



# Enhancing Your Building Retrofit with Effective Multi-Solving Strategies

WEDNESDAY, FEBRUARY 12<sup>TH</sup>, 2025

# Land Acknowledgement

I want to acknowledge that we are on the unceded ancestral lands of the Wolastoqiyik people. This land, shaped by the Wolastoq River, has been home to generations who have cared for it with deep respect. Today, as we meet here, let us commit to understanding and supporting Indigenous Peoples' rights and responsibilities to this territory. May this acknowledgment inspire us to act in ways that honor their traditions and contributions.



# FCM's Green Municipal Fund

Supports innovative municipal sustainability projects across Canada through funding, resources and training.

## Some program offerings



Community Efficiency  
Financing



Sustainable  
Affordable  
Housing



Community  
Buildings Retrofit



Low Carbon Cities  
Canada





# WORKSHOP AGENDA

|             |                                   |
|-------------|-----------------------------------|
|             |                                   |
| 10:45-10:50 | Welcome & Opening Remarks         |
| 10:50-11:00 | Anchor Activity                   |
| 11:00-11:15 | Presentation - Rohan Mishra       |
| 11:15-11:25 | Personal Reflection + Group Share |
| 11:25-11:40 | Presentation – Ursula Eicker      |
| 11:40-11:55 | Group Brainstorming Activity      |
| 11:55-12:00 | Closing Remarks                   |



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**Why are you here for this workshop and what do you hope to get out of it?**

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**What unique skills do you bring to the table?  
What unique roles do you tend to take on  
during projects?**

**i** Start presenting to display the poll results on this slide.

# ROHAN MISHRA

Environment &  
Sustainability Lead | Town  
of New Glasgow, NS



The background of the slide is a photograph of a river scene. In the foreground, there is a wooden dock or pier extending into the water. A bridge with a green roof and metal railings spans across the river in the middle ground. In the background, there is a decorative archway with a colorful sunburst design. The sky is clear and blue, and the water reflects the surrounding greenery and structures.

# Enhancing Your Building Retrofit with Effective Multi-Solving Strategies Community Resilience Hubs and Beyond

Rohan Mishra – Environment & Sustainability Lead

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9027593565





# AGENDA

- Introduction
- Community Building Retrofits
- Community Resiliency Hubs
- Biomass – An effective multi-solving strategy





# About New Glasgow

- The Town of New Glasgow is in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people. The Town also recognizes the African Nova Scotians whose culture, heritage, and history have been and remain a key part of our town and province for more than 400 years.
- The Town of New Glasgow is situated on the banks of the scenic East River of Pictou with a population of just under 10,000 residents located on the North Shore and acts as the urban center to Pictou County.



# Introduction

- The Town of New Glasgow is committed to ambitious climate action and is a member of the Global Covenant of Mayors for Climate & Energy and the Federation of Canadian Municipalities – Partners for Climate protection (PCP) Program.
- The Town of New Glasgow is also a participating municipality in the Circular Cities and Regions Initiative (CCRI)
- The Town has adopted a Corporate Climate Action Plan and a Community Climate Action Plan





### Corporate Emissions Inventory

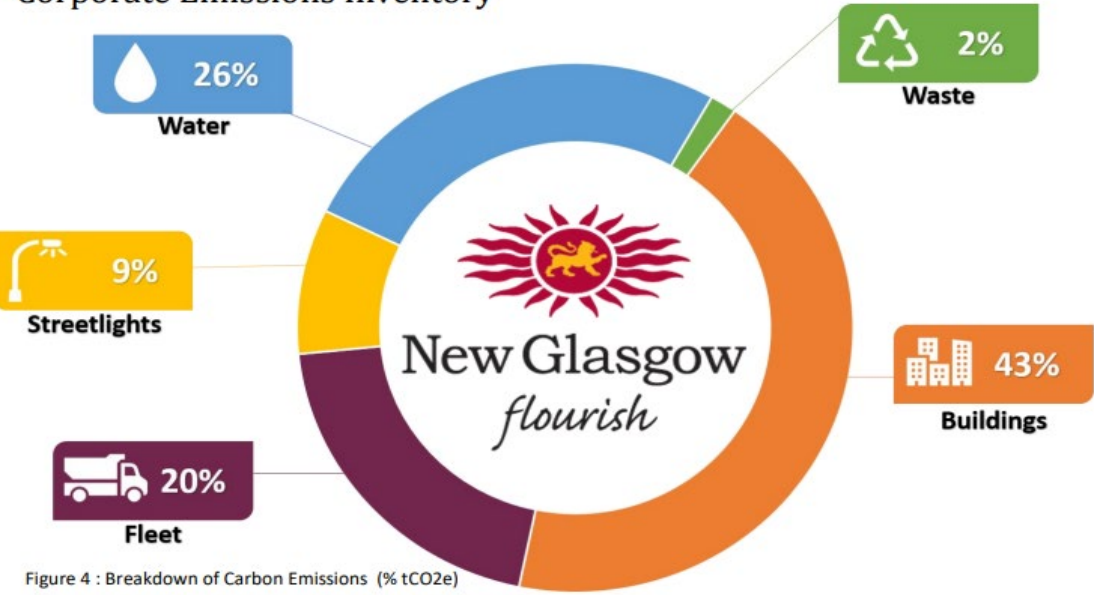


Figure 4 : Breakdown of Carbon Emissions (% tCO2e)

| Sector             | Emissions (tCO2e) | Energy       | Cost (\$)           |
|--------------------|-------------------|--------------|---------------------|
| Buildings          | 1307.37           | 11154        | \$338,735.82        |
| Fleet              | 605.81            | 8880         | \$285,834.16        |
| Streetlights       | 266.16            | 1423         | \$63,132.53         |
| Water & Wastewater | 777.98            | 4893         | \$168,798.90        |
| Solid Waste        | 46.44             | -            | \$24,303.44         |
| <b>Total:</b>      | <b>3003.76</b>    | <b>26530</b> | <b>\$880,804.85</b> |

CO<sub>2</sub>  
**3003.76**  
 tonnes of CO<sub>2</sub>



# New Glasgow's Corporate Emissions Profile

# Community Building Retrofits



- The Built Environment is the largest contributor to GHG emissions in our corporate emissions profile.
- The Green Municipal Fund's Community Buildings Retrofit (CBR) initiative supports the retrofitting of aging community buildings to enhance energy efficiency, reduce GHG emissions, lower costs, and promote vibrant community spaces.
- The Town of New Glasgow has been able to leverage this programming to conduct retrofits and implement renewable energy allowing us to address our GHG emissions, lower costs and create vibrant community spaces.

