



Smart Cities

# City Climate Action Planning

Devon Cantwell, MSc  
University of Ottawa  
November 27, 2022

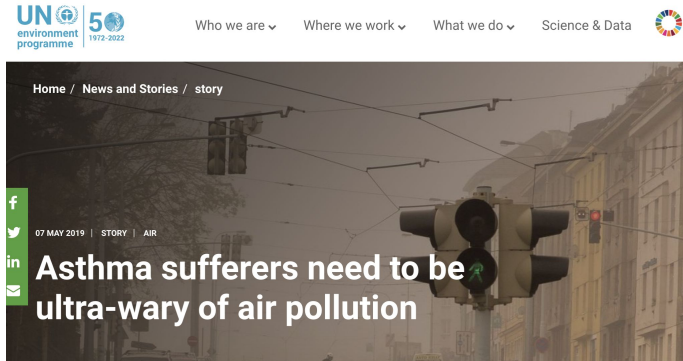
# Why do cities matter?

- 55% of people live in cities globally as of 2018, 65% by 2050 (source: United Nations)
- Cities account for 70% of global CO<sub>2</sub> emissions (source: United Nations)



**68% of the world population projected to live in urban areas by 2050, says UN**

# People who live in cities experience environmental health impacts



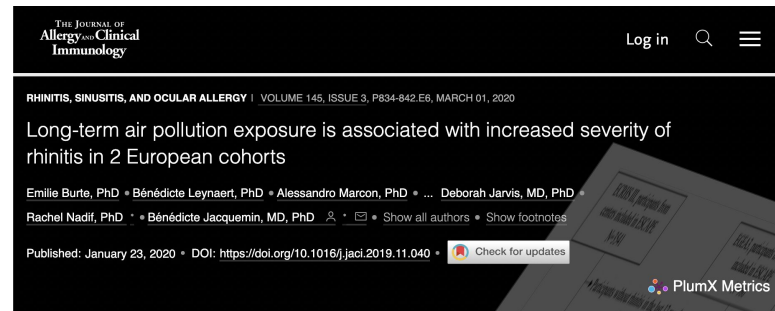
Air pollution exposure in early pregnancy linked to miscarriage, NIH study suggests

*Ozone is a highly reactive form of oxygen that is a primary constituent of urban smog.*

## How a 'Toxic Cocktail' Is Posing a Troubling Health Risk in China's Cities

*A recent study in Chinese cities found a potential link between a hazardous mix of air pollutants and death rates. These findings point to the need for a new approach to assessing the dangers of urban smog in fast-industrializing parts of the developing world.*

BY FRED PEARCE · APRIL 17, 2018



# Climate change threats are highly present in cities

Toronto

**Toronto is designed for a climate that doesn't exist anymore and it needs to 'face the reality,' experts say**

IPCC study warns of more heat waves, droughts, floods and other extreme weather

By [Ali Raza](#) - CBC News - Posted: Aug 13, 2021 4:00 AM ET | Last Updated: August 15



**Floods in London are the latest sign big cities aren't ready for climate change**

By [Ivana Kottasová](#), CNN  
Updated 7:00 PM ET, Mon July 26, 2021



More from CNN

[Why the 'stunning' poll being pushed by Republicans isn't that...](#)

[R. Kelly's physician testifies the singer had herpes since at...](#)

**Students get almost 70% off. Totally our best deal.**  
Go back to school with [Ally's College Deal](#)

**As heat island effects worsen due to climate change, cities try to adapt**

New trees and lighter pavement are among the cooling measures to help tackle worsening urban heat islands.

Published Aug 17, 2021

By [Katie Pzyzk](#)  
Contributor

in f t w e



Local News | Northwest | Traffic Lab

**How cities can help protect transit riders from extreme heat**

Aug 21, 2021 at 6:00 am | Updated Aug 21, 2021 at 6:00 am

f e w



A man waits at a bus stop in SoDo under one of the Bee trees in the area in a largely industrial neighborhood in June. A study released this year found that high, [University of the South Florida](#). [More »](#)

By [Michelle Baruchman](#)

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Why this ad? [D](#)

**How North American cities are bracing for more heatwaves**

By [Jessica Murphy](#)  
BBC News, Toronto

12 August

[Climate change](#)



GETTY IMAGES

**Dave Puglisi** @DavePuglisiTV · Aug 20  
Orlando Mayor Buddy Dyer and the Orlando Utilities Commission are addressing the media about a "unprecedented event" that they say needs immediate community assistance. More on the ask on [@fox35orlando](#)

125 1K 1.8K

**Dave Puglisi** @DavePuglisiTV · Aug 20  
The city of Orlando is asking residents to reduce water consumption IMMEDIATELY. Liquid oxygen used to treat water is being diverted to the hospitals to treat COVID patients. They believe if water consumption doesn't change, water treatment could hit a critical point in a week.

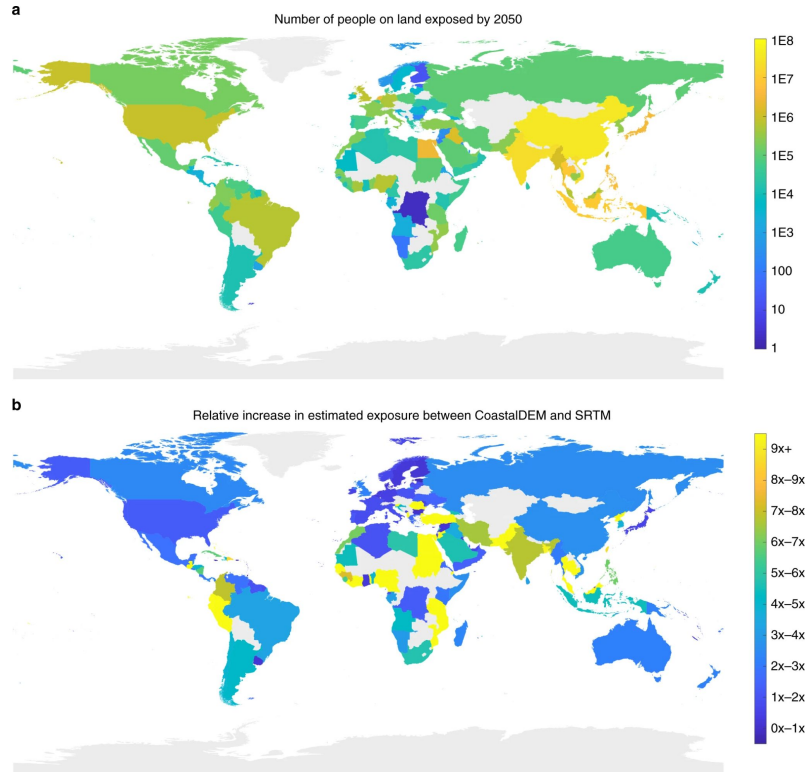
1.5K 17.4K 15.2K



# 190 million people currently occupy global land below projected high tide lines for 2100 under low carbon emissions

**Current population** on land below projected mean higher high water level in 2100 assuming intermediate carbon emissions (RCP 4.5) and relatively stable Antarctic ice sheets (sea level model K14). Estimates based on CoastalDEM.

Factor by which CoastalDEM **increases estimates of people on vulnerable land** over SRTM in each country under K14/RCP 4.5.



# What types of climate change policies do cities create?

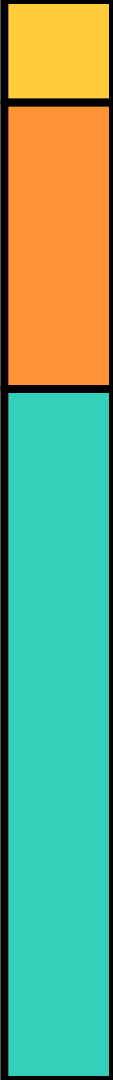


## Mitigation

Policies intended to reduce emissions and accelerants of climate change

## Adaptation

Policies intended to create infrastructure that will help living creatures survive changing planetary conditions





# City Climate Action Plans (CAPs)

- Threat identification and assessment
- History + previous action
- Mitigation strategies (if applicable)
- Adaptation strategies (if applicable)

# Three Pillars of C40 CAPs Framework



Focuses on the plan's governance and coordination and the need for community and business engagement, and communications, throughout the plan's development and implementation



Considers the evidence base and existing city conditions, including baseline emissions, 2050 emissions trajectory, climate risk, and socioeconomic priorities.



Defines the transformational action and implementation plan, including the development and prioritisation of actions and the processes of monitoring, evaluation, reporting and revision



# Santa Barbara

142 pages



City of Santa Barbara

## Climate Action Plan

September 2012



### Executive Summary

#### Santa Barbara carbon emissions reduction targets

The carbon emission targets are consistent with established State and regional targets, and with City General Plan policies directing sustainability and climate protection measures. The targets are identified in metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e).

- Year 2020 target for total carbon emissions:** Reduction of overall annual Santa Barbara citywide carbon emissions to 1990 level by the year 2020, per the State AB 32 target.

[1990 level is estimated at **224,389 MTCO<sub>2</sub>e**.]

- Year 2020 and 2030 targets for per capita vehicle carbon emissions:** Zero increase in annual 2005 average per capita level of carbon emissions from passenger vehicle and light truck travel in 2020 and 2030, per the SB 375 State and regional County targets.

