3 | Enhance Transit Service | n/a |
| ST 3.4 | Develop a Low-Carbon Freight Strategy | P3 |
| ST 3.5 | Enable Electric Vehicles (EVs) | P3 |
| ST 4.1 | Expand energy retrofits at City facilities | Green Bond |
| ST 4.2 | Scale-up renewable energy installations | Green Bond |
| ST 4.3 | Utilize landfill gas and biogas | Community Bond |
| ST 4.4 | Improve fleet fuel efficiency | n/a |
| ST 4.5 | Promote Smart Commute for Toronto Public Service | n/a |
| ST 5.1 | Continue TransformTO's community engagement | n/a |
| ST 5.2 | Use building disclosure as an engagement tool | n/a |
| ST 5.3 | Leverage live green Toronto | n/a |
| ST 5.4 | Collaborate with utilities on local programming | n/a |

| Long-term Action | Description | Recommended financing mechanism |
|---|---|---|
| 1 | Concentrate future development in areas appropriate for district energy and accessible to rapid transit | N/A |
| 2 | Incorporate the rate of building demolition as new buildings replace existing buildings | N/A |
| 3 | Reduce dwelling unit size | N/A |
| 4 | Reduce commercial floor space per employee | N/A |
| 5 | Apply TGS to new buildings | N/A |
| 6 | Retrofit multi-unit residential buildings pre-1984 (Tower Renewal+) | Green Bond |
| 7 | Retrofit of multi-unit residential buildings post-1984 | Green Bond |
| 8 | Retrofit older homes (HELP+) pre-1980 | Green Bond |
| 9 | Retrofit newer homes (HELP+) post-1980 | Green Bond |
| 10 | Retrofits for commercial and office buildings (BBP+) | Green Bond |
| 11 | Apply the TGS when buildings are renovated | N/A |
| 12 | Re-commissioning of commercial buildings on an ongoing basis | Green Bond |
| 13 | Incorporate solar PV systems into new construction | Green Bond |
| 14 | Incorporate solar PV systems on roofs of existing buildings | Green Bond |
| 15 | Develop offshore wind turbines | P3 |
| 16 | Apply integrated solar thermal and solar PV systems to facades | Green Bond |
| 17 | Expand zero carbon district energy systems | Green Bond |
| 18 | Install electric heat pumps for space heating | N/A |
| 19 | Install distributed energy storage | Green Bond |
| 20 | Increase the use of renewable natural gas | Green Bond |
| 21 | Condensed work week/four day work week | N/A |
| 22 | Integrated transit improvements | P3 |
| 23 | Introduce transit in areas with high density and insufficient transit | P3 |
| 24 | Car free areas | Community Bond |
| 25 | Personal transportation planning (Smart Commute+) | Green Bond |
| 26 | Increased cycling mode share | Community Bond |
| 27 | Increased walking mode share | Community Bond |
| 28 | Improve light rail, metro, tram and bus fuel economy and reduce C02 emissions | Green Bond |
| 29 | Introduction of autonomous vehicles/car sharing | N/A |
| 30 | Increased adoption of EVs | N/A |
| 31 | Process efficiency improvements | N/A |
| 32 | Implement strategies to reduce emissions associated with the last mile of delivery | N/A |
| 33 | Transition to zero emissions vehicles | N/A |
| 34 | Electrify the City vehicle fleet | Green Bond |
| 35 | Increase waste diversion rates | Green Bond |
| 36 | Generate biogas from waste water | Community Bond |

## Appendix C: Evaluation Framework

The evaluation framework is a way to consider TransformTO in relation to potential financing mechanisms, and/or current financing mechanisms (if the actions are extensions of current programs, such as the Better Building Partnership).

It has 7 categories and 21 subcategories, each pertaining to a different facet of selecting one of the three financing mechanisms for a TransformTO initiative. They are:

- Financial Considerations
    - Projected Capital Investment Necessary (Excluding operating costs)
    - Funding possible with mechanism
    - Funding Gap
    - Return of Project (lifetime cost or benefit to the City)

- Non-Financial Considerations
    - C02e Emissions Reduction (by 2020 in tonnes)
    - Social Impact
    - Resiliency
    - Non-Financial Resources from Chosen Financial Mechanism
    - Other considerations

- Flexibility/Fungibility
- Costs
    - Transactional Costs (financing)
    - Operating Costs (from TransformTO projections)

- Risks
    - Variability of Demand
    - Revenue Loss (PPPs)
    - Political Risks/ Benefits Associated w/ use of Financial Mechanism
    - Other

- Precedent: Use of Financial Mechanism for Type of Project
    - Jurisdiction
    - Project
    - Total Capital Raised
    - Outcome

- Feasibility

These have been formatted into an excel document that is attached to this report and filled out with all available information. In certain cases, not all of this information was available. The purpose of the framework is to structure the thinking of the person analyzing potential financing

mechanisms. It also serves to draw out real world examples of initiatives implemented in Toronto or elsewhere and identify their financing mechanisms. It helped the report writers think through their analysis. It is attached to this report for transparency and to help the reader use it, if they wish.