# Community Resiliency Hubs

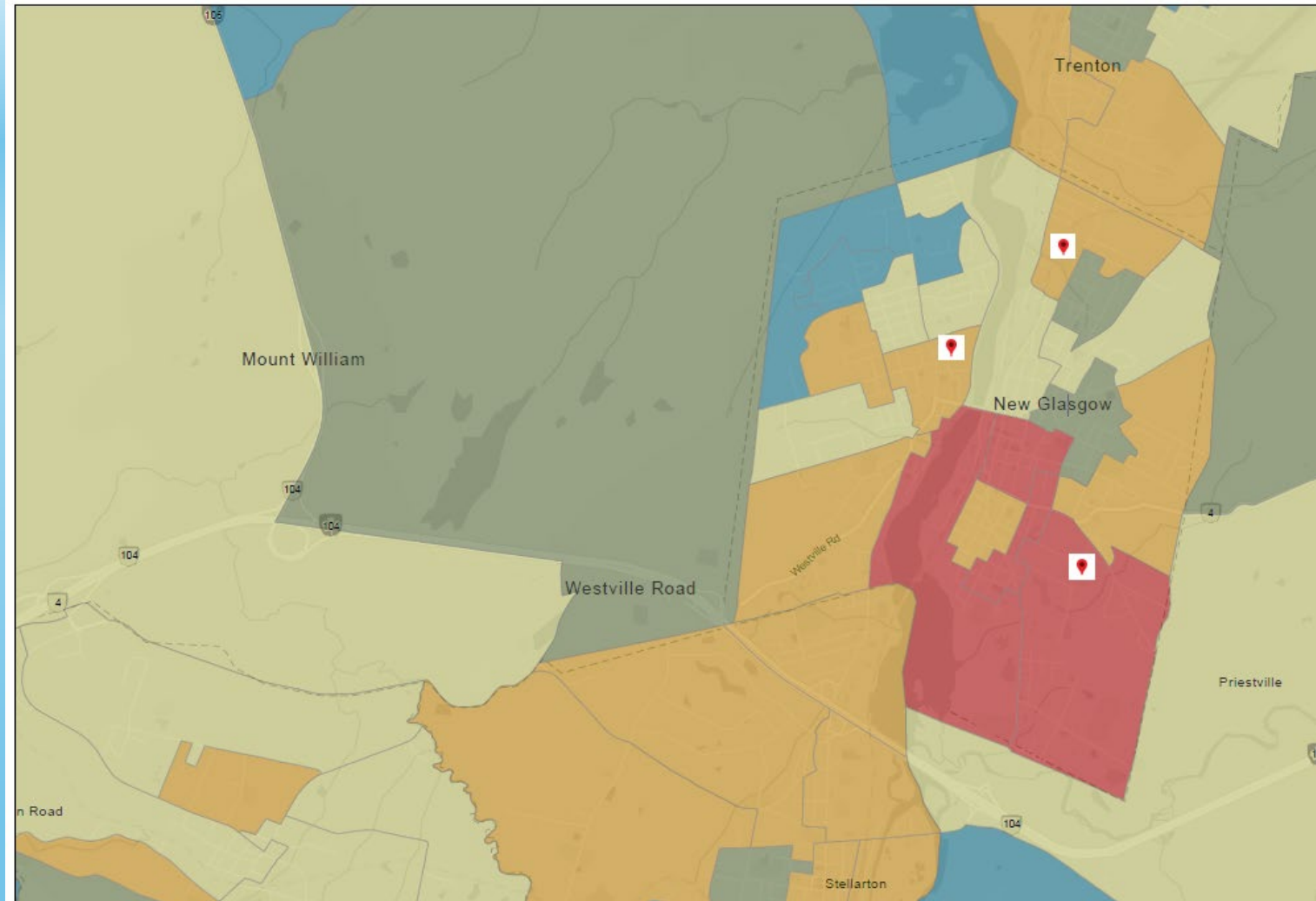
Community Resilience Hubs are designed to provide essential services during extreme weather events or emergencies. These hubs offer individuals the ability to charge electronic devices, access internet or phone services, receive information from officials, and take refuge in a safe environment with temperature controls in place. Light meals can also be prepared within these spaces, when required.





# Community Resiliency Hubs

- The Town of New Glasgow has designated three Community Centers to serve as Community Resilience Hubs: the West Side Community Center, North End Community Center, and Ward One Community Center. These centers are in areas with relatively high social vulnerability.
- Using the CBR Initiative the Resiliency Hubs have been retrofitted with energy efficiency upgrades (heat pumps and LED lights)
- These buildings have also received resiliency upgrades (generator backup)



12/8/2024, 5:22:22 PM

Social Vulnerability Index


|                       |   |   |   |                        |
|-----------------------|---|---|---|------------------------|
| 1 - Low Vulnerability | 2 | 3 | 4 | 5 - High Vulnerability |
|-----------------------|---|---|---|------------------------|

# Community Resiliency Hubs

- The Town is working on adopting an official policy that will speak to this project. An internal review has been done, we are waiting on inputs from external stakeholders such as community center boards, community and REMO before presenting the policy to Council.
- There will also be an ask made in next years budget to secure supplies to equip these centers to serve as resiliency hubs.
- For future, we plan on using CBR again to get a solar project that will speak to the energy consumption of all 3 of our community centers and there is an application in place for an accessibility ramp at the ward 1 community center.







# Community Resiliency Hubs

- This project has multi solved for mitigating our GHG emissions, increasing community resiliency and adapting to our realities of a changing climate with increasing high frequency storms.
- It has helped us address items in both our corporate and community climate action plan strategies.

# Biomass as an effective multi solving strategy

- The New Glasgow Municipal Operations Building is a one storey steel structure with a gross floor area of 80,000 sq ft.
- Buildings constitute 43% of our corporate emissions, this building alone represents ~ 15% of our total corporate emissions.





# Biomass as an effective multi solving strategy

- Poor building envelope
- Transportation garage



# Biomass as an effective multi-solving strategy

- With the given constraints, Using sustainably sourced biomass appears as a viable solution of reducing GHG emissions and save costs.
- We have received additional support from the Province of Nova Scotia to subsidize clearing of Hurricane Fiona's deadwood.
- The Town administers woodlands within the Town and also within the Forbes Lake Source Water Protection Area north of the Town applying principles of ecological forestry.



# Biomass as an effective multi-solving strategy

- There is ~ 100 ha (representing ~5000 tons of Biomass/fuelwood) of impacted area still to clean up that will get subsidized.
- \$100,000 is spent on oil to run the building measuring over 400 tCO<sub>2</sub>e. Converting to Biomass will amount to \$ 40,000-60,000 in costs and bring its carbon footprint down to ~40-80 tCO<sub>2</sub>e. So a potential ~40-60% reduction in costs and ~80-90% reduction in carbon footprint is possible.
- have been able to leverage Green Municipal Funds CBR program to make an ask for next fiscal to pursue this project.



# Biomass as an effective multi solving strategy

- The potential of multi solving through this project is immense. We can address our GHG emissions while making considerable savings.
- We are significantly reducing future wildfire risks by clearing out the deadwood caused by Hurricane Fiona.
- By entering a fuel supply contract with a local contractor and generating economic opportunity.
- The project could also serve as a proof of concept for a larger scale biomass project to offset power generation by coal in the area.



James





Thank You For Listening!



**NetZero**  
NEW GLASGOW



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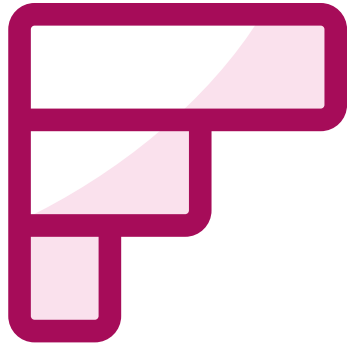


# Questions?

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**What non-energy benefits are you prioritizing in your building retrofits?**

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# URSULA EICKER

PhD, Canada Excellence Research Chair (CERC) in Smart, Sustainable and Resilient Cities and Communities, Concordia University, Montreal







**ASSESSING BUILDING RETROFIT  
BENEFITS WITH DIGITAL TWINS**

**Ursula Eicker**

Canada Excellence Research Chair (CERC) in Smart, Sustainable and Resilient Communities and Cities  
Concordia University, Montréal



# CROSS-SECTORAL COLLABORATION



Next-Generation Cities Institute (NGCI)  
Founding Co-Director  
*CERC Prof. Ursula Eicker*  
*Canada Excellence Research Chair*  
*in Smart, Sustainable and Resilient*  
*Cities and Communities*

**200**  
researchers

**14**  
associate  
research  
centers

**3**  
Research  
clusters

## DESIGN, ARTS CULTURE AND COMMUNITY RESEARCH CLUSTER



*Prof. Baron Tymas*  
Cluster Co-Director



*Prof. Silvano De la Llata*  
Cluster Co-Director

## BUILT AND NATURAL ENVIRONMENTS RESEARCH CLUSTER



*Prof. Pierre Gauthier*  
Cluster Co-Director



*Prof. Erkan Yönder*  
Cluster Co-Director

## MOBILE, SECURE AND SHARING CITIES RESEARCH CLUSTER



*Prof. Govind Gopakumar*  
Cluster Co-Director




*Prof. Chun Wang*  
Cluster Co-Director

# FIELDS OF ACTIVITIES



**STAKEHOLDER ENGAGEMENT**

- Co-creation processes
- Local value creation
- Living Lab approaches



**PHYSICAL TRANSFORMATION**

- Zero emission neighborhoods
- Livability, wellbeing, green spaces
- Sustainable mobility
- Resilient infrastructure



**DIGITAL INTEGRATION**

- Tools4Cities
- Integration & interoperability
- District energy management
- Cyber- and information security



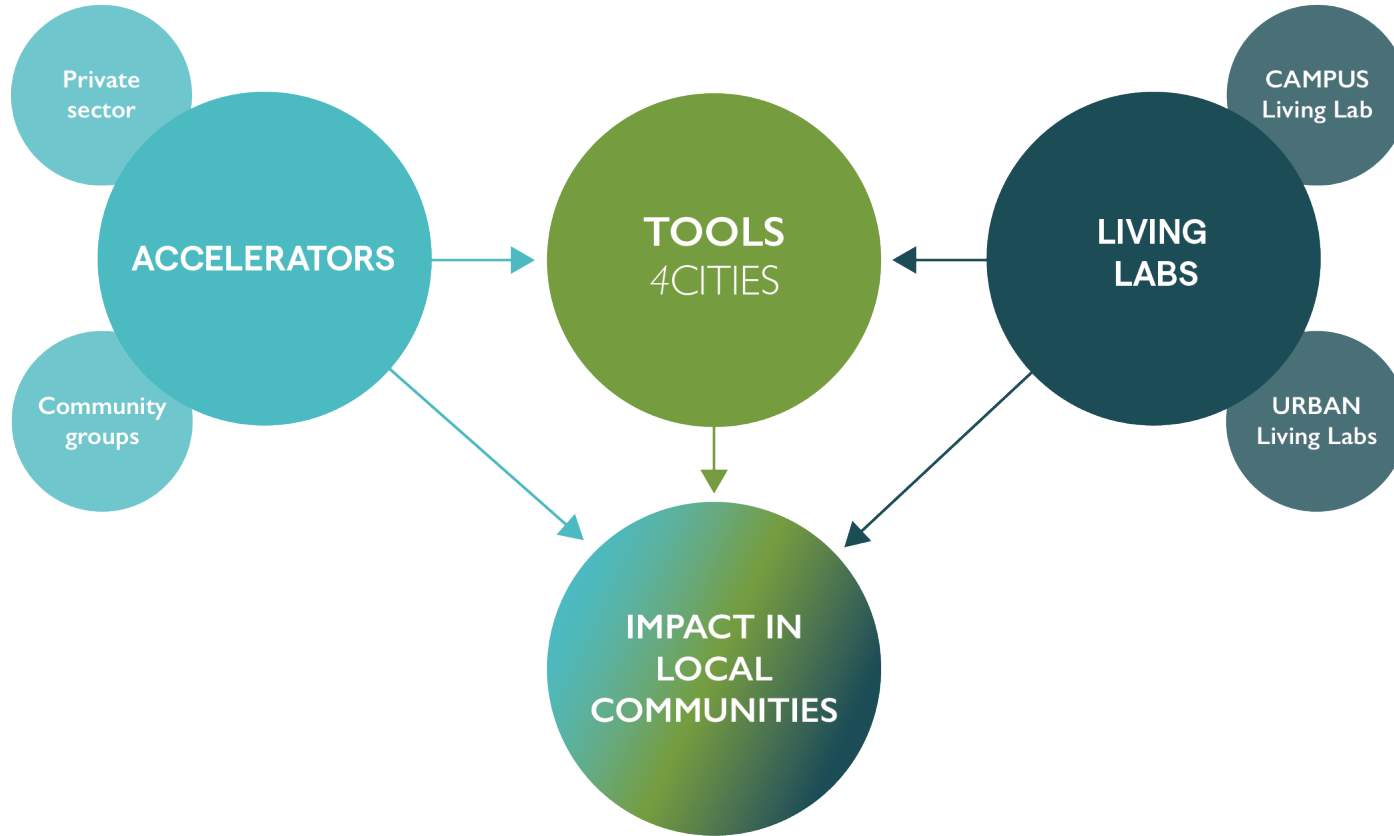
**NEW ECONOMIC PARADIGM**

- New smart services
- New business models
- Green and circular economy

URBAN TRANSFORMATION TO NEXT-GENERATION CITIES



# METHODS FOR TRANSFORMATION



## ACCELERATORS / PILOTS

Our accelerators support impact-driven companies or organizations through advice, training, mentorship, and financing solutions to decarbonize real estate projects or neighbourhoods for a fixed period of time.

## LIVING LABS

User-centred open innovation ecosystems are based on a systematic user co-creation approach, integrating research and innovation processes in real-world communities and settings.

## TOOLS4CITIES

This platform combines digital twin technology, complex simulations, and serious gaming to engage stakeholders in collaborating and co-creating innovative solutions for neighbourhood/ community transformation and local value creation.



# BUILDING RETROFIT CHALLENGES

## CHALLENGES

- The rate of building retrofit is very low – we will take 100 years to retrofit every building
- The contribution of the building sector to decarbonization is too low
- The high initial cost of the retrofit and long payback times
- High financial risk due to uncertainty in real savings with retrofit measures
- There is little consideration of co-benefits for comfort, well-being, neighbourhood upgrade, safety and more

# BUILDING RETROFIT SOLUTIONS

## POSSIBLE SOLUTIONS

- “Energiesprong” type of solutions, originally developed in the Netherlands. The program aims to aggregate individual retrofit opportunities into large segments of demand for equipment suppliers and constructors, encouraging large-scale investment and economies of scale
- Electrification of the heating systems combined with building efficiency measures
- Innovative financing models and long-term payback solutions
- Automated processes to simulate, measure and verify retrofit solutions to reduce uncertainty (TOOLS4CITIES)
- Assess co-benefits and upgrades of the neighbourhood (TOOLS4CITIES)



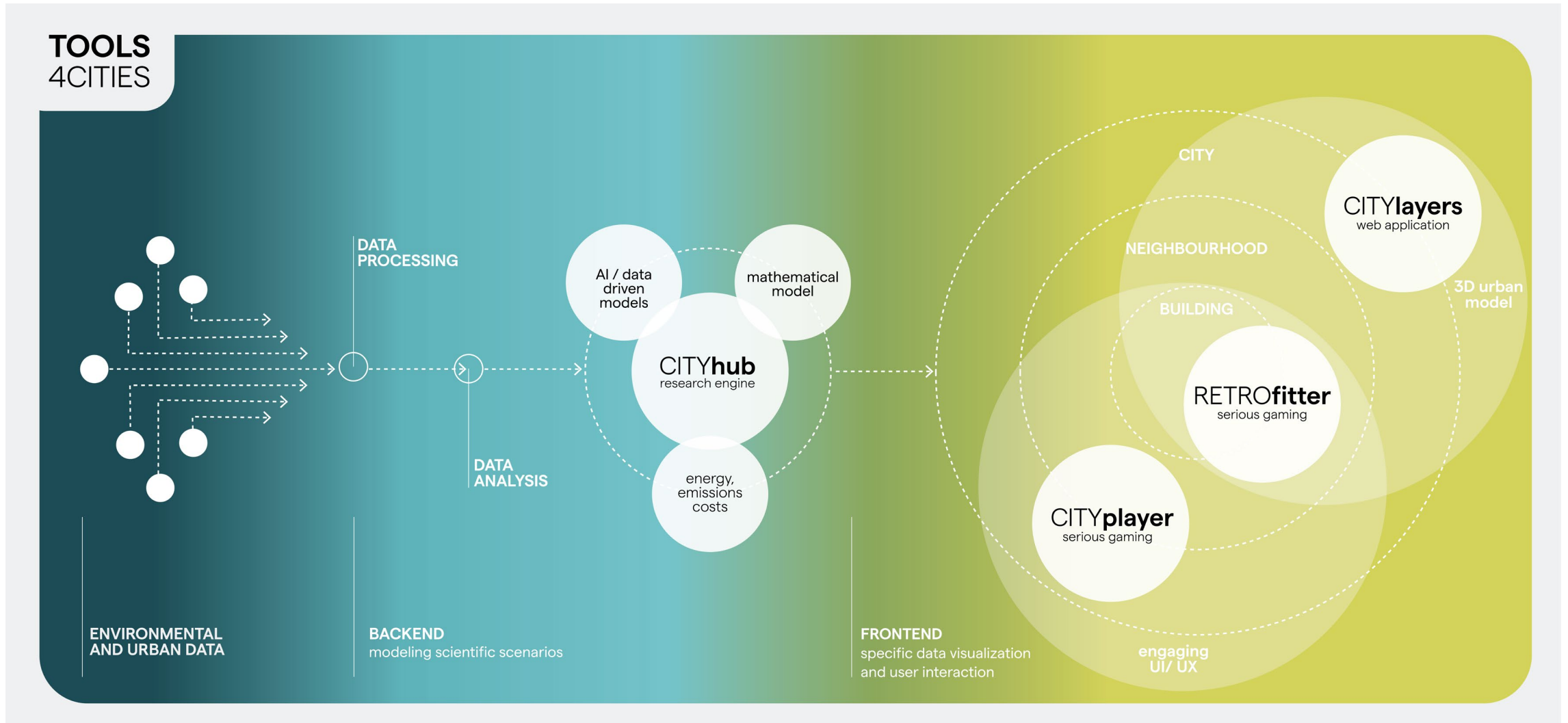
# TOOLS FOR MODELLING URBAN CHANGE

**TOOLS** CITYlayers  
4CITIES CITYplayer  
RETROfitter  
CITYhub

TOOLS4CITIES is a suite of complementary digital tools being developed to address urgent and difficult problems in the pursuit of sustainable cities around the world. From buildings to transportation, from citizens to local government, each tool is tailored towards a particular stakeholder whilst leveraging a common data model of the entire city.



# TOOLS4CITIES





# AUTOMATED ENERGY, COST & EMISSION CALCULATION

TOOLS CITYlayers  
4CITIES



Couches Services Workbench

Faisabilité du DHCN Info Bâtiments

Émissions du trafic Générateur IDF

Rénovation d'un Bâtiment

Rénovation Multi-Bâtiment

> Transport

> Energie

> Déchets

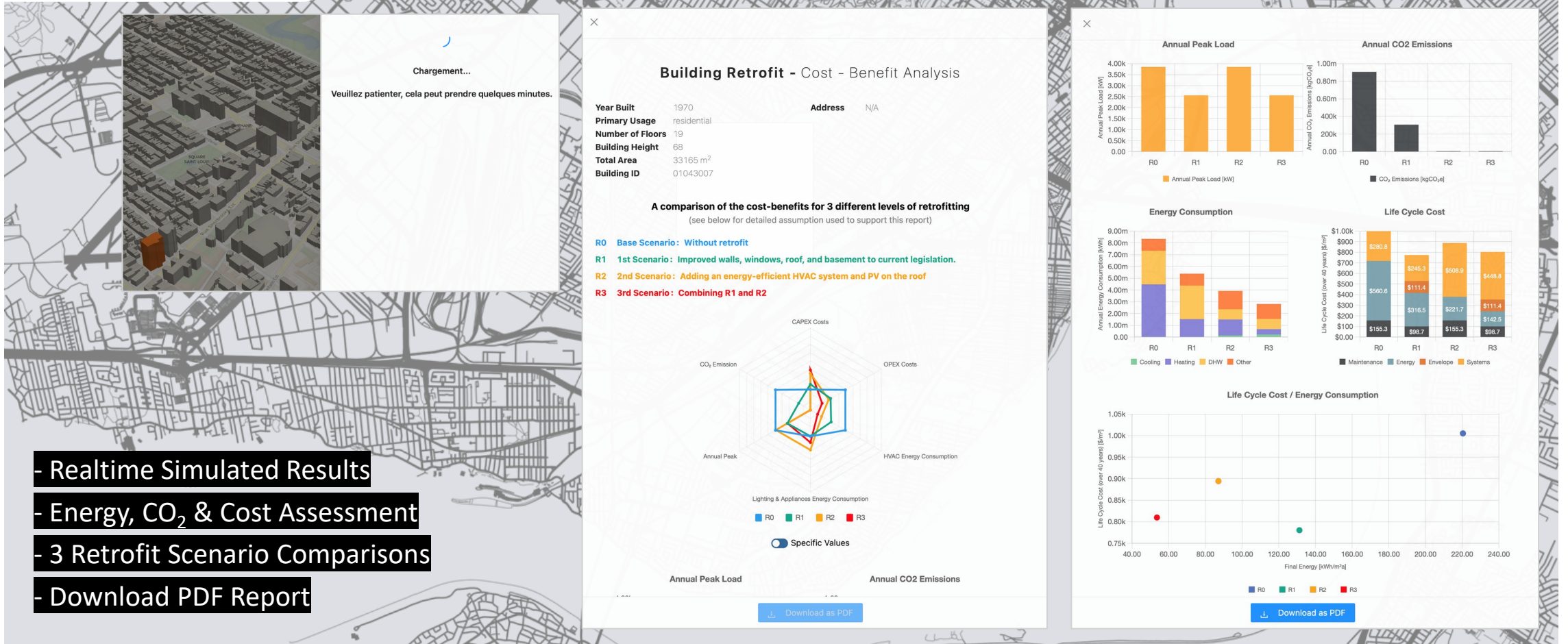
> Écosystème



# CITYlayers - SINGLE BUILDING RETROFIT ASSESSMENT

TOOLS  
4CITIES

CITYlayers



- Realtime Simulated Results
- Energy, CO<sub>2</sub> & Cost Assessment
- 3 Retrofit Scenario Comparisons
- Download PDF Report



# CITYlayers - MULTI-BUILDING RETROFIT STRATEGIES

TOOLS  
4CITIES

CITYlayers

SÉLECTIONNEZ DES USAGES

Assistance ⓘ Quitter ⌵

ANALYSE DE RÉNOVATION MULTI-BÂTIMENT

SÉLECTIONNEZ DES USAGES

Assistance ⓘ Quitter ⌵

|                                   |     |                                     |
|-----------------------------------|-----|-------------------------------------|
| Residential                       | 928 | <input checked="" type="checkbox"/> |
| Stand Alone Retail                | 81  | <input checked="" type="checkbox"/> |
| Medium Office                     | 42  | <input checked="" type="checkbox"/> |
| Dormitory                         | 34  | <input checked="" type="checkbox"/> |
| Secondary School                  | 15  | <input checked="" type="checkbox"/> |
| Event Location                    | 11  | <input checked="" type="checkbox"/> |
| Warehouse                         | 10  | <input type="checkbox"/>            |
| Non-Heated                        | 10  | <input checked="" type="checkbox"/> |
| Hotel                             | 9   | <input checked="" type="checkbox"/> |
| Small Hotel                       | 9   | <input checked="" type="checkbox"/> |
| Out-Patient Health Care           | 6   | <input checked="" type="checkbox"/> |
| Convention Center                 | 5   | <input type="checkbox"/>            |
| Strip Mail                        | 5   | <input checked="" type="checkbox"/> |
| Office And Administration         | 4   | <input type="checkbox"/>            |
| Industry                          | 4   | <input checked="" type="checkbox"/> |
| Primary School                    | 3   | <input checked="" type="checkbox"/> |
| <b>Nombre De Bâtiments : 1162</b> |     |                                     |