[2005 level is estimated at **4,413 MTCO<sub>2</sub>e/person**.]

#### Summary of citywide emissions inventories and forecasts

The following summary chart (ES-1) shows that the Santa Barbara community has already met the 2020 and 2030 carbon emissions targets. With continued implementation of existing carbon-reducing measures in place and identified future measures, these targets will continue to be met and surpassed through in the years 2030 and 2030.

| Figure ES-1 – Summary of Santa Barbara Carbon Emissions Forecasts        |   |
|--|---|
| Forecast Scenario  | Annual Emissions<br>(Metric tons CO <sub>2</sub> e) |
| <b>Citywide Total Emissions – Year 2020 (AB 32 Target)</b>               |   |
| 2007 citywide emissions inventory (baseline)                             | 719,833   |
| 2020 target for total emissions (1990 level)                             | <b>224,388</b>                                      |
| 2020 emissions forecast – “business as usual” (with General Plan growth) | 861,326   |
| Emissions reductions needed to meet 2020 target                          | -136,938  |
| Emissions reductions from State legislative measures                     | -179,580  |
| 2020 emissions forecast with State reductions                            | 681,746   |
| Emissions reductions from City climate plan                              | -138,561  |
| 2020 emissions forecast with State and City climate plan reductions      | <b>543,185</b>                                      |
|  | <b>25% below 1990 target level</b>                  |
| <b>Per Capita Vehicle Emissions – Year 2020 (SB 375 Target)</b>          |   |
| 2020 population forecast   | 92,064  |
| 2020 target for per capita on-road vehicle emissions (2005 level)        | <b>4,413/person</b>                                 |
| 2020 vehicle emissions forecast – business as usual                      | 5,965/person  |
| Vehicle emissions reduction needed to meet 2020 target                   | -1,552/person                                       |
| Vehicle emissions reductions from State legislative measures             | -1,693/person                                       |
| 2020 vehicle emissions forecast – with State reductions                  | 4,272/person  |
| Vehicle emissions reduction from City climate plan                       | -1,176/person                                       |
| 2020 vehicle emissions forecast – with State and City reductions         | <b>3,096/person</b>                                 |
|  | <b>30% below 2005 target level</b>                  |

- Green Business Program of Santa Barbara County** (County program/City participation)  
This program offers incentives and assistance to encourage businesses to take voluntary actions to protect, preserve, and improve the environment beyond what current laws require. Businesses are certified by adopting conservation and pollution prevention measures.

### ENERGY EFFICIENCY & GREEN BUILDING: ADDITIONAL FUTURE CITY ACTIONS

#### City Government Operations

- Energy-efficient City facilities** (City program; General Plan (GP) policy ER5.2; through 2030)  
Continue implementing programs through the City Sustainable Santa Barbara program for retrofitting of municipal systems with energy efficient equipment, systems, and programs.  
The following equipment upgrades are currently planned to further improve energy efficiency at City buildings: upgrade computer systems to provide automated computer workstation power-off function; replace separate copier, printer, fax, and scanner units with shared multi-function printing units; virtualize 35 remaining servers in primary City Hall and Business Continuity data centers to reduce electrical power and cooling requirements.
- Recreational field lighting efficiency projects** (City program; target 2015)  
Install energy-efficient lighting projects at Dwight Murphy and Pershing Ball Fields.

#### Communitywide Measures

- Energy efficient buildings–voluntary actions** (City program; GP policy ER5.1; through 2030)  
Encourage all new construction to be designed and built consistent with City green programs and policies, the California Green Building Code, and Architecture 2030 goals for energy efficiency in buildings.  
Further reduce energy consumption over time in both new building and through retrofits. Establish a voluntary program and time line for increasing the energy efficiency and carbon neutrality of new buildings or additions, and existing building stock. Provide:
  - Information on current energy use and conservation options;
  - Incentives for voluntary upgrades;
  - Voluntary incremental upgrades may be encouraged at time of sale, and/or other methods for greening the existing building stock; and
  - Tools for financing for energy-efficiency upgrades and on-site solar and wind power generation. Continue City work with the County emPower program for financing private energy efficiency and alternative source projects, including assisting with applications, inspections, and outreach education and promotion.
- County Green Business program. Continue City work to check and certify participating local green businesses.

# Salt Lake City

15 pages

## Climate Positive 2040

*Reduce pollution,  
save resources &  
empower our city*



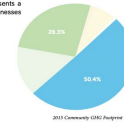
### HIGHLY EFFICIENT BUILDINGS

Better performing new and existing buildings are crucial to the Climate Positive plan since emissions associated with electricity and natural gas use represent the largest part of the community carbon footprint. Reducing energy waste through efficiency and conservation measures represents a cost-effective way to address climate change while also saving businesses and households money.

**Project Skyline**  
Project Skyline accelerates investment in energy efficiency and raises public awareness of building energy performance among the largest commercial facilities in Salt Lake City. The initiative also opens job growth and fosters a stronger local economy. Building owners across the City are encouraged to pursue energy saving targets by evaluating building energy use, setting energy savings goals and implementing cost-effective improvement projects.

**Utility Incentives**  
Rocky Mountain Power and Quorum Gas offer incentive programs to reduce emissions and improve the performance of residential and non-residential properties. Partnering with these utilities is key to ensure the ongoing effectiveness of programs while also capturing more robust incentive offerings that eliminate pollution and save ratepayers money.

**High-Performance New Construction**  
Energy codes for new construction are adopted at the state-level in Utah. Salt Lake City will continue to encourage the adoption of updated, increasingly efficient energy codes that support a responsible built environment statewide.



### AIR QUALITY

Salt Lake City faces significant air quality challenges year-round. In the winter, the Wasatch Front's unique geography leads to periodic temperature inversions that trap cold air underneath a layer of warm air. This phenomenon acts like a lid – causing particulate pollution to double every day during an inversion. In the summer, emissions from vehicles, industry, and a multitude of chemical products, combined with high temperatures and bright sunshine, lead to harmful ozone levels.

As the capital city, Salt Lake City has been a consistent leader in pioneering approaches to reduce air pollution. The City regularly presents its air quality best practices to neighboring cities and towns. This helps smaller municipalities understand how they can begin to engage their residents and businesses on air pollution, while also formulating strategies to reduce emissions from their internal operations. Salt Lake City addresses air quality in each of the following sectors and is supported by strategies described in the previous sections of Climate Positive.

**Area Sources**  
Salt Lake City prioritizes energy benchmarking and tune-ups for commercial buildings through a combination of policy, incentives, and educational resources. The City also provides guides for home improvements, including details on thermostat controls, home insulation and efficient appliances, to help more residential buildings toward a cleaner energy future.

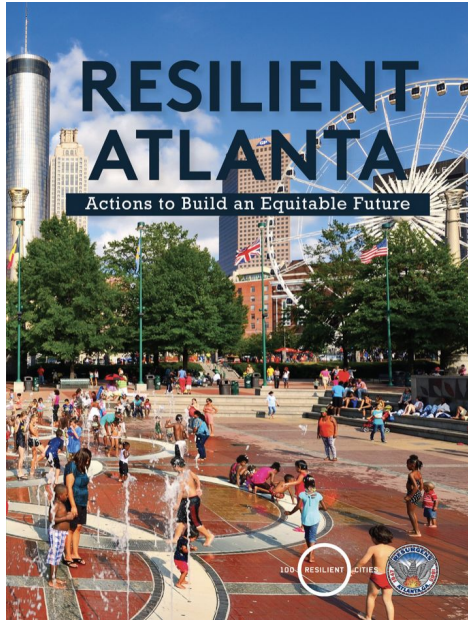
**Transportation**  
In addition to encouraging active and public transportation as a tool for reducing mobile emissions, the City sponsors an annual Clear the Air Challenge. The program has reduced over 3,000 tons of carbon emissions since its inception in 2006. In 2011, the City adopted an idle-free ordinance to limit vehicle idling within Salt Lake City boundaries.

**Industry**  
The Utah Department of Environmental Quality leads regulatory efforts related to local industry and the City supports ongoing pollution reduction programs. Reducing emissions from industry and area sources will become increasingly important as cleaner vehicles and fuels are adopted.



# Atlanta

78 pages



## INTRODUCTION EXISTING PLANS

### Existing Plan Alignment with Resilient Atlanta Visions

|   | Vision 01<br>People and<br>Culture thrive<br>Work | Vision 02<br>Economic<br>Atlanta<br>Adapt to<br>Progress | Vision 03<br>Beautiful<br>Future City<br>Livable | Vision 04<br>Design Our<br>Landscapes<br>Sustain Our<br>Values |
|---|---|--|--|--|
| Atlanta Housing Authority Vision 2022 (2017)                      | ●   | ●  | ●  | ●  |
| City of Atlanta Platform (2017)                                   | ●   | ●  | ●  | ●  |
| City of Atlanta, Atlanta City Design (2017)                       | ●   | ●  | ●  | ●  |
| City of Atlanta Capital Improvement Program (2017)                | ●   | ●  | ●  | ●  |
| Our Future Atlanta Agenda (2017)                                  | ●   | ●  | ●  | ●  |
| Partners for HOME ClearPath (2017)                                | ●   | ●  | ●  | ●  |
| Atlanta Regional Commission Atlanta Region's Plan (2016)          | ●   | ●  | ●  | ●  |
| City of Atlanta Comprehensive Development Plan (2016)             | ●   | ●  | ●  | ●  |
| City of Atlanta Green Infrastructure Strategic Action Plan (2016) | ●   | ●  | ●  | ●  |
| City of Atlanta Capital Improvement Program (2016)                | ●   | ●  | ●  | ●  |
| City of Atlanta Climate Action Plan (2015)                        | ●   | ●  | ●  | ●  |

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## INTRODUCTION EXISTING PLANS

### Existing Plan Alignment with Resilient Atlanta Visions

|  | Vision 01<br>People and<br>Culture thrive<br>Work | Vision 02<br>Economic<br>Atlanta<br>Adapt to<br>Progress | Vision 03<br>Beautiful<br>Future City<br>Livable | Vision 04<br>Design Our<br>Landscapes<br>Sustain Our<br>Values |
|--|---|--|--|--|
| Hartsfield-Jackson Atlanta International Airport Master Plan (2015)  | ●   | ●  | ●  | ●  |
| City of Atlanta Creating Linkages and Eliminating Barriers: The Strategic Community Investment Report (2015) | ●   | ●  | ●  | ●  |
| Transformation Alliance Strategic Plan (2015)  | ●   | ●  | ●  | ●  |
| Atlanta BeltLine Equitable Development Plan (2015)   | ●   | ●  | ●  | ●  |
| City of Atlanta Project GreenSpace (2009)  | ●   | ●  | ●  | ●  |
| City of Atlanta Connect Atlanta Plan 2008, 2015 appendices   | ●   | ●  | ●  | ●  |
| Atlanta Regional Commission's Livable Centers Initiative (2007)  | ●   | ●  | ●  | ●  |

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## INTRODUCTION ATLANTA'S RESILIENCE CHALLENGES

The music industry similarly has a significant impact on the both the culture and economy of Atlanta, contributing \$3.7 billion in economic impact annually.

Another sector critical to Atlanta's economy is the Hartsfield-Jackson Atlanta International Airport, which is the fourth-busiest in terms of origin and destination flights in the world. The airport has been ranked as the world's most trusted airport by passenger traffic every year since 2000 and is considered a major hub for "hub" throughout the southeastern United States. The Airport also provides more than 65,000 jobs on-site, making it the state's largest employer.

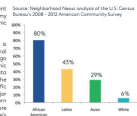
Despite Atlanta's array of economic assets and robust economic growth, Atlanta has the highest income inequality of any city in the U.S. and has continued to grow more unequal over the past decade. In 2016, the poorest 20 percent of households in Atlanta earned less than \$18,000 annually, while the richest 5 percent of households in Atlanta earned more than \$188,000. At the top, since 2008, the income gap between the middle class is widening. Compared to 10 other cities, Atlanta has the sixth-highest middle-class population (i.e. households with \$40,000-\$100,000 incomes), representing 32 percent of the population.

Tackling economic inequality is paramount to creating a resilient, strong Atlanta. Resilient poverty has intergenerational impacts as it limits the ability of young people to successfully achieve upward social mobility and break the cycle of poverty for the next generation. This means that we must address inequality today in order to create a stronger Atlanta tomorrow. As long as significant swaths of Atlanta lack access to quality jobs and middle incomes, the city's residents continue to remain vulnerable to systemic stresses.

**Wage Gap Between White Workers and Workers of Color**

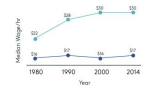
- White Workers
- Workers of Color

22



### % Children Living in High Poverty Communities by Race

It is estimated that 35.5 percent of people in the city have incomes below the Federal poverty level. Like most cities, Atlanta's poverty is disproportionately experienced by the city's Black residents, with 63 percent of Atlanta's Black children living in high-poverty communities (where the poverty rate is higher than 20 percent), compared with 24 percent of Asian and 14 percent of White residents. Poverty and income inequality are also highest along geographic lines with the southern and western areas of the city particularly vulnerable.

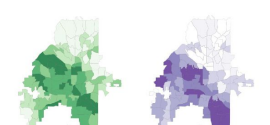
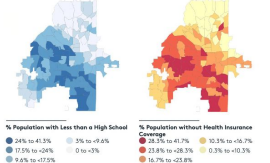


**Wage Gap Between White Workers and Workers of Color**

- White Workers
- Workers of Color

22

## INTRODUCTION ATLANTA'S RESILIENCE CHALLENGES



**% of the Population in Poverty**

- 41.2% to 41.3%
- 32.4% to 40.2%
- 19.2% to 32.0%
- 35.4% to 41.1%
- 21.8% to 28.3%
- 10.7% to 25.8%
- 3% to 9.4%
- 0% to 3%

**Year Birthrate per 1,000 Births (2008-2012)**

- 20.5 to 20.6
- 16.1 to 20.5
- 14.5 to 16.1
- 48.3 to 49.4
- 0 to 46.5

Source: National Equity Atlas

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# Ottawa



## Climate Change Master Plan



City of Ottawa  
Planning, Infrastructure  
and Economic Development

Approved January 2020

Amended December 2020

[ottawa.ca/climatechange](http://ottawa.ca/climatechange)

[ottawa.ca](http://ottawa.ca)  3-1-1  
TTY/ATS 613-580-2401

35 pages

## 6 PRIORITIES FOR THE NEXT FIVE YEARS (2020–2025)

As identified by the IPCC, significant action and investment is required in the next 10 years to achieve the GHG emission targets and to build resilience in Ottawa. The next five years are critical to putting Ottawa on the path to meet GHG emission targets and prepare for future climate conditions. The *Climate Change Master Plan* identifies eight priority actions for the next five years (2020–2025) that can be embedded in City business. They are:

- 1) Implement *Energy Evolution: Ottawa's Community Energy Transition Strategy*.
- 2) Undertake a climate vulnerability assessment and develop a *Climate Resiliency Strategy*.
- 3) Apply a climate lens to the new *Official Plan* and its supporting documents.
- 4) Apply a climate lens to asset management and capital projects.
- 5) Explore the feasibility of setting corporate carbon budgets, including piloting them within a small portion of the organization

- 6) Explore options for carbon sequestration methods and the role of green infrastructure
- 7) Encourage private action through education, direct and indirect incentives, municipal support, and advocacy for support of individuals and private organizations by senior levels of government
- 8) Develop a governance framework to build corporate and community capacity, align priorities, and share accountability in tackling climate change.

The first three priorities are already underway and have started either because of Council direction or government legislation. The last five priorities have been identified as critical areas to be explored and developed in the short-term in order to achieve the long-term vision. Descriptions of each priority including the details of the action, key outcomes, corporate and community partners, timelines, and resource requirements are outlined below. Existing and new budget requirements have been identified; securing this funding will be critical to their success.



# Is it good?

Or is it just greenwashing?



# How do we know if city climate change policies are actually good?

**Is the policy based on data?**

**Are a variety of stakeholders consulted and involved in implementation?**

**Is the policy funded or resourced in some way?**

**Is there a plan to evaluate effectiveness of the policy during and after implementation?**



# Some areas of city climate action policy:

- Renewable energy
- Transportation and Housing
- Greenspaces
- Recycling
- Emergency preparedness

# Renewable Energy





**Are “net-zero”  
cities really  
“net-zero”?**

# net-zero emissions

carbon dioxide (CO<sub>2</sub>) or greenhouse gas (GHG) **emissions** =  
carbon dioxide (CO<sub>2</sub>) or greenhouse gas (GHG) **removal**

**net-zero**

**=/=**

**zero emissions**

**Examples of renewable  
energy transitions in Latin  
America**

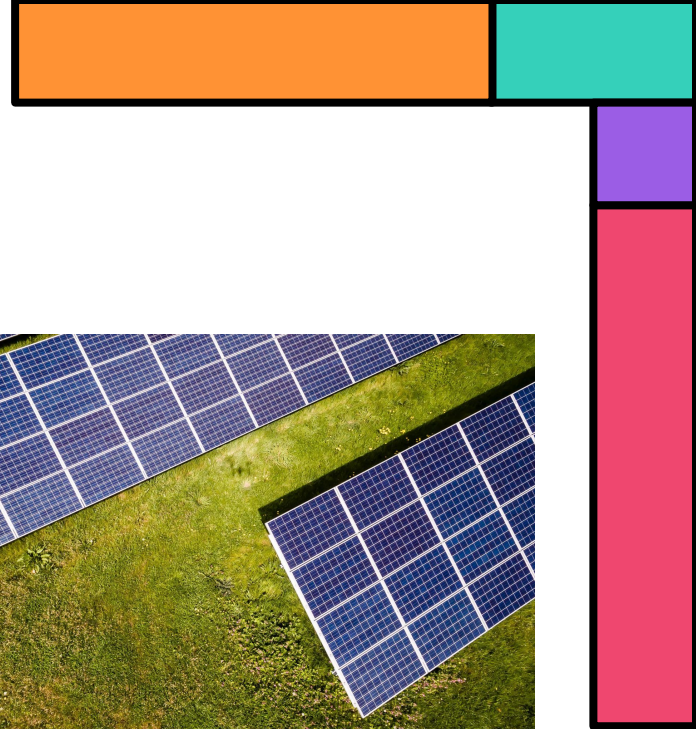
# Mexico City

- Solar energy (Solar City or Ciudad Solar)
- Solar water heating systems and solar PV in public buildings, small and medium businesses
- Retrofitting public buildings
- Waste-to-energy biogas ramp up (15% per year)