## Appendix D: Green Bond Certification Overview

Source: International Capital Market Association, "Green Bond Principles", http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/

**EXTERNAL REVIEW**

It is recommended that issuers use an external review to confirm the alignment of their Green Bonds with the key features of the GBP as defined above. There are a variety of ways for issuers to obtain outside input to the formulation of their Green Bond process and there are several levels and types of review that can be provided to the market. Such guidance and external reviews might include:

1) **Consultant Review**: An issuer can seek advice from consultants and/or institutions with recognized expertise in environmental sustainability or other aspects of the issuance of a Green Bond, such as the establishment/review of an issuer's Green Bond framework. "Second opinions" may fall into this category.
2) **Verification**: An issuer can have its Green Bond, associated Green Bond framework, or underlying assets independently verified by qualified parties, such as auditors. In contrast to certification, verification may focus on alignment with internal standards or claims made by the issuer. Evaluation of the environmentally sustainable features of underlying assets may be termed verification and may reference external criteria.
3) **Certification**: An issuer can have its Green Bond or associated Green Bond framework or Use of Proceeds certified against an external green assessment standard. An assessment standard defines criteria, and alignment with such criteria is tested by qualified third parties / certifiers.
4) **Rating**: An issuer can have its Green Bond or associated Green Bond framework rated by qualified third parties, such as specialised research providers or rating agencies. Green Bond ratings are separate from an issuer's ESG rating as they typically apply to individual securities or Green Bond frameworks / programmes.

An external review may be partial, covering only certain aspects of an issuer's green bond or associated Green Bond framework or full, assessing alignment with all four core components of the GBP. The GBP recommend public disclosure of external reviews, or at least an executive summary, for example by using the template available at www.icmagroup.org/greenbonds which once completed can be made available online for market information (see section on GBP Resource Centre below). The GBP encourage external review providers in any case to disclose their credentials and relevant expertise, and communicate clearly the scope of the review conducted.

The GBP considers that the timing of an external review may depend on the nature of assets financed (new projects or refinancing of existing assets) and publication of reviews can be constrained by business confidentiality requirements.

## Appendix E: Existing Funding Mechanisms

Funding Mechanisms used to finance City of Toronto Climate Projects

Certain TransformTO initiatives already exist and are funded in ways that are not not PPPs, green or community bonds. These methods are highlighted in the table below. This is not a comprehensive list but rather a list of financing mechanisms that the City is already employing for climate initiatives similar to TransformTO that are not PPPs, green or community bonds.

| Action | Similar Action Currently Funded | Funding Mechanism | Within Project Scope? |
|---|---|---|---|
| Short Term (ST) 1.1 | Better Buildings Partnership (BBP), Toronto Green Standard (TGS)[41] (ST 1.1 is an extension of the BBP) | Federation of Canadian Municipalities (FCM) Green Municipal Fund[42] | Partially. Relies on budget-based financing (for incentives), external financing and private partners. |
| ST 1.3 | Sustainable Energy Plan | Funded by increasing recoverable debt[43] | Partially. Depends on City's appetite for increasing debt ceiling (if so, similar to Green Bond) |
| ST 1.4 | Social Housing Renovation and Retrofit Program (SHRRP)[44] | Funded by the Province | No. |
| ST 1.5 | | | |
| Long Term (LT) 06 | High-rise Retrofit Improvement Support Program (Hi-RIS)[45] | Up-front cost covered by City, recovered by | No. LIC could be useful, but not the City covering the up- |

[41] City of Toronto. (n.d.). Better Buildings Partnership - Programs for Businesses & Nonprofits. Retrieved April 11, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=b246136696f85410VgnVCM10000071d60f89RCRD

[42] Federation of Canadian Municipalities. (n.d.). Toronto Green Standard and the Better Buildings Partnership. Retrieved April 11, 2017, from https://www.fcm.ca/Documents/case-studies/GMF/2009/Toronto_Green_Standard_and_the_Better_Buildings_Partnership_EN.pdf

[43] City of Toronto. (n.d.). Sustainable Energy Plan. Retrieved April 11, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=02f109b0aac52410VgnVCM10000071d60f89RCRD

[44] City of Toronto. (2010). 2010 City of Toronto Budget Summary. Retrieved April 11, 2017, from http://www1.toronto.ca/City%20Of%20Toronto/Strategic%20Communications/City%20Budget/bb2010_full.pdf

[45] City of Toronto. (n.d.). Hi-RIS Program - Tower & Neighbourhood Revitalization Unit - Neighbourhoods and Communities. Retrieved April 11, 2017, from http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=ab3147e94c5b3410VgnVCM10000071d60f89R

| | | | |
|---|---|---|---|
| LT 07 | | local improvement charge (LIC) | front cost. |
| LT 25 | Smart Commute (LT 25 is Smart Commute +) | Split funding coverage: Transportation Canada ($2.2 million); Private Sector ($1 million); Municipalities, including Toronto ($3.5 million)[46] | Partially; City of Toronto wouldn't be able to provide funds from its budget but federal and private funds could be raised. |

These are financing mechanisms that the City is using or has used. They were not highlighted as the expertise on these issues is in-house and the analysis of this report is valuable in that it brings in new knowledge about other funding mechanisms.

CRD

[46] Smart Commute. (2007, August 23). Smart Commute Initiative: Effective Congestion Relief. Retrieved April 11, 2017, from http://www.toronto.ca/legdocs/mmis/2008/pg/bgrd/backgroundfile-13043.pdf