

TALK



transformation!

Resilience and Adaptation to
Extreme Weather

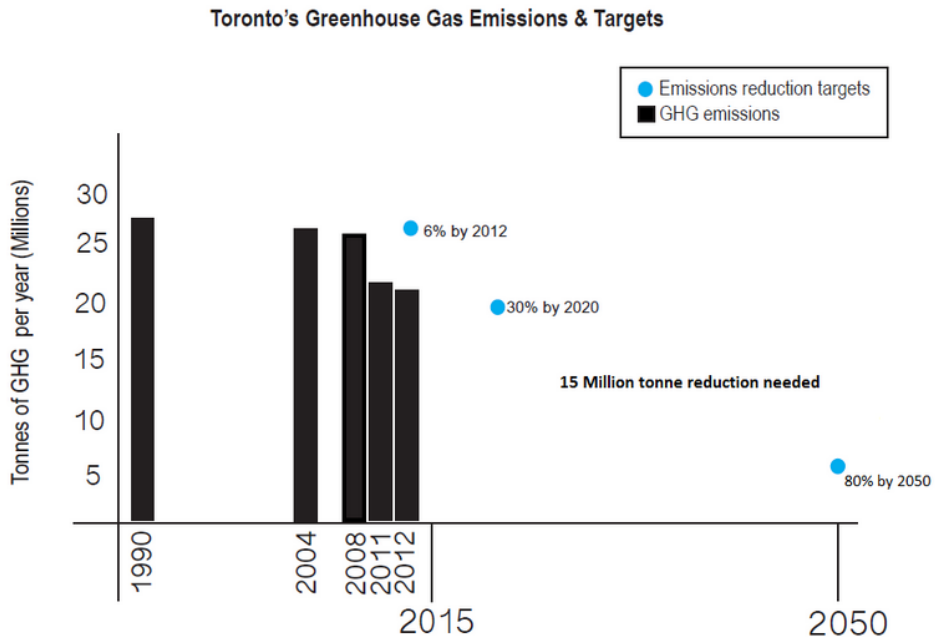
**What does the community have to say?
Summary of workbook ideas**



Background

Toronto has established a goal of reducing greenhouse gas emissions by 80% by 2050 to support its vision of being one of the most sustainable and resilient cities in the world.

Toronto's Greenhouse Gas Emissions



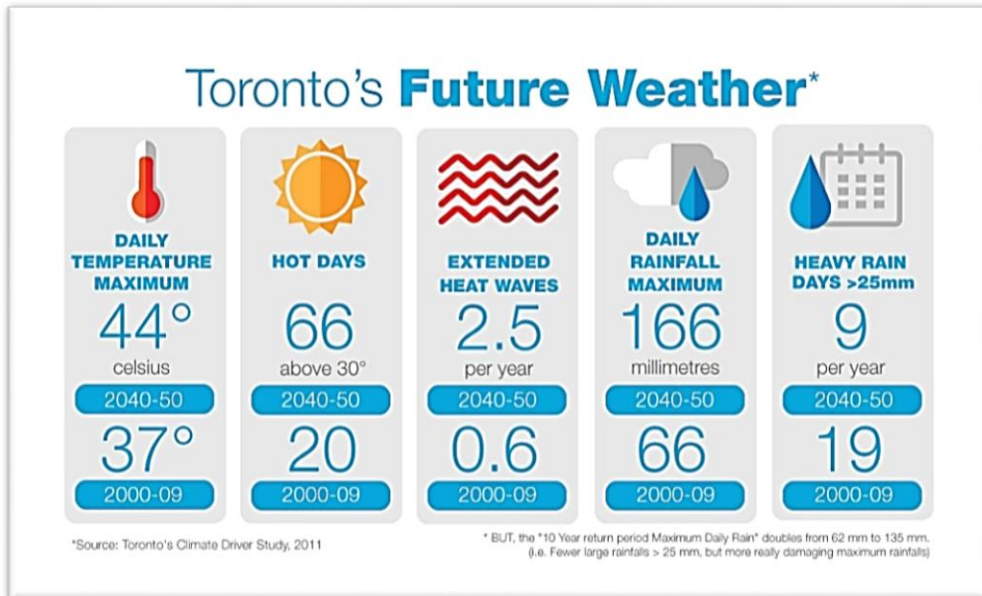
TransformTO is an initiative that will help us achieve this goal.