# Palmas (Brazil)

- 2035 goal generate 100% of local electricity supply from solar PV
- City-level tax incentive -- discount of up to 80% on two municipal taxes for a period of five years.
- Financed through municipal tax increase



# Recife (Brazil)

- 2050 carbon neutrality goal
- 2037 goal of 100% renewable energy sources for city-wide operations
- Municipal forum for citizen/resident participation
- Meetings are public and also includes local energy company





# Watch out!

- Carbon offsets
- Emissions tracking





# Alternative tracking methods

- Consumption-based
- “Border taxes”
- Ownership-based



# Is net-zero carbon emissions good policy?

**Is the policy based on data?**

**Are a variety of stakeholders consulted and involved in implementation?**

**Is the policy funded or resourced in some way?**

**Is there a plan to evaluate effectiveness of the policy during and after implementation?**

# Transportation and Housing





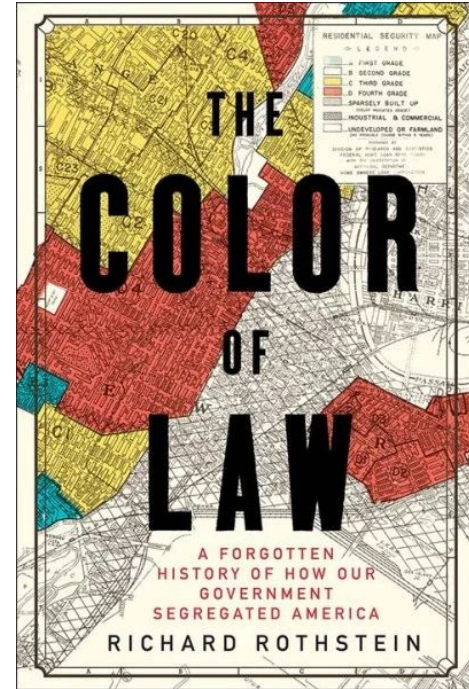
**How do housing and  
transportation policies impact  
climate adaptation and  
mitigation?**



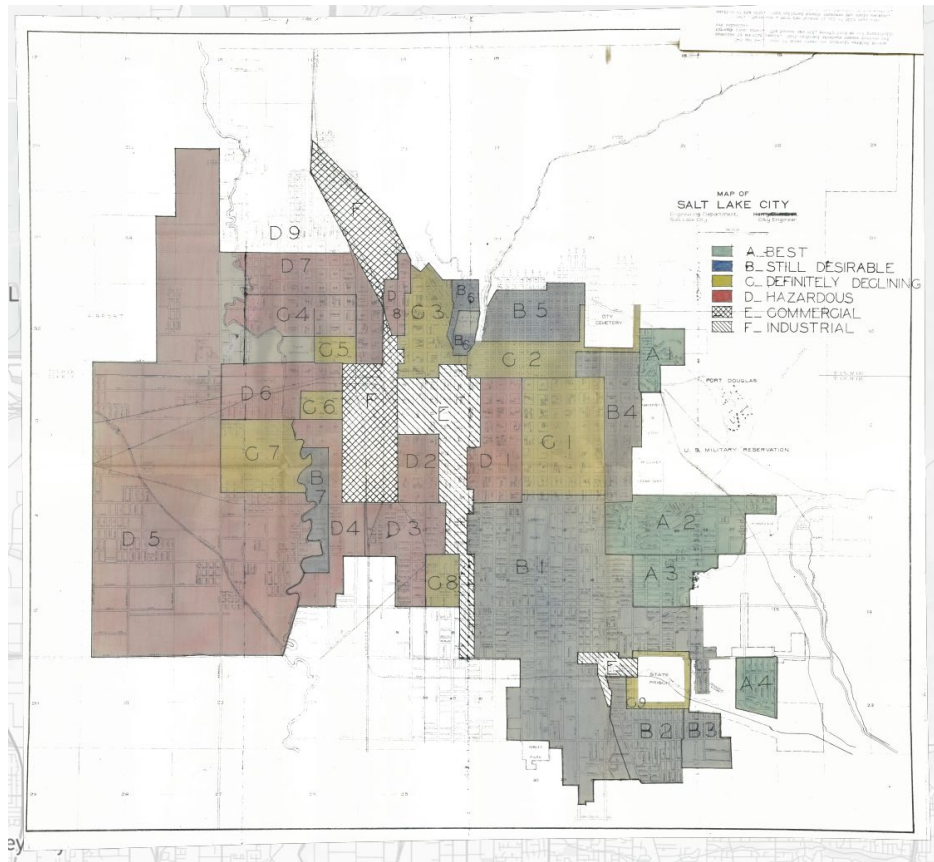
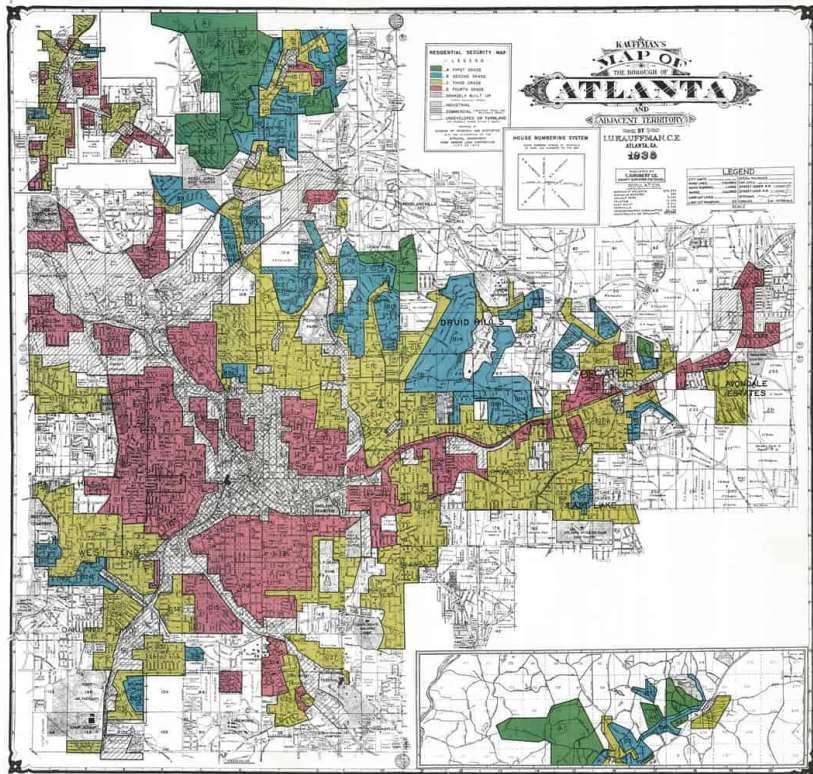
# A little history lesson...

## Redlining:

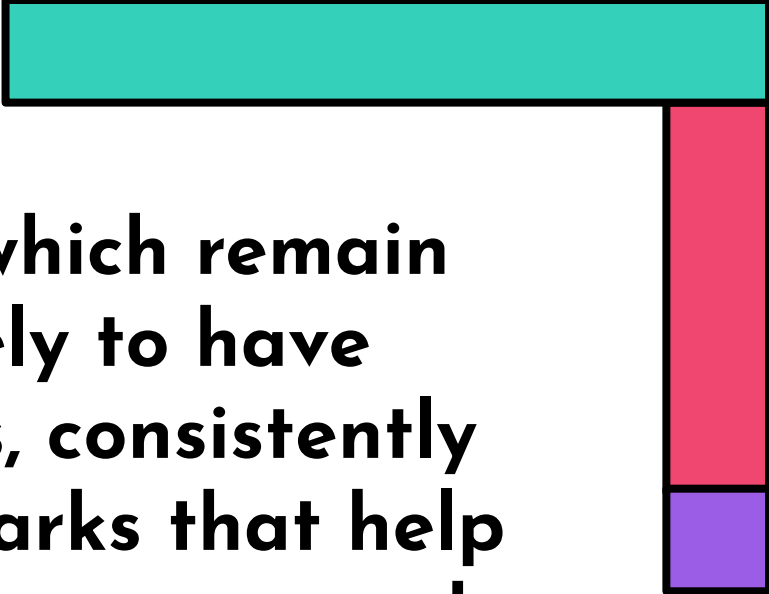
The systematic and discriminatory practice by which banks, insurance companies, and other companies restrict access to services based on geographic areas.







