



## EcoHack-a-City Calgary - Final Presentation Group 1



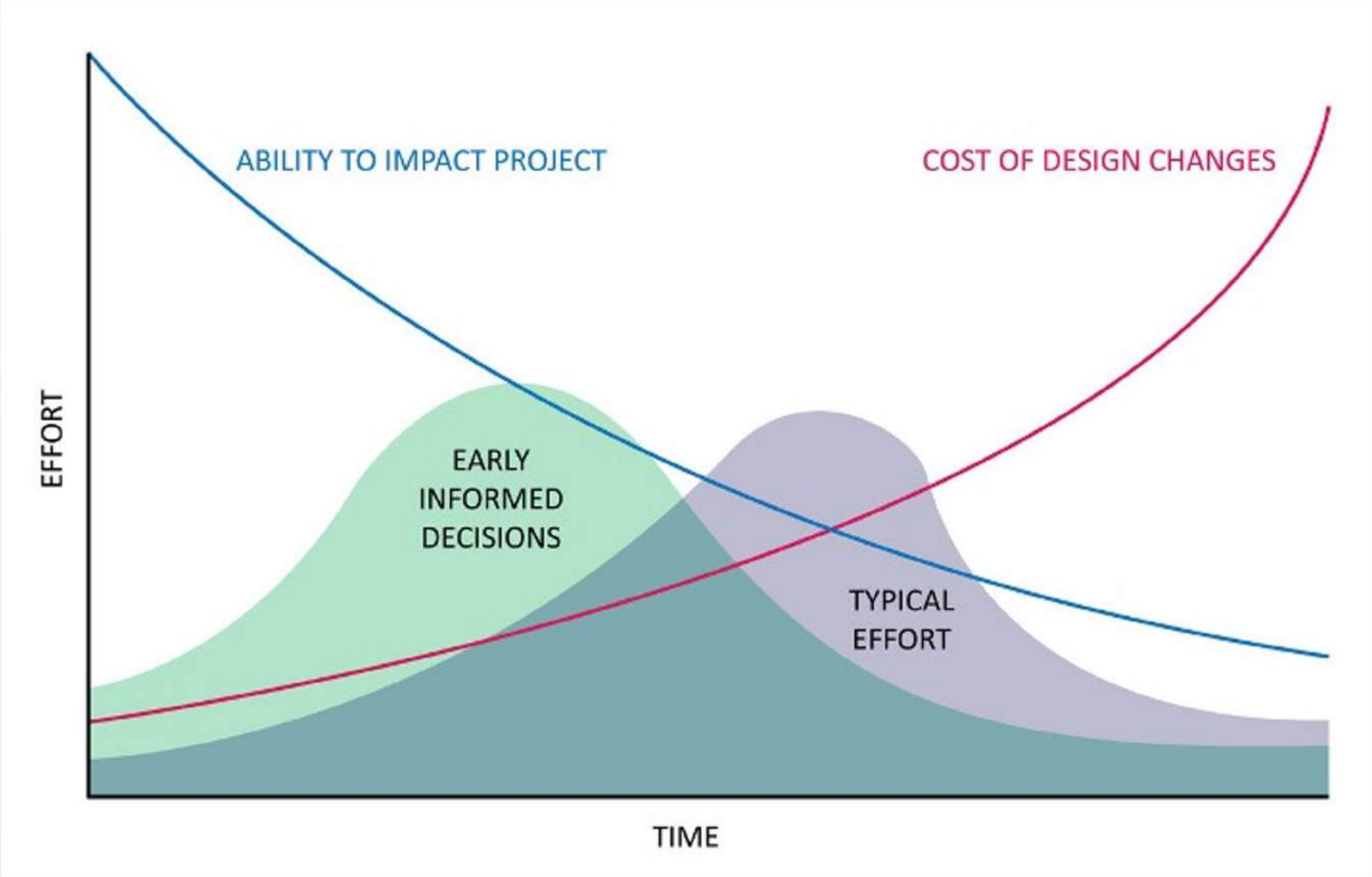
# THE CHALLENGE

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How do we accelerate the adoption of Deep Energy Retrofits (DER) of commercial high rise buildings in downtown Calgary in order to achieve the goal of net zero on-site operational carbon emissions by 2050, while also tracking and minimizing the embodied carbon of the Retrofits.