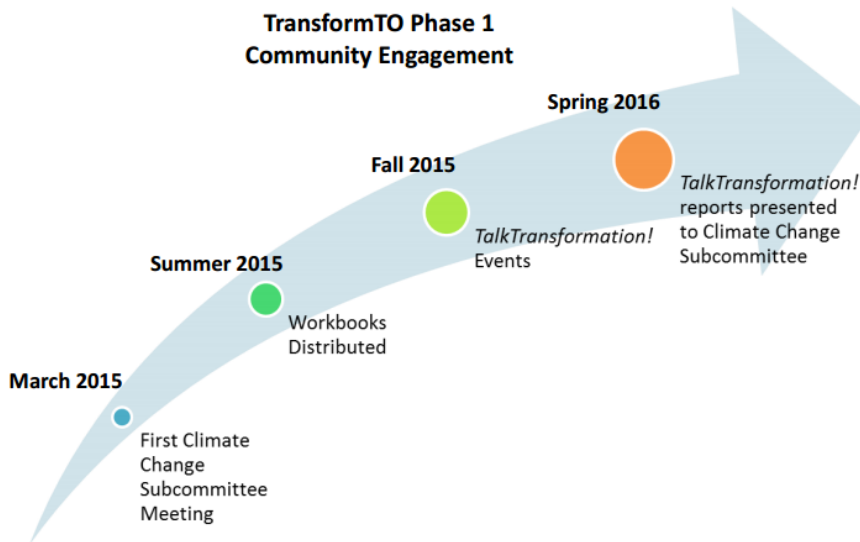
Building on the success of the City's plans and strategies, including the Climate Change Action Plan (2007), TransformTO will encourage collaboration and dialogue between City divisions, community members, experts and other stakeholders to chart our path to a sustainable future.

Climate models predict that Toronto's weather will change significantly by 2050. In fact, we have already begun to experience severe weather events, the ice storm and flood of 2013 being just one example. We will continue to experience high rainfall and high temperatures. The average maximum temperature is expected to rise from 33° C to 44°C.

The City is already taking actions. Examples of these actions include planting more trees to clean and cool the air, increasing the size of storm sewers, and installing permeable surfaces to help manage storm water.

Improving our resilience to extreme weather will help us flourish in the future.





Each TalkTransformation! event will focus on a particular topic:

- Resilience and Adaptation to Extreme Weather
- Low-Carbon Mobility and Transportation
- Green Spaces and Urban Agriculture
- Energy Systems and Buildings
- Sustainable Consumption and Behaviour
- Health and Climate Change

The objective of the series is to encourage community members and experts to share their ideas and to generate dialogue that will help to inform the actions we will take to improve our resilience and sustainability. The events will run through to the spring of 2016.

Residents are invited to join the conversation and share their ideas by completing the online TransformTO workbook. What follows is a summary of comments related to resilience and extreme weather.