Confirmer La Sélection

- Select Contiguous Area
- Filter By Building Function
- Up to 10,000 buildings



# CITYlayers - MULTI-BUILDING RETROFIT STRATEGIES

TOOLS CITYlayers  
4CITIES



Assess CO<sub>2</sub>,  
Life-Cycle Costs,  
Energy Consumption  
for Base Case

**ANALYSE DE RÉNOVATION MULTI-BÂTIMENT**

**RÉNOVATION MULTI-BÂTIMENT - APERÇU**

Assistance ⓘ    Quitter ⌵

**Indicateurs**

|   |             |
|---|-------------|
| Emissions CO <sub>2</sub> (kgCO <sub>2</sub> e/m <sup>2</sup> ) | Cas de base |
| Coût du Cycle de Vie (\$/m <sup>2</sup> sur 40 ans)             | 17          |
| Consommation d'énergie (kWh/m <sup>2</sup> )                    | 1044        |
| <b>Total de bâtiments</b>                                       | 177         |
|   | <b>1079</b> |

Absolu     Relatif

Emissions CO<sub>2</sub> ▾

| Vintage | Pre 1900 | 1940-1960 | 1960-1980 | 1980-2000 | 2000-2020 | Post 2020 |
|---------|----------|-----------|-----------|-----------|-----------|-----------|
| Total   | 422      | 424       | 51        | 114       | 47        | 21        |

Retour
Suivant

2



# CITYlayers - MULTI-BUILDING RETROFIT STRATEGIES

TOOLS CITYlayers  
4CITIES



### ANALYSE DE RÉNOVATION MULTI-BÂTIMENT

### CRÉER UNE STRATÉGIE DE RÉNOVATION

Assistance ⓘ Quitter ⌵

| Indicateurs   | Cas de base | Strategie Rénovation 1 |
|---|-------------|------------------------|
| Emissions CO <sub>2</sub> (kgCO <sub>2</sub> e/m <sup>2</sup> ) | 17          | 11                     |
| Coût du Cycle de Vie (\$/m <sup>2</sup> sur 40 ans)             | 1044        | 1026                   |
| Consommation d'énergie (kWh/m <sup>2</sup> )                    | 177         | 137                    |
| <b>Total de bâtiments</b>                                       |             | <b>1079</b>            |

Relatif

Retour Fin

- Compare retrofit scenarios:
- Envelop only
- Energy system change only
- Both measures combined



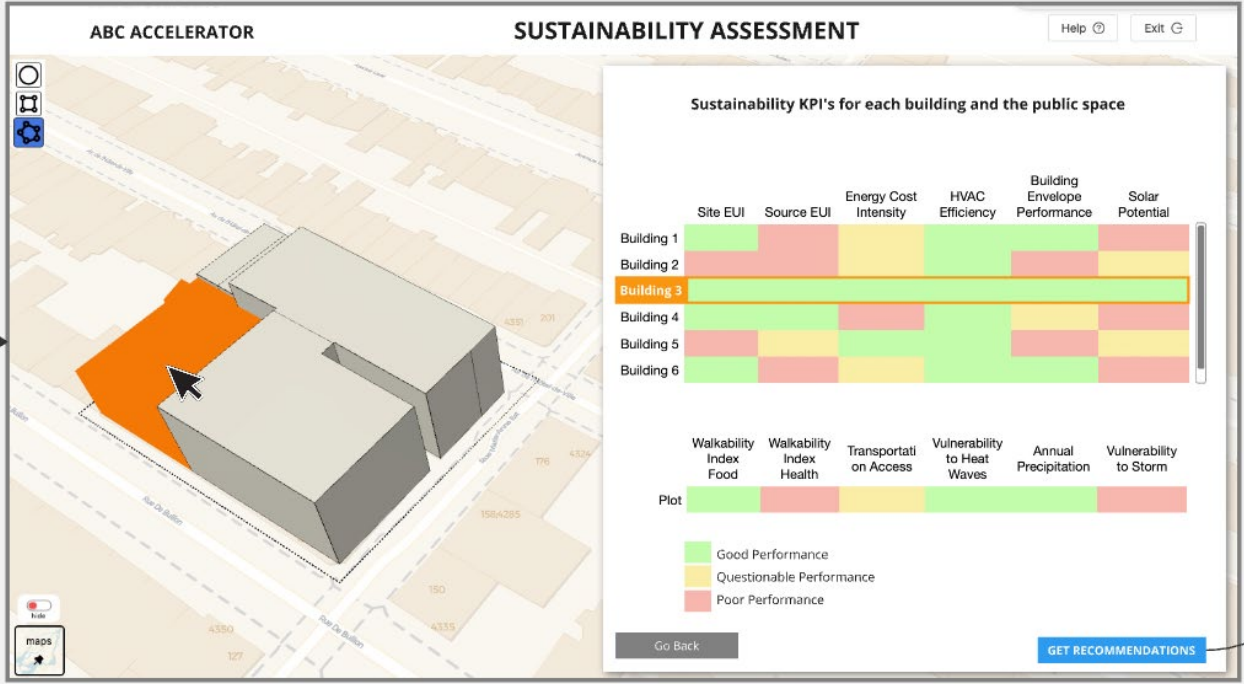
# CITYlayers - ABC ACCELERATOR



**ACCELERATOR  
FOR ZERO CARBON  
BUILDING PROJECTS**

**TOOLS** CITYlayers  
4CITIES

## 4 SEE SUSTAINABILITY ASSESSMENT



Service to assess co-benefits of retrofit solutions around buildings, public spaces and energy systems