- The City of Calgary did not meet its 2020 reduction goals and is not currently on track to meet its 2050 goals.
- The current 30% vacancy in downtown office space provides an opportunity to perform the DERs with limited disruption to tenants, but also means the demand for space is currently low.
- All commercial buildings account for 30% of city-wide energy use but only represent 1% of the total number of buildings in the City, so a few buildings emit the most carbon.
- Commercial high-rise building owners are seeing the double impact for reduced rental income and increasing energy and maintenance costs from these older existing buildings.
- All Calgary residents are affected as high vacancy also means reduced property tax income for the city, which has to be made up by tax increases elsewhere.
- Residents and workers of these commercial buildings will be impacted positively or negatively depending on the renovations undertaken.

# THE CURRENT SOLUTIONS THAT ARE AVAILABLE



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## METHODOLOGIES/PLATFORMS/DATA

- Passive House, Net Zero, LEED, etc. – 20 years of data, we are not pioneers
- Use what exists – Do not re-invent
- Change enablement/Knowledge accelerator/Multi-stakeholder – ZebX
- Pilot/Demonstration projects

## TEAM SELECTION

- Procurement & pre-qualification
- Valued based selection
- Early selection of key stakeholders

## DESIGN & PLANNING

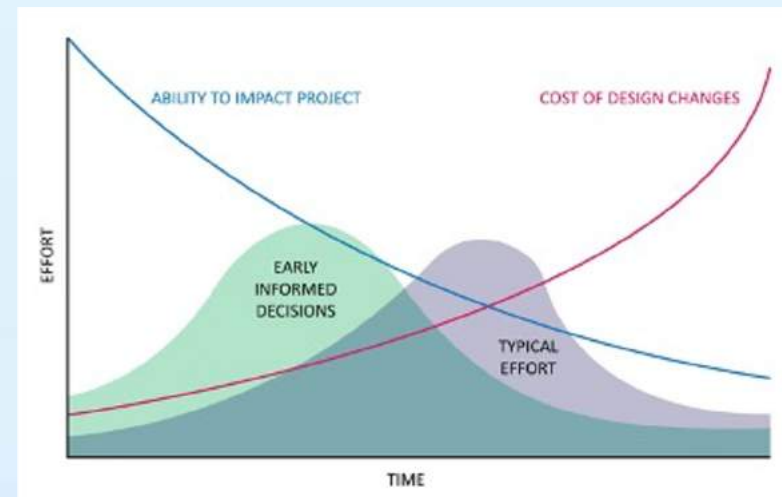
- MacLeamy Curve
- Integrated, collaborative, Team-based design
- Non-sequential, joint decision making
- Target cost design

## PROJECT DELIVERY

- Integrated Project Delivery (IPD) - Transparent, shared risk/reward
- Results based best for project thinking

## CONTINUOUS LEARNING & IMPROVEMENT

- Result tracking
- Capture and publish best practices
- Open source



# THE GAPS THAT EXIST AND WHO/WHAT IS PRIMARILY IMPACTED? WHAT IS THEIR SPECIFIC NEED?

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What is missing to solve this?

## GAPS

### 1. City of Calgary

- a. Short term: lack of legislative tools at the municipal level to affect substantial change – Our available options are actively being investigated
- b. Leadership: We need to innovate and fail fast so that we can generate inertia in the right direction.