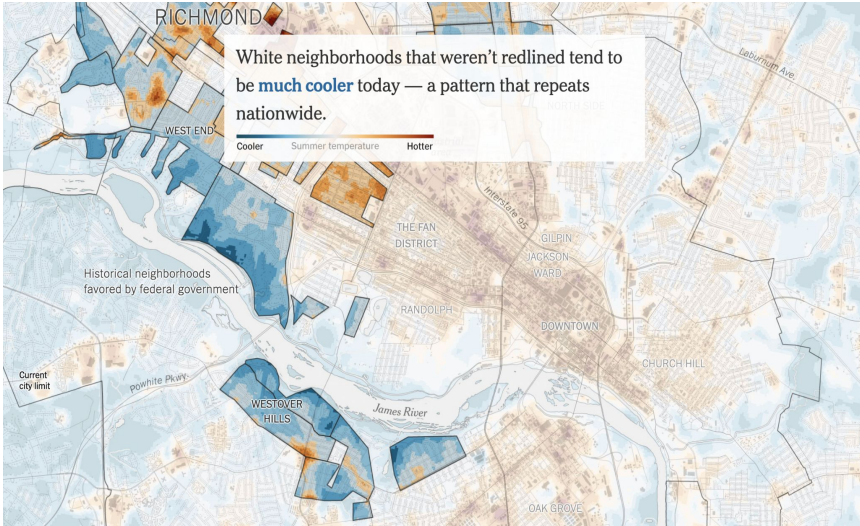
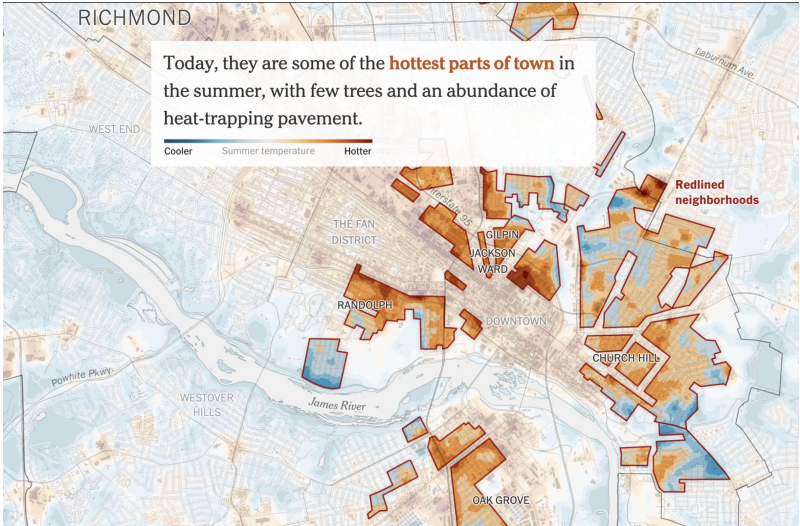




**“Redlined neighborhoods, which remain lower-income and more likely to have Black or Hispanic residents, consistently have far fewer trees and parks that help cool the air. They also have more paved surfaces, such as asphalt lots or nearby highways, that absorb and radiate heat.”**

**- *NYT*, 8/24/2020**

# Urban Heat Island Effects



# Homeless populations face high health risks from air pollution

**Table 2.** Health outcomes experienced by IEHs in relation to air pollution.

| Health Effect        | Frequency | Percent |
|----------------------|-----------|---------|
| Medical visit        | 119       | 86.2    |
| Difficulty breathing | 111       | 80.4    |
| Headache             | 80        | 58.0    |
| Mental health        | 36        | 26.1    |

Source: "Air Pollution-Related Health Impacts on Individuals Experiencing Homelessness: Environmental Justice and Health Vulnerability in Salt Lake County, Utah" (DeMarco et al, 2020)



**How can city housing and transportation policy address climate change and the legacy of redlining?**

**We need to change  
the ways in which we  
plan, fund, build, and  
organize communities  
and transportation.**

# “Infill” Housing

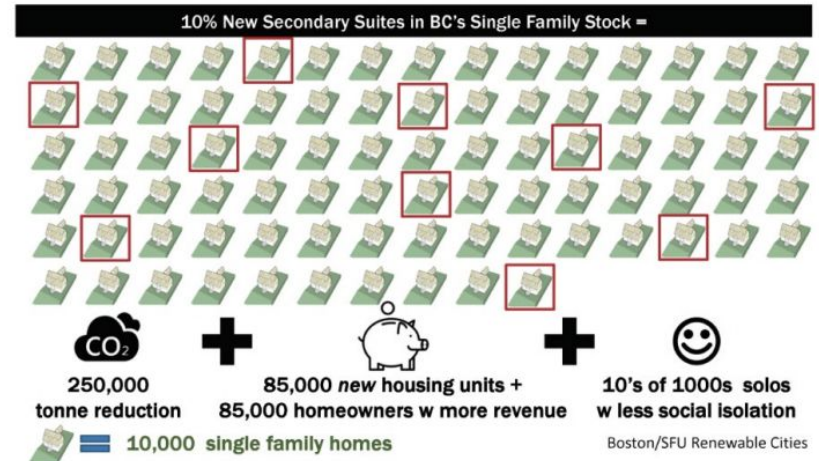
The process of building new housing in already established neighborhoods.  
Ex: replacing single-family units with brownstones or townhomes.





# Accessory Dwelling Units (ADUs)

“Accessory dwelling units—ground floor suites, garage conversions, additions, laneway homes—are one of the most significant, cheapest, fastest untapped opportunities for meaningful progress on affordable housing, social connectedness and climate action. **Doubling occupancy in a single-detached home essentially cuts per capita housing GHGs in half.** When ADUs are situated close to jobs, services and transit, GHGs reductions are even more dramatic.” - Renewable Cities, 2018



# Policy to support infill/higher density housing



AFFORDABLE HOUSING

## Will upzoning neighborhoods make homes more affordable?

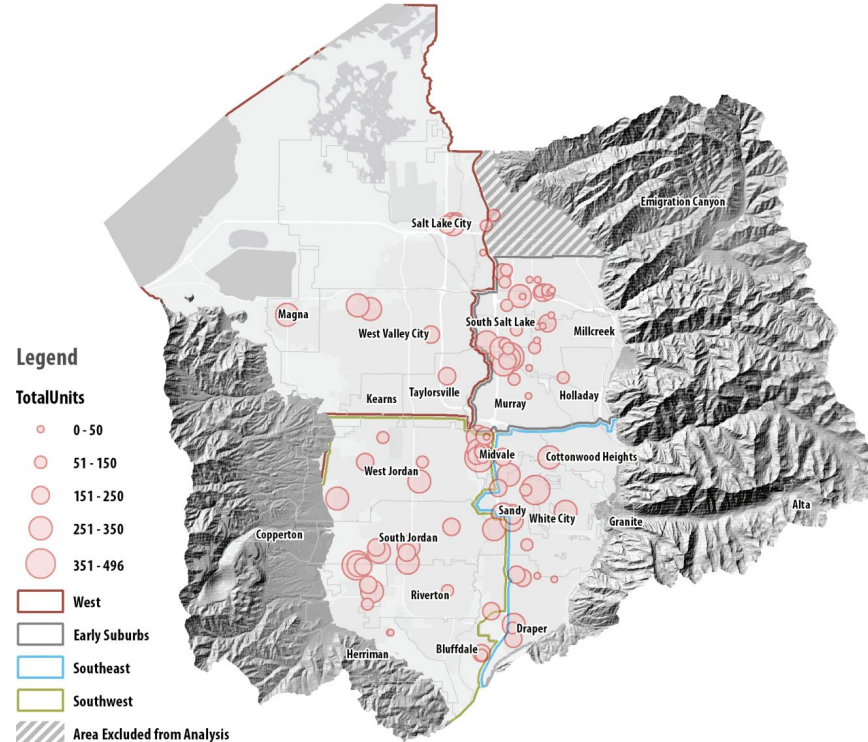
*Cities and states across the country are proposing new upzoning laws to combat the housing crisis. Will they work?*

By **Diana Budds** | Jan 30, 2020, 1:00pm EST

Illustration by **Alyssa Nossner** | Curbed

# What does housing density look like in Salt Lake City?

Figure 1: Areas of Analysis and Location of Apartments by Number of Units, 2010–2018