# CITYlayers - ABC ACCELERATOR



**ACCELERATOR  
FOR ZERO CARBON  
BUILDING PROJECTS**

**TOOLS** CITYlayers  
4CITIES

5 SEE RECOMMENDATIONS

**ABC ACCELERATOR SUSTAINABILITY ASSESSMENT**

**PRIORITIZED RECOMMENDATIONS TO IMPROVE SUSTAINABILITY**

Energy Savings | Capital Expenditure | Environmental Impact | Social Impact

**MOST IMPORTANT** | **PRIORITARY** | **SOMEWHAT IMPORTANT** | **LEAST IMPORTANT**

| ALL | BUILDINGS                         | PUBLIC SPACE        | ENERGY SYSTEMS |
|-----|-----------------------------------|---------------------|----------------|
| P1  | Window Glazing                    | Building 1          | BUILDING       |
| P2  | Strong preparation for deliveries |                     | PUBLIC SPACE   |
| P3  | Green Roof                        | Building 1          | BUILDING       |
| P4  | Daylight Strategy - Ext Shading   | All buildings       | BUILDING       |
| P5  | Heat Storage                      | Buildings 3,4,5 & 6 | ENERGY SYSTEM  |
| P6  | Waste Water Heat Recovery         | Buildings 1,4 & 6   | ENERGY SYSTEM  |
| P7  | Draining Surfaces                 |                     | PUBLIC SPACE   |
| P8  | Shelter For Buses                 |                     | PUBLIC SPACE   |
| P9  | Window Glazing                    | Buildings 2 & 5     | BUILDING       |
| P10 | Advanced Certification            | Buildings 3,4 & 6   | BUILDING       |

**PRIORITIZED RECOMMENDATIONS TO IMPROVE SUSTAINABILITY**

Energy Savings | Capital Expenditure | Environmental Impact | Social Impact

**MOST IMPORTANT** | **PRIORITARY** | **SOMEWHAT IMPORTANT** | **LEAST IMPORTANT**

| ALL | BUILDINGS                                     | PUBLIC SPACE  | ENERGY SYSTEMS |
|-----|---|---------------|----------------|
| P1  | Window Glazing                                | Building 1    |                |
| P2  | Daylight Strategy - Ext Shading               | All buildings |                |
| P3  | Green Roof                                    | Building 1    |                |
| P4  | Strong preparation for deliveries             |               |                |
| P5  | Draining Surfaces                             |               |                |
| P6  | Shelters for Buses                            |               |                |
| P7  | Last Mile Waste Collection with Electric Vans |               |                |

**PRIORITIZED RECOMMENDATIONS TO IMPROVE SUSTAINABILITY**

Energy Savings | Capital Expenditure | Environmental Impact | Social Impact

**MOST IMPORTANT** | **PRIORITARY** | **SOMEWHAT IMPORTANT** | **LEAST IMPORTANT**

| ALL | BUILDINGS                                     | PUBLIC SPACE  | ENERGY SYSTEMS |
|-----|---|---------------|----------------|
| P1  | Window Glazing                                | Building 1    |                |
| P2  | Daylight Strategy - Ext Shading               | All buildings |                |
| P3  | Green Roof                                    | Building 1    |                |
| P4  | Strong preparation for deliveries             |               |                |
| P5  | Draining Surfaces                             |               |                |
| P6  | Shelters for Buses                            |               |                |
| P7  | Last Mile Waste Collection with Electric Vans |               |                |

**Prioritize recommendations**



# CITYlayers - ABC ACCELERATOR



ACCELERATOR  
FOR ZERO CARBON  
BUILDING PROJECTS

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ABC ACCELERATOR SUSTAINABILITY ASSESSMENT

Help ⓘ Exit G

RECOMMENDATIONS TO IMPROVE SUSTAINABILITY

Energy Savings Capital Expenditure Environmental Impact Social Impact

MOST PRIORITY PRIORITY SOMEWHAT IMPORTANT LEAST IMPORTANT

All  Buildings  Public Spaces  Energy Systems

|   |   |  |
|---|---|--|
| 5 | Eco responsible parking certification.  | #01042518, #01042517, #01042515, #01042479, #01042481, #01042498, #01042514, #05012199, #01042476, #01042482, #01042497, #01042512                       |
| 6 | Changing WWR per façade.                | #01111721, #01097321, #01042515, #01042479, #01042481, #01042498, #01042514, #05012199, #01042476, #01042482, #01042497, #01042512                       |
| 7 | Heat recovery from commercial premises. | #01042494, #01111721, #01097321, #01042518, #01042517, #01042515, #01042479, #01042481, #01042498, #01042514, #05012199, #01042476, #01042497, #01042512 |

Back

Co-benefits of retrofit solutions around buildings, public spaces and energy systems