### 2. Owners/Builders/Consultants

- a. Values of existing assets are falling
- b. “Incentives” to build building of yesterday
- c. The sector responds to market demand so demand needs to be encouraged
- d. Lack of a coordinated approach to skills development (Polytechnic, Universities, and continued education)

### 3. Users/Citizens

- a. Lack of understanding of the benefits of building to zero-emissions standards (why is it important and what role does it play in achieving future climate goals, potential financial returns, resale value)

# WHAT ARE THE IMPACT ZONES (1 TO 3) TO ACT ON IN THE NEAR FUTURE? AND WHY?

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1. Demonstration Project(s) - The City of Calgary needs to partner with industry in the development of projects that integrate ZEB targets early in the design/development process.
  - a. City is building more “integrated civic facility sites”
  - b. Benefit of practicing with new development approaches like “integrated project delivery”
  
1. Standardization - Development of standards through the demonstration projects, including
  - a. Scopes of work for master planning
  - b. Changes in the information that is presented to Planning Commission
  - c. Standard targets and goals for Energy Use Intensity, Thermal Energy Demand Intensity (TEDI), National Energy Code for Buildings (NECB), that is scalable to different building archetypes etc.
  - d. Procurement methods for onboarding the “best team” to help achieve the goals in an integrated fashion
  
1. Resources - AB version of BC’s Zero Energy Building Exchange (ZEBx)
  - a. A platform to share lessons learned and exchange ideas, successes, challenges, building practices, etc.

## OUR KEY LEARNINGS DURING THE PROCESS (AND HOW WE CAN USE IT IN OUR FUTURE WORK)

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The new City of Calgary council has started the inertia towards energy efficient and low carbon emitting buildings by declaring a “Climate Emergency”. Now is the time to increase this inertia.

- Now is the time for the City of Calgary to act as a leader and set the new norm for downtown commercial high-rise buildings through the implementation of step codes, incentive programs rewarding innovation, and educational programs.
- It will be key for the City of Calgary to lead a successful DER project and summarize it in a business case that could be used to showcase the benefits of this project.
- By showing leadership in this area, other building types and owners and organizations will be able to better access the knowledge, funding and technology to follow suit and continue the momentum of achieving net zero on-site operational carbon emissions.
- This action should act as a catalyst and accelerator for cities across Canada to work towards the same goal.