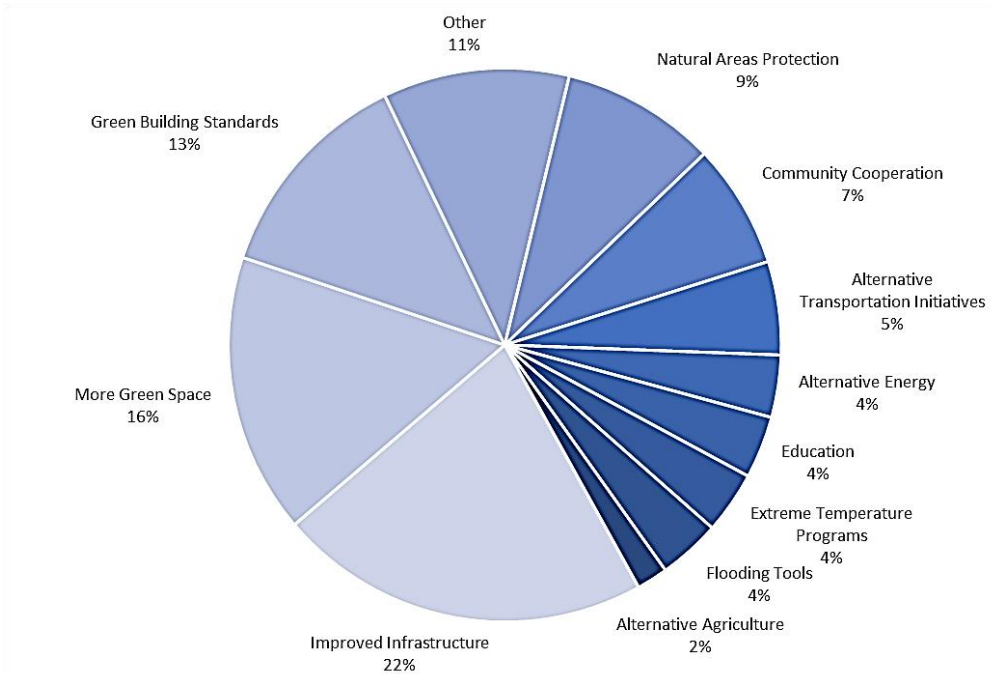
Summary of Community Comments

1.0 Ideas with potential to increase Toronto's resilience to extreme weather:

What is the one idea that has the most potential to increase Toronto's resilience to extreme weather?

In the chart below, we grouped community responses into 12 main categories. The majority of the ideas focused on infrastructure improvements (22%); more green spaces, such as parks and gardens (16%), encouraging greener building standards (such as green roofs, trees, living walls) (13%); and protecting our natural areas (wetlands, waterfront) (9%). Other categories included an array of solutions to improve overall resilience and adaptation (encouragement of alternative transportation options, community emergency weather centres, alternative energy, education, agriculture etc.).

Key Resilience Ideas

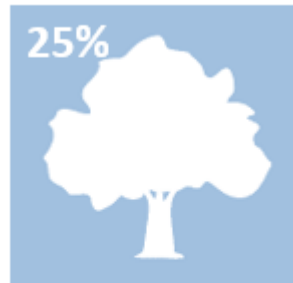


The key ideas highlighted by the community fall within four main categories.

Modifying existing infrastructure and implementing 'greener' building standards received the strongest focus from the public, (35%), followed by creating and maintaining more green space to address extreme heat and flooding, (25%). The respondents also highlighted the importance of community, alternative transportation and shelters during extreme weather events.



**Infrastructure
and building
standards**



**Natural areas
and green
spaces**



**Community
cooperation**



**Alternative
transportation**



**Extreme weather
programs**

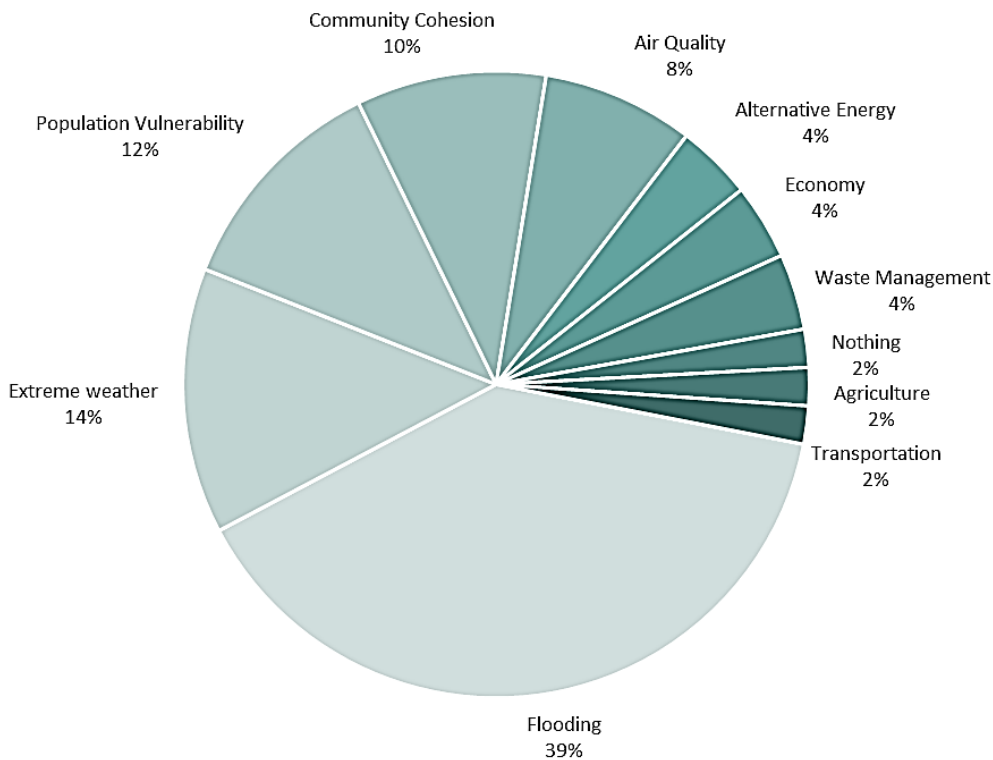
2.0 Key areas of focus for extreme weather resilience planning

Following the identification of key resilience projects (1.0), survey respondents were asked to explain their overall vision and how their ideas will contribute to the city's long-term resilience planning.

How will this idea build Toronto's resilience to extreme weather?

Most respondents identified the key areas of focus within which their ideas fell. Areas requiring particular attention included flooding, (39%); extreme weather events such as heat and cold, (14%); protecting vulnerable populations, (12%); and improving air quality, (8%).

Emerging Themes/ Areas of Focus



According to community responses, we can improve our resilience by addressing...

Economy

Agriculture **Alternative** **Transportation**

Quality **Population**

management **Air** **Extreme**

Flooding

cohesion **vulnerability**

Resilience **energy**
Waste **weather**

Community

3.0 Successful examples of urban extreme weather resilience

Community members were asked to provide example of successful extreme weather resilience projects that have been implemented in Toronto and other cities in the world. A variety of interesting resilience initiatives were highlighted, ranging from small-community projects to large government-sponsored programs. Some of the examples of local and international projects mentioned by community members include:

3.1 Rain Garden Financing Program - Lake Simcoe Region

Lake Simcoe Region Conservation Authority provides financial support for rain garden projects in the area. The program supports the creation of rain gardens on residential and private properties in the area. Rain gardens help to alleviate flooding during extreme rain events by allowing more storm water to drain into the soil. For more information please click on [the Lake Simcoe Conservation Authority website](#).



3.2 Green roofs in Basel, Switzerland and Toronto

Basel, Switzerland has the highest coverage of green roofs per capita in the world. The city has provided financial incentives and support for green roof projects since 2002 to reduce energy use and encouraging biodiversity.

The City of Toronto's Eco Roof Incentive Program helps to fund the installation of both green and cool roofs on residential, industrial, commercial and institutional buildings across the city.

More information please click and view the City of Toronto's: [Live Green Toronto website](#).



3.3 Real-time water management - United States

U.S. Geological Survey collects real-time water data on streamflow conditions, water quality, surface water and groundwater, which enables cities to predict short-term events, such as floods, and long-term changes that may occur as a result of climate change. The program provides information that helps to manage and regulate water use throughout the country.

For more information please visit: [U.S. Geological Survey Homepage](#)



3.4 Urban densification – Central Toronto

During extreme weather events, our proximity to goods and services as well as our neighbours can improve our resilience. Many neighbourhoods, particularly within the city's central core, have already experienced densification. Designing more neighbourhoods to imitate the densification that has occurred centrally can be beneficial for Toronto's future resilience.



3.5 Naturalization and protection of Toronto watersheds by the City of Toronto and the TRCA

Toronto and Region Conservation Authority (TRCA) and the City of Toronto are implementing a number of naturalization and revitalization projects in key natural areas and watersheds.

Many projects, such as the Lower Don River and Port Lands projects, use an ecosystem based approach to rehabilitate the areas and encourage natural development. These projects will provide important flood protection to areas within our city.

More information: [Toronto and Region Conservation Authority website](#)

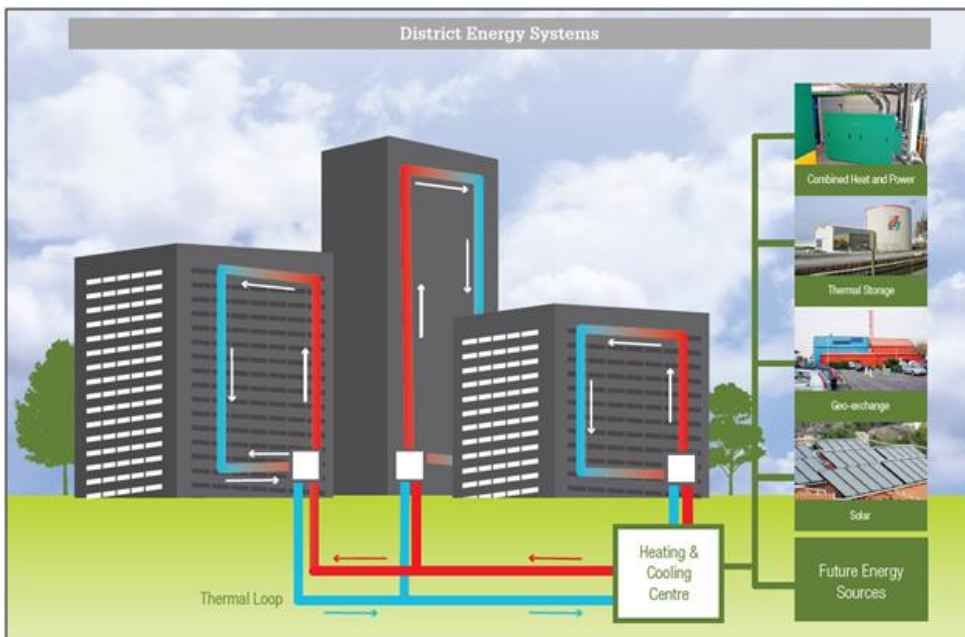


3.6 Waterfront district energy system - Toronto

City buildings use large amounts of energy for heating and cooling. District energy systems are a local, efficient and resilient alternative to the traditional means of delivering electricity and natural gas to individual buildings.

District energy systems consist of a common heating and cooling centre, and a series of thermal pipes that connect several buildings. This connection helps to reduce the overall energy use of each building and the neighbourhood in general. There are a number of DES projects in Toronto including several in and around the waterfront area.

For more information please visit [Live Green Toronto](#) and [Waterfront Toronto](#)



3.7 Streetscape trees in cities worldwide

Trees are important for temperature regulation in urban centres. In addition to provide a cooling effect in the hot summer months, trees and green spaces provide additional benefits.

A number of cities have incorporated healthy tree growth into their strategies. Toronto's goal is to increase tree canopy coverage to 40% by 2022.

For more information please visit the [City of Toronto info page on trees and ravines](#)



3.8 Community support - Hurricane Sandy

Family, friends and neighbours are an important source of support during extreme weather events. After events such as Hurricane Sandy, and Toronto's extreme storms, many residents rely on their community networks for information and help. Encouraging stronger neighbourhood networks through community social programs and events can help us build social resilience to extreme weather events.