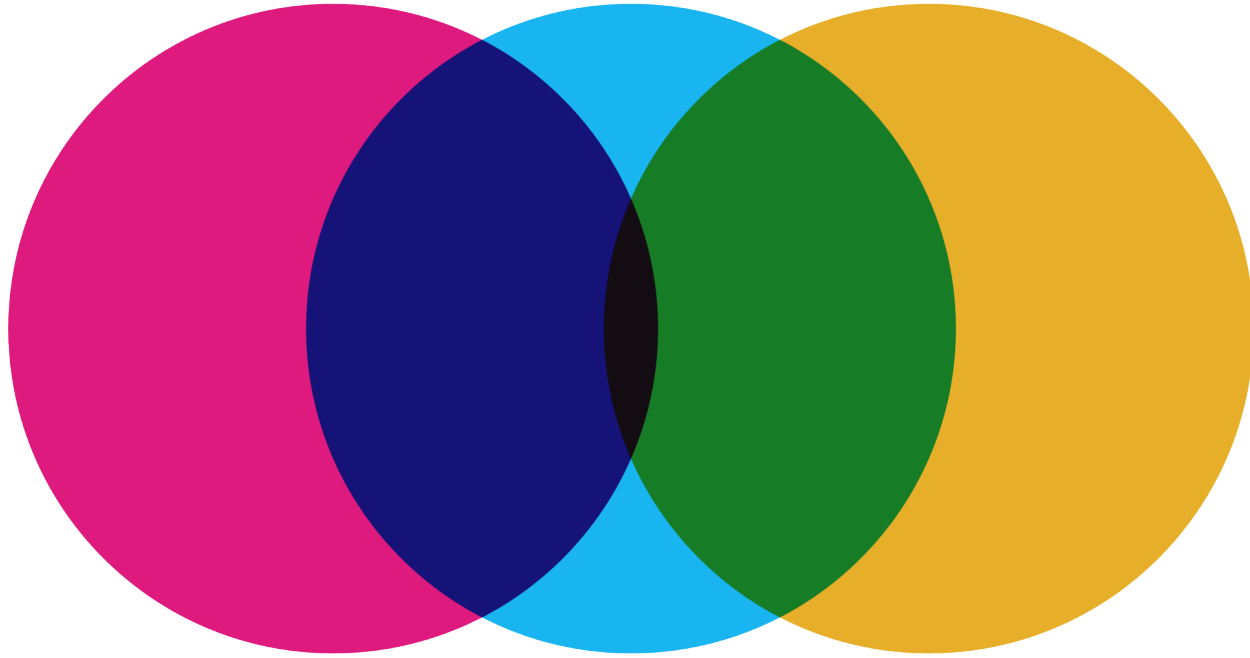
# CONCLUSIONS



**Reduce risk and show long-term cost savings using the automated retrofit calculator TOOLS4CITIES**

**Automatically assess the co-benefits for livability using the ABC accelerator tool in TOOLS4CITIES**

**Organize stakeholders to accelerate the implementation of larger-scale retrofit projects**



# COLLABORATION FOR IMPACT

*ursula.eicker@concordia.ca*

CONCORDIA



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# Questions?

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**What are the most important co-benefits of retrofit solutions, how can you integrate them into your retrofit? / Quels sont les avantages connexes les plus importants des rénovations écoénergétique, comment pouvez-vous les intégrer à vos projets?**

① Start presenting to display the poll results on this slide.



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**What can be a successful strategy to deploy and scale retrofit actions in your municipality? / Quelle serait une stratégie efficace de déploiement et de mise à l'échelle des mesures de rénovation écoénergétique dans votre municipalité?**

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**How can community benefits be maximized in a retrofit project with limited resources? / Comment les retombées locales peuvent-elles être maximisées dans un projet de rénovation écoénergétique assorti de ressources limitées?**

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What are three actionable steps you can take in the next **week, month, year** to help you incorporate multi-solving strategies into your building retrofit?

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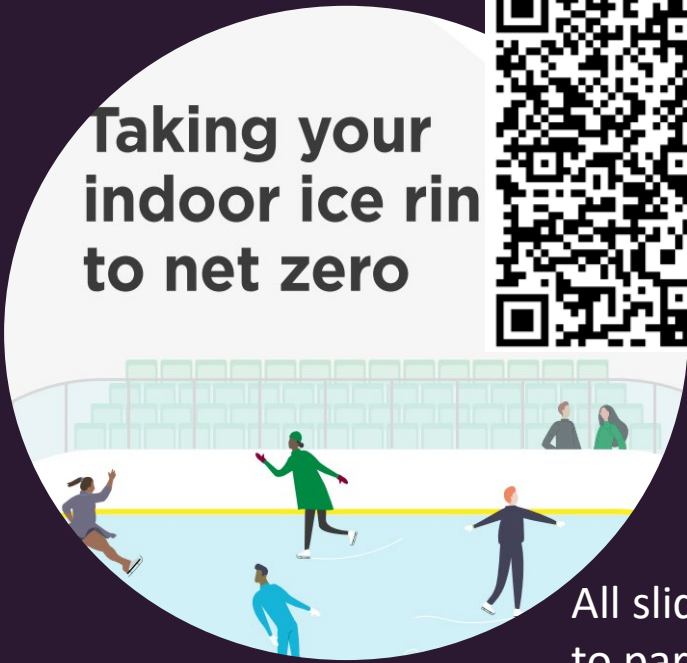
# Learn more

Building on the learning today, here are a few resources for you

[Read our guide for taking your ice rink to net zero](#)



Taking your indoor ice rink to net zero



[Check out our guide for taking your indoor swimming pool to net zero](#)



Taking your indoor swimming pool to net zero



All slide decks, worksheets and links are available to participants at [bit.ly/scc-learning](https://bit.ly/scc-learning)



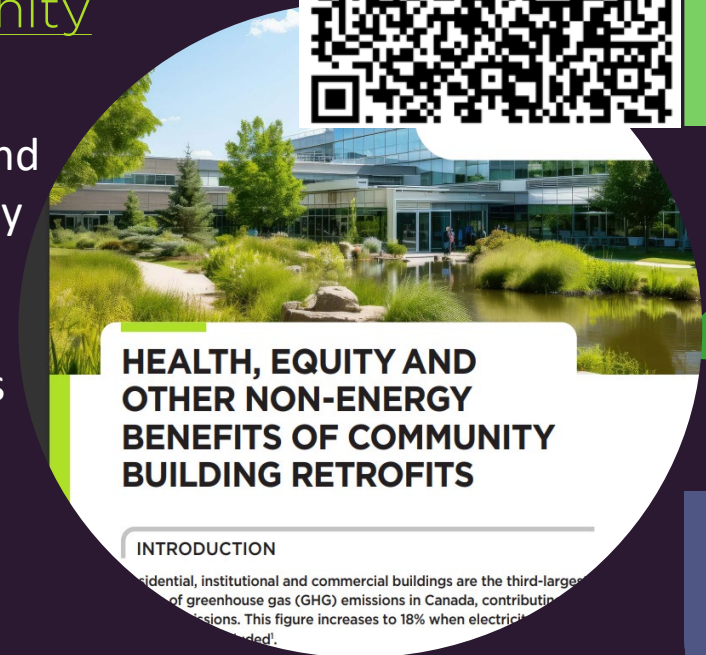
# Learn more

Building on the learning today, here are a few resources for you

- [GMF's Community Building Retrofit Factsheets](#)
- [Community Building Retrofit Advisory Service](#)
- [More information about the building upgrades happening in the City of Ottawa](#)
- [GMF's Guide: Equity and non-energy benefits of community building retrofits](#)



Health, equity and other non-energy benefits of community building retrofits



# Share your feedback

Please take out your phone



Scan this code