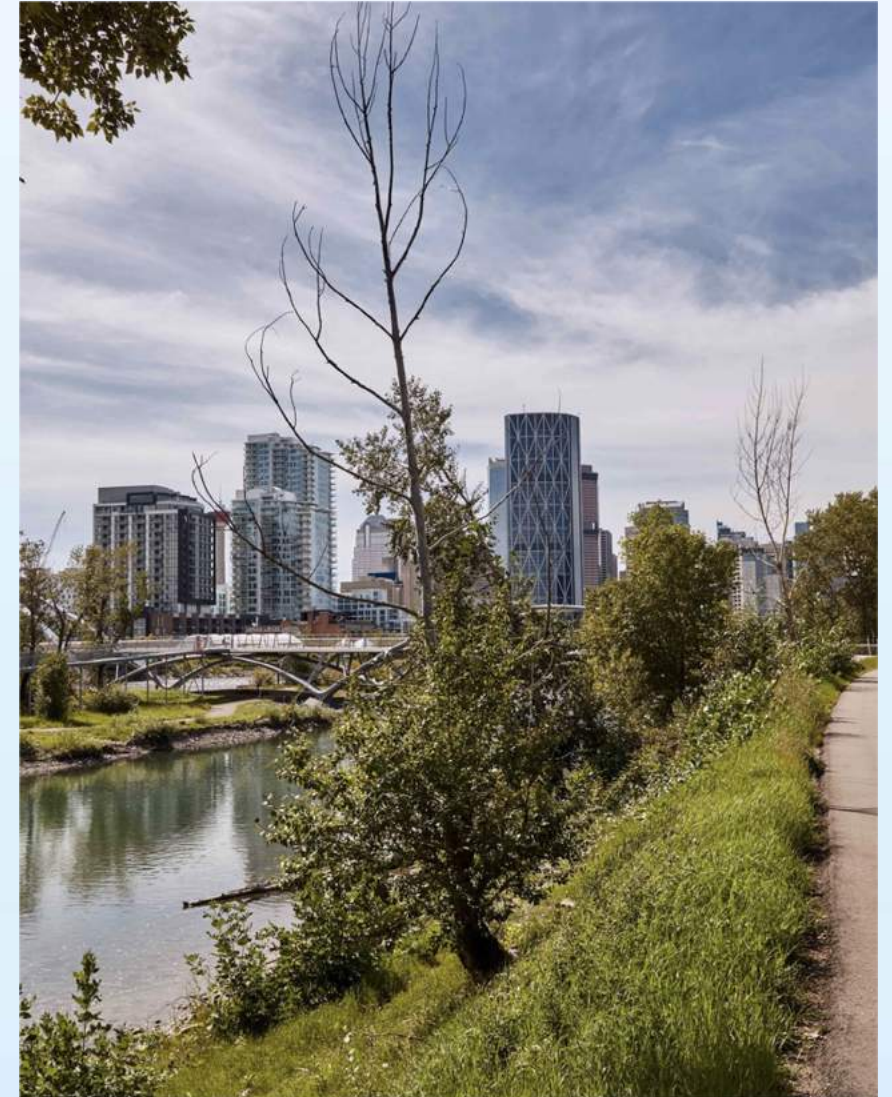
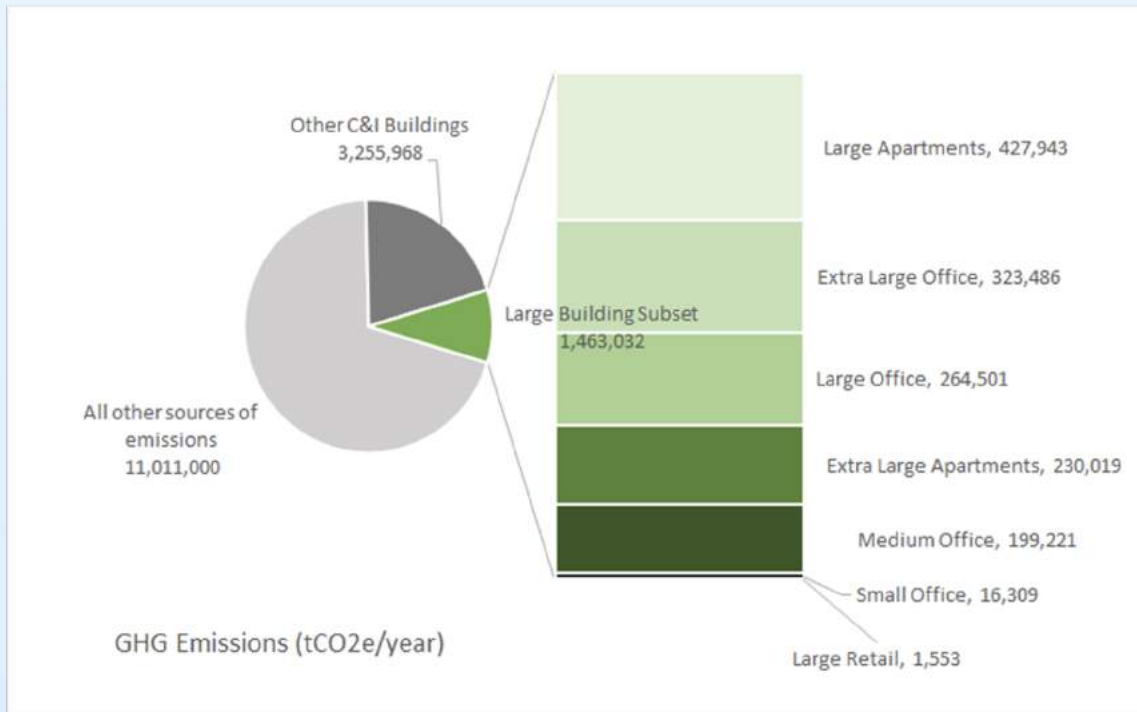
**EcoHack-a-City Calgary - Final Presentation Group 2**





# THE CHALLENGE

*How might we achieve deep retrofits in the commercial high rise building sector (including mix use commercial/residential) across Calgary to reach net zero buildings by 2050?*



# THE CURRENT SOLUTIONS THAT ARE BEING TRIED



- 2030: 35% less GHG fr buildings
  - all new buildings net zero Op's.
  - 40% less GHG's in construction
- 2050: All buildings net zero. All new carbon neutral
- [Zero Emissions Building Plan](#),  
[Green Home Retrofit Plan](#)