Source: Salt Lake County Assessor, Kem C. Gardner Policy Institute

# Combating gentrification and displacement

## Renters

Education – tenant rights, financial literacy

Financial assistance – stabilization

Incentives to property owners

Expanding supply – land trusts, co-housing, cooperative housing

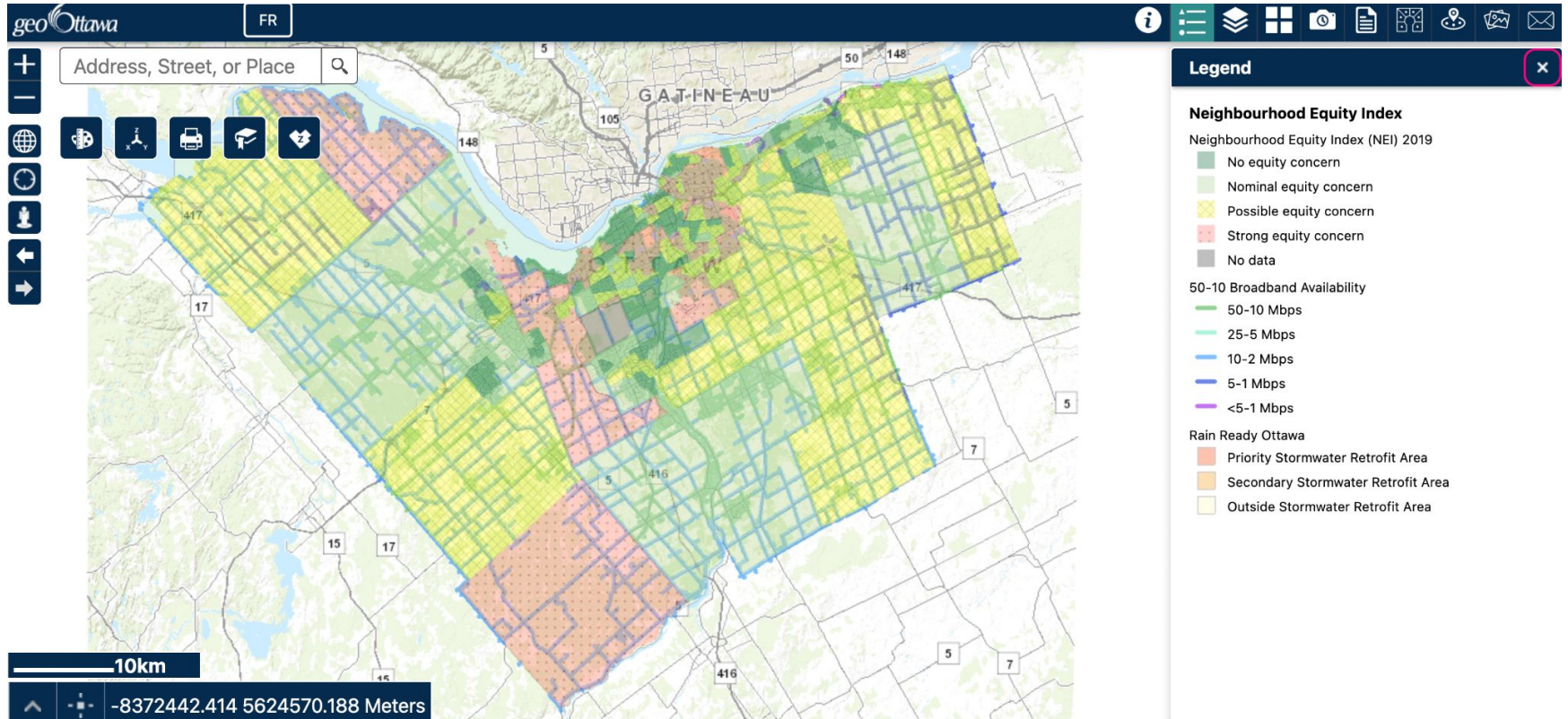
## Homeowners

Education – combating predation of vulnerable homeowners

Technical assistance – understanding development opportunities

Financial assistance – increasing access to capital for development

# Neighborhood Equity in Ottawa





# Is upzoning housing policy good policy?

**Is the policy based on data?**

**Are a variety of stakeholders consulted and involved in implementation?**

**Is the policy funded or resourced in some way?**

**Is there a plan to evaluate effectiveness of the policy during and after implementation?**

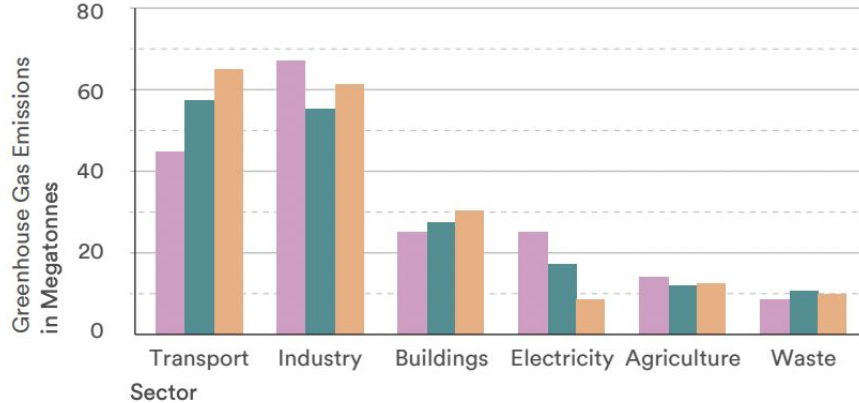
# Transportation

- Electric/renewable sourced energy buses
- More mass transit options = lower emissions
- More housing density near mass transit options = lower emissions

Greenhouse gas emissions by source

From Ontario's Five-Year Climate Change Action Plan 2016 – 2020, page 7.

1990  
2012  
2020





# **Transportation in Cities**

# Santiago de Chile

- 450 electric buses (6% of fleet)
- By 2022, 5K replaced
- By 2025, all electric fleet
- Solar PV park (2018) provides 50% of the city's energy



# London

- Transport for London (TfL) manages all the public transport- the Underground, bus routes, cycle hire, taxis, light rails, trams, street design.
- Comprehensive management of all transit systems allow for deeper cuts and streamlined ability to reduce emissions.
- Solar PV placement along track lines and in all TfL buildings-- up to 6% of all Underground's energy demands
- Using transport heat to provide heat to homes
- Strategic use of batteries at points with high energy loss
- Direct power purchase agreements with wind farms





# Does your city have good transportation policy?

**Is the policy based on data?**

**Are a variety of stakeholders consulted and involved in implementation?**

**Is the policy funded or resourced in some way?**

**Is there a plan to evaluate effectiveness of the policy during and after implementation?**

# Green spaces





**What do green spaces actually do?**

**Who has access to green spaces?**



# Green spaces help adaptation needs

- Improved air quality
- Reduced temperature (5-20 degrees C)
- Reduced likelihood of flooding





# **Assessing Urban Green Spaces**

# Hanoi

|                                      |  |  |   |  |   |
|--------------------------------------|--|--|---|--|---|
|                                      | Policies, legislation & plans for greenspace                         | Policies, legislation & plans for adaptation                   | Mechanisms/effectiveness of integrating across sectors                  | Mechanisms/effectiveness of integrating across scales/levels       | Presence of leadership & champions                      |
| <b>Goals, targets &amp; outcomes</b> |  |  |   |  |   |
|                                      | Rationales & justification for greenspace provision                  | Opportunities for innovation/experimentation/learning          | Knowledge-sharing within city & internationally                         | Linking greenspace & adaptation with development goals             | Ability to access long-term and self-sustaining funding |
| <b>Pathways</b>                      |  |  |   |  |   |
|                                      | Climate data for evidence-driven decision-making                     | Greenspace data for evidence-driven decision-making            | Decision-support tools for non-technical staff                          | Capabilities of policy-makers and related stakeholders             | Processes to integrate different kinds of data          |
| <b>Data &amp; knowledge</b>          |  |  |   |  |   |
|                                      | Approaches to support civil society collaboration                    | Channels for public participation in decision-making           | Effectiveness of participation on outcomes                              |  |   |
| <b>Societal collaboration</b>        |  |  |   |  |   |
|                                      | Processes to understand access to key greenspace / adaptation assets | Processes to understand vulnerability across society and space | Explicit consideration of justice in greenspace planning for adaptation | Measures to reduce inequalities in greenspace/ adaptation benefits |   |
| <b>Ethical &amp; normative</b>       |  |  |   |  |   |

|            |  |   |
|------------|--|---|
| <b>KEY</b> |  | Limited evidence of competence in responses         |
|            |  | Evidence of competence, but challenges/ limitations |
|            |  | Strong evidences of competence in responses         |

# Fukuoka

|                                      |  |  |   |  |   |
|--------------------------------------|--|--|---|--|---|
|                                      | Policies, legislation & plans for greenspace                         | Policies, legislation & plans for adaptation                   | Mechanisms/effectiveness of integrating across sectors                  | Mechanisms/effectiveness of integrating across scales/levels       | Presence of leadership & champions                      |
| <b>Goals, targets &amp; outcomes</b> |  |  |   |  |   |
|                                      | Rationales & justification for greenspace provision                  | Opportunities for innovation/experimentation/learning          | Knowledge-sharing within city & internationally                         | Linking greenspace & adaptation with development goals             | Ability to access long-term and self-sustaining funding |
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|            |  |   |
|------------|--|---|
| <b>KEY</b> |  | Limited evidence of competence in responses         |
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# Taipei

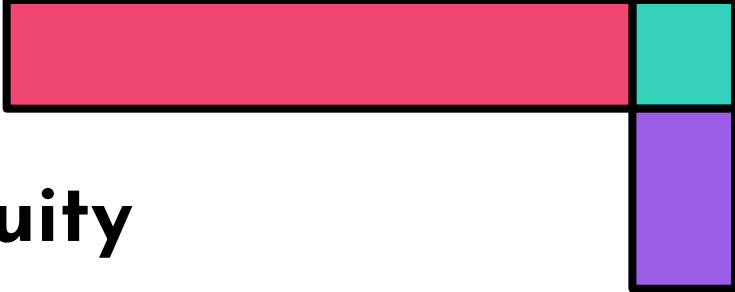
|                                      |  |  |   |   |   |
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|            |  |  |
|------------|--|--|
| <b>KEY</b> |  | Limited evidence of competence in responses        |
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|            |  | Strong evidences of competence in responses        |



# Equity in urban green spaces

- “larger parks that can support urban forests, jogging or biking are more likely to be located in wealthier, whiter areas of the city (e.g., the Monon trail in Indianapolis, Indiana; Central Park in New York City, New York; Forest Park in St. Louis, Missouri).”
- “parks in poorer, Black majority neighborhoods, may be co-located near hazardous sites, may previously have been the sites of severe pollution (Su et al. 2011, p 323), or lack upgraded amenities” (Sister, Wolch, and Wilson 2010, p 244).
- “lower-income neighborhoods were more likely to have higher user density than higher-income neighborhoods” (Sister, Wolch, and Wilson 2010, p 240)
- “parks in low income communities were more likely to contain basketball courts, less likely to have trails, and less likely to have aesthetic features” (Vaughan et al. 2013, p 13)



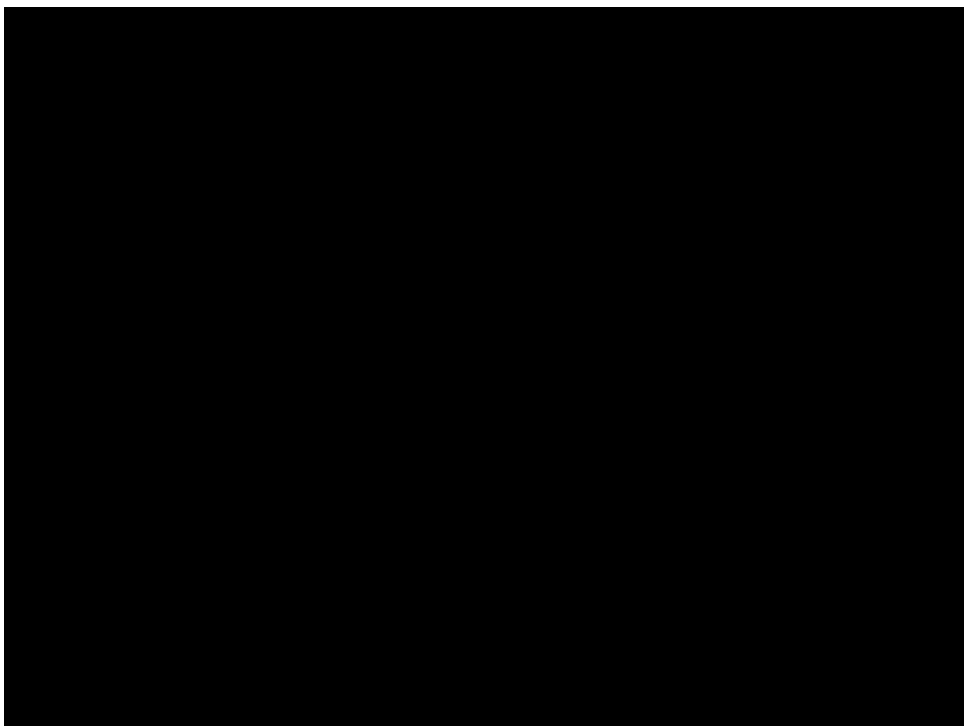
# Addressing green space equity

- Acknowledge that not all green spaces are the same
- Prioritize and co-plan with Black, Indigenous, and other historically marginalized communities
- Public-Private-Partnership (PPP) vs. community-owned
- Emphasise on long-term inclusion vs. short-term or project specific inclusion

# Recycling







**OOPS!**  
Los siguientes artículos  
están prohibidos en su contenedor

**OOPS!**  
The following items are prohibited  
in your curbside recycling cart.

Don't get an "oops!" tag  
on your recycling cart!

Yard Waste  
Styrofoam  
Electronics & Batteries  
Textiles & Shoes  
Liquids  
Food Waste  
Tanks & Paint Cans  
Wood & Construction  
Household Materials  
Hoses, Ropes & Cords  
Auto Parts & Scrap Metal  
Diapers  
Miscellaneous Plastics  
Items Outside of Cart

Other:  
Your cart was not serviced today due to the above noted contamination. Please remove items to have your recycling cart serviced on your next collection day.

**ACCEPTED ITEMS**  
All accepted recyclables must be clean.

**PAPER**  
No shredded paper

**CARDBOARD**  
Dry flattened boxes

**PAPERBOARD**  
Unlined only

**KNOW**  
If you have any questions call (813) 274-3333

Tampa  
Department of Public Works  
Solid Waste Management



**Why isn't recycling more accessible for everyone?**



# Recycling programs are based on...

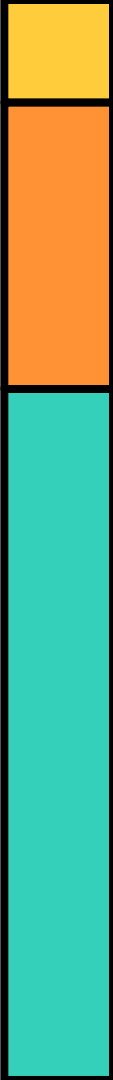


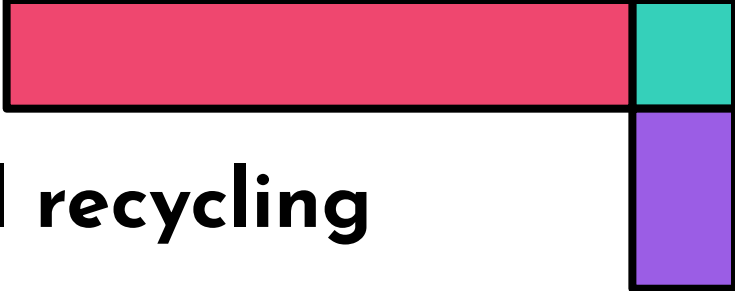
## Markets

Demand in market = payment for post-consumer recyclables

## Municipalities

Government regulations can sustain market demand; recycling requires equipment, salaries and other costs.

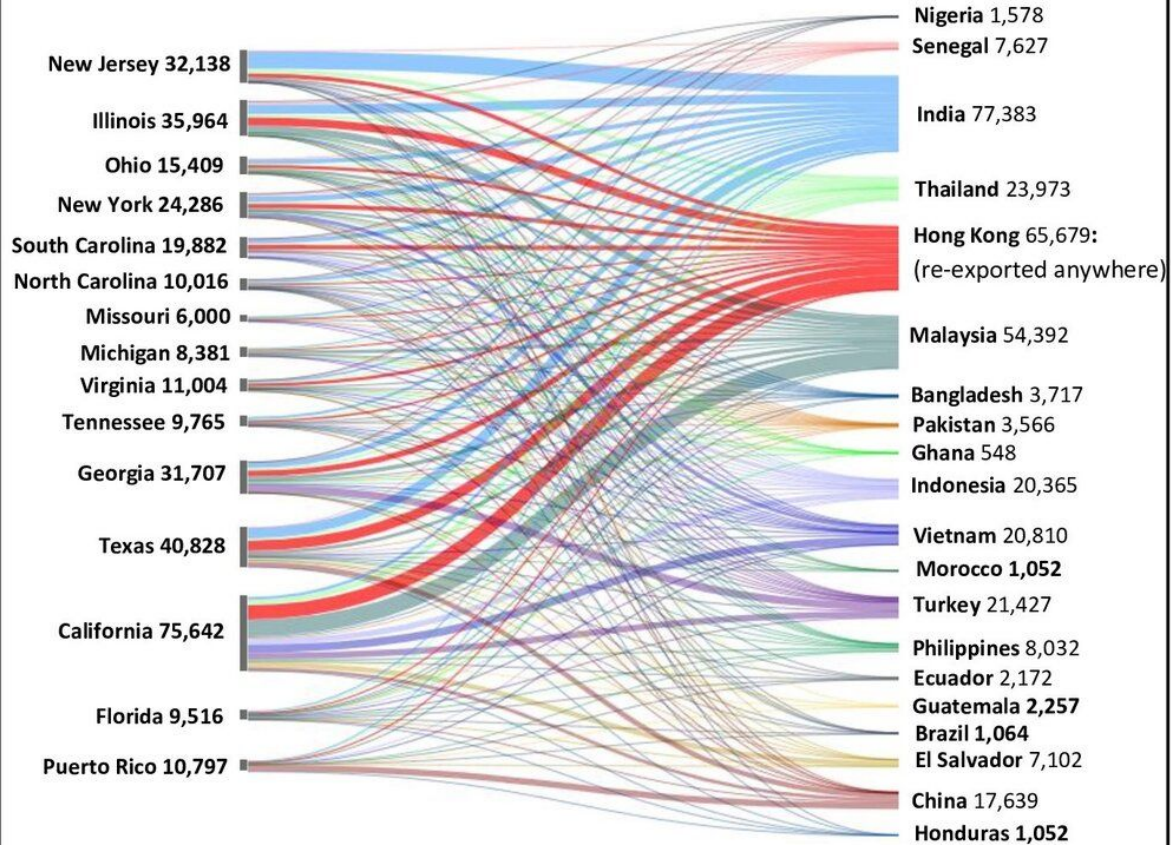




# Best practices for municipal recycling

- 1) Set recycling priorities with data
- 2) Make it convenient
- 3) Incentivize participation
- 4) Make information about recycling easy to find and positive
- 5) Get buy-in from collection workers and waste management operators
- 6) Maximize recyclable revenues and create local markets for reuse

**2019 US Plastic Waste: Top 15 States Exporting to Countries with Poor Waste Management  
(Metric tonnes)**



Visualization: Mouli Venkatesan & The Last Beach Cleanup

Export Data: [usatrade.census.gov](https://usatrade.census.gov)



# Is your municipal recycling policy good policy?

**Is the policy based on data?**

**Are a variety of stakeholders consulted and involved in implementation?**

**Is the policy funded or resourced in some way?**

**Is there a plan to evaluate effectiveness of the policy during and after implementation?**





# What types of limitations do cities experience?

- Federalism, etc plastic bag bans
- Utility coordination
- Federal policy misalignment
- Financial limitations

# US state preemption legislation- plastic bags



- Bans** \*HI has a defacto statewide ban.
- Fees or Taxes** \*VA law allows localities to tax.
- Preemption**
- No Statute**

# Emergency Preparedness



# Emergency preparedness is largely not updated for climate change realities

- Ex: New Orleans requires an 82 hour notice for mandatory evacuation of the city

**Brian McNoldy** @BMcNoldy

#Ida is close to becoming the fifth Category 5 hurricane to ever make landfall in the continental U.S. Three days ago (26Aug 15Z), the 1st advisory was written for TD9. History has shown that this is what these super-rapid intensifiers do, and Ida's rate would even surpass these.

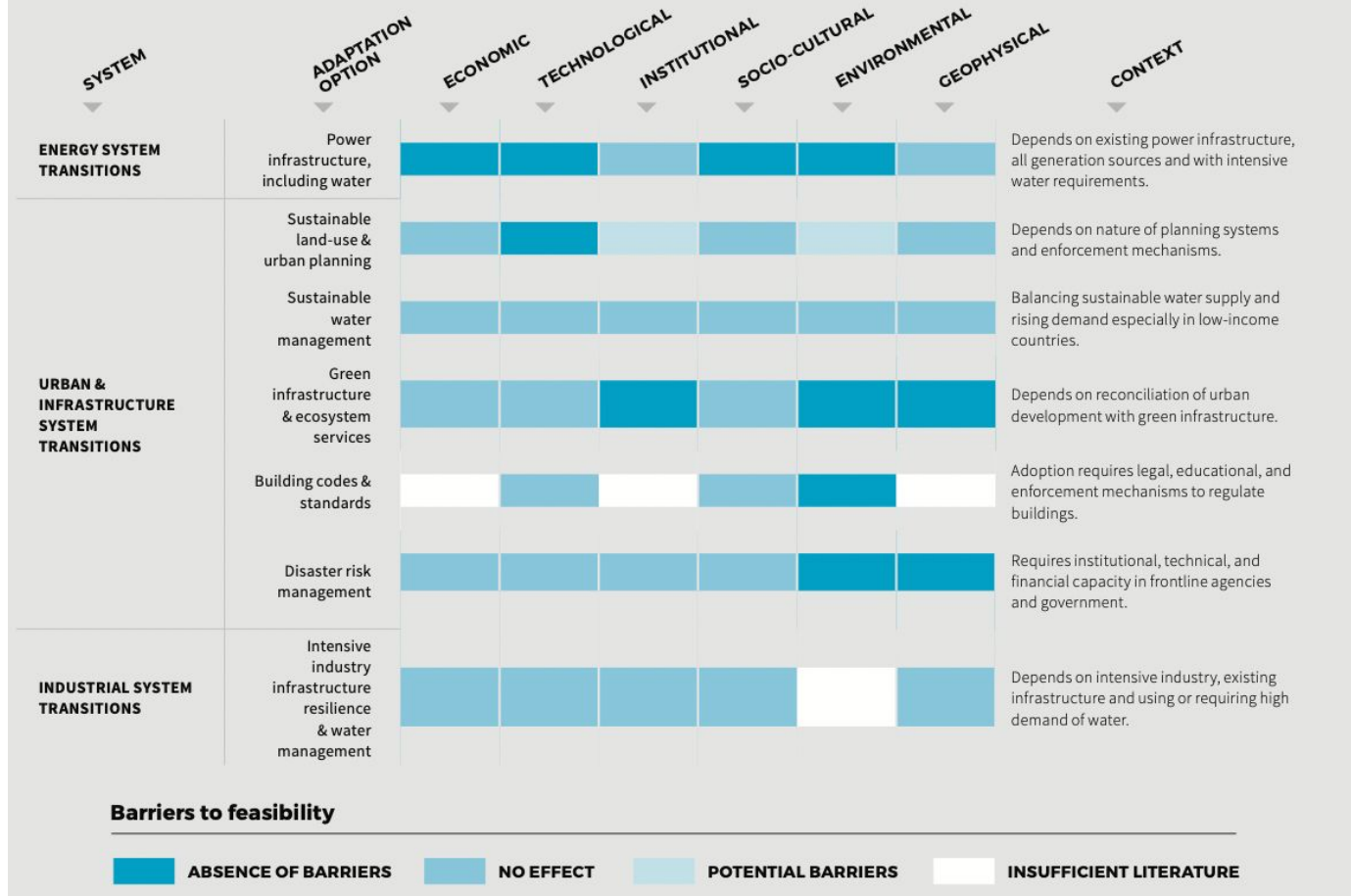
**Brian McNoldy** @BMcNoldy · Aug 27

As we watch #Ida with anxiety this weekend, remember that "ALL FOUR" Category 5 hurricane landfalls on the continental U.S. were just tropical storms three days prior. Do not underestimate what nature is capable of.

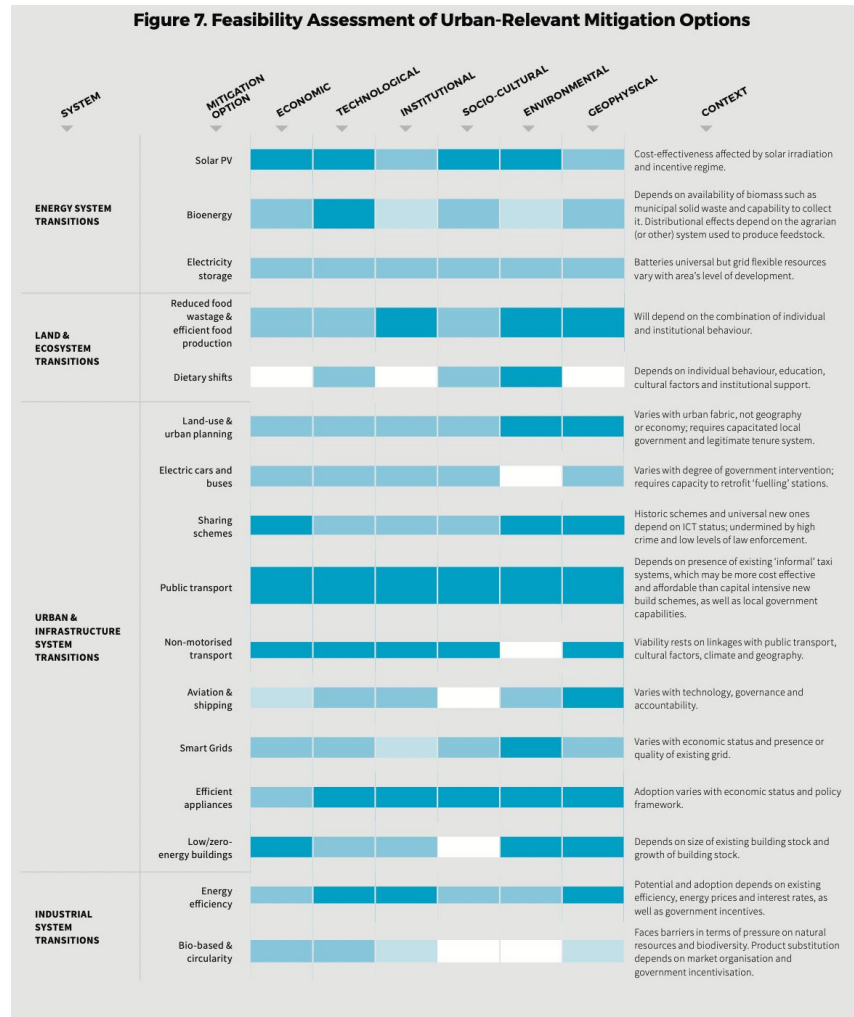
**Category 5 Hurricane Landfalls on the Continental United States**

8:16 AM · Aug 29, 2021 · Twitter Web App

### Figure 6. Feasibility Assessment of Urban-Relevant Adaptation Options



**Figure 7. Feasibility Assessment of Urban-Relevant Mitigation Options**



A decorative graphic in the top right corner consisting of a large pink rectangle, a smaller teal square to its right, and a purple square below the teal one.

# What should you push your city on?

- 1) TRANSPORTATION
- 2) Incentives for efficient appliances
- 3) Plans and structures for clean energy transitions (especially solar)
- 4) Emergency preparedness updates
- 5) Housing-first policies and housing density
- 6) Low/zero-energy buildings



A decorative graphic in the top right corner consisting of a large pink rectangle, a smaller teal square to its right, and a purple square below the teal one.

# How do you get involved with city climate action efforts in Ottawa?

- 1) **Get involved** with groups like Ecology Ottawa
- 2) **Learn** about who is most vulnerable to climate change impacts in your community
- 3) **Read** through the Ottawa Climate Change Master plan
- 4) **Ask questions and reach out** to the Ottawa Climate Change and Resiliency team

# City Climate Action Networks





# Why do cities participate in networks?

- To share general knowledge, vision
- To share technological or policy expertise
- To demonstrate leadership locally, nationally, internationally

# **Examples of City Climate Action Networks**

**ICLEI**





# Urban Sustainability Directors Network

**USDN**  
urban sustainability  
directors network





**C40/  
Global Covenant  
of Mayors**





# Low Carbon Cities Canada (LC3)





# Regional Networks



# CONTACT INFO

## WEBSITE

[devoncantwell.com](http://devoncantwell.com)

## TWITTER

[@devon\\_cantwell](https://twitter.com/devon_cantwell)