3.9 Bike lanes – New York City

Cycling is becoming a more popular mode of transportation worldwide, including in New York City (NYC). It is estimated that over one million New Yorkers ride bikes. To keep up with the popularity of this active and sustainable method of transportation, NYC is expanding its already impressive bike network. In the last three years, it has built over 200 miles (321 km), of bike lanes, and continues to install cycling infrastructure to make city streets safer, encourage active commuting and improve air quality.

The City of Toronto is also expanding cycling infrastructure by connecting and installing bike lanes across the city.

For more information please visit the the City of Toronto [Cycling map](#)



[New York City image source](#)

3.10 Permeable pavement

Over the years, a large portion of urban areas have been paved with roads, sidewalks and parking lots. Most of these surfaces are impermeable, which means that they divert stormwater directly into the sewers and put additional stress on our systems during extreme weather events.

Surfaces such as permeable pavement help to absorb water and reduce urban flooding. There are a number of permeable pavement projects in Toronto including school yards, parking lots and driveways.



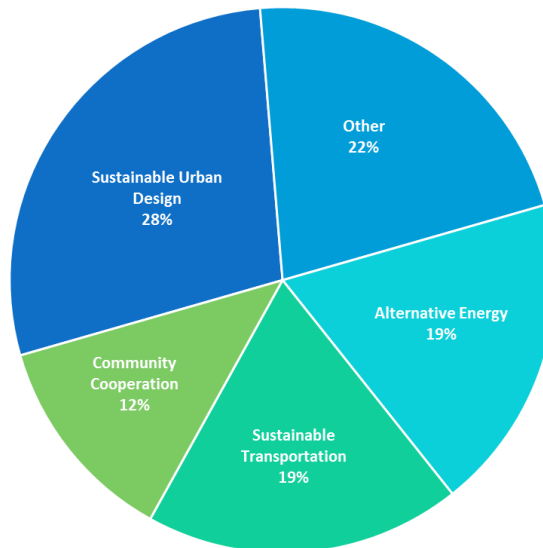
4.0 Community comments

Community members were asked to share any additional ideas that they would like discussed at the TalkTransformation! – Resilience event.

What other ideas and questions would you like to hear discussed at the Talk Transformation! Resilience event?

Many suggestions revolved around sustainable building practices (28%), in Toronto. Specific ideas included utilization of more durable materials, green roofs, and pavement removal. Sustainable transportation was a popular answer (19%). Respondents recognize the need for better public transit and cycling infrastructure. Aviation was identified as an unsustainable method of transportation that needs to be reduced. Community members also focused on alternative energy (19%), such as deep lake cooling, district energy systems, geothermal and solar. Community-run initiatives that help residents prepare for, and survive extreme weather events, also ranked highly (12%).

Additional Ideas/ Areas that May Contribute to Resilience



Examples of specific comments and questions:

"Is it possible to expand the deep lake water cooling system beyond the downtown core to communities that have sprouted up along the lake to the east and west of downtown (Liberty Village, Cork Town, etc.)?"

"With less transport both in the city and to/from the city (due to reduced transportation fuel use), where are the new opportunities for local sustainable jobs? What will we need to produce that we currently import? What will we need to process here that we currently export? How can we do that in a way that bolsters local enterprise and local jobs?"

"How distributed electricity generation can enhance resilience during grid failures."

"Everything instituted should include the most vulnerable and disabled. It will ensure they can participate fully, make it better for everyone, and not incur extra costs for services just for them. Right now, the waste system, public transit, sidewalks, etc. are designed with ideology bias as if climate change, design, and being green should not accommodate the poor, vulnerable, and disabled -- when accommodating their needs will not only boost our economy, keep them from being isolated, but also lead to better-for-the-environment systems..."

"Less talk and more action..."

"Stories about extreme weather responses that worked well will bring out a positive attitude. I am thinking of flood and hurricane stories from the U.S. Most of us think of the effect of Hurricane Katrina on New Orleans when we think of severe weather overwhelming whatever systems they had in place."