**energie  
sprong**

## [Energiesprong](#)

- Netherlands program for deep energy retrofit of residential and commercial properties
- Federal government funded, set standards, provided supportive legislation

## [Transform TO](#)

**2050: Reduce All Building emissions to net zero**

- **Nine Policy Actions**

- 1. Benchmarking**

- a. Require** annual emissions performance reporting and public disclosure
- b. Establish emissions performance targets**

- 2. Require** energy and emissions audits and tune-ups

3. Provide supports to **reduce the complexity**, costs and time

4. Expand and enhance **retrofit financing**

- 5. Streamline the permitting** and approval processes for deep retrofits

- 6. Build awareness** and capacity of home and building owners to undertake emissions reduction measures

7. Support **workforce development** and training

- 8. Advocate and partner** with other orders of government to ensure appropriate authorities and funding



# THE CURRENT SOLUTIONS THAT ARE BEING TRIED

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## Retrofit Accelerators

- [Edmonton](#)
- [Toronto Atmospheric Fund](#): Green Municipal fund, IESO, CMHC, NRC

## Education Resources

- [Canadian Institute for Energy Training](#)
- [CaBGC Decarbonising Large Buildings Report](#)
- [Role of Buildings in the energy transition](#)
- [Benchmarking Higher Education Buildings](#)

## Building Performance Standards

- [Energy Star](#)      [Net Zero](#)  
[Passiv Haus](#)      [CaGBC \(LEED\)](#)
- **Benchmarking Performance:** BMS, BAS, Electrification, Digitisation, AI facilitates systematic performance improvement

## Funding & Sustainable Finance

- [TCFD](#) Reporting requirements
- Government of Canada: [Green Municipal Fund](#), [Greener Homes Grant](#)
- [Canada Infrastructure Bank](#)
- [COP 26 Net Zero Banking Alliance](#)
  - Green Bonds, Sustainability Linked Loans
- **Building Owners:** Canada Pension Fund through Oxford, Insurance Companies, Brookfield, Ivanhoe Cambridge

## Case Studies

- [Retrofit Canada](#) Sundance Housing Co-op Edmonton (NRCan funded)

# THE GAPS THAT EXIST AND WHO/WHAT IS PRIMARILY IMPACTED? WHAT IS THEIR SPECIFIC NEED?

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- **Building owners without the financial resources or know how to advance retrofits**
  - Need income/profits while doing retrofits
  - ROI isn't there particularly for older building stock, harder to see long term benefits
  - Commercial properties that are less profitable may be left behind
  - Lack of knowledge of where to start [Energy audits and engineering studies (time and cost)]
- **Tenants in Buildings (includes local and small business owners)**
  - Where do they go while retrofits are happening?
  - Need a place to maintain business operations with limited disruptions
  - May see an increase in costs (rent, Common Area Maintenance) to offset the capital needed for the retrofits
  - Could benefit from early involvement in the retrofit process to plan for impacts and potential costs
  - Limited by their leases
- **City's Climate Team**
  - Limited resources invested to do this work, and a lack of time (2050 is fast approaching)
  - Resistance from industry
  - Will commercial owners leave if regulations are "too difficult" to implement

# WHAT ARE THE IMPACT ZONES (1 TO 3) TO ACT ON IN THE NEAR FUTURE? AND WHY?

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## **Benchmarking as Storytelling**

- City of Calgary's benchmarking program
- Sustainable Campus Collaborative

## **Shift Mindsets Through Education**

- Building Owners / Operators
- City Council and internal champions at the city

## **Demonstration Project / Local Case Study**

- Borrow a case study from another jurisdiction
- Identify current work in this area in Calgary

# OUR KEY LEARNINGS DURING THE PROCESS (AND HOW WE CAN USE IT IN OUR FUTURE WORK)

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## **EcoHack Challenge: How to Deep Retrofit Existing Buildings to Achieve Net Zero Emissions by 2050**

- At the largest scale, the scope and scale of the challenge touches on many aspects of our society - environment, social, economic, government, private sector, institutions, supply chain, and community.
- We realized that we did not have the knowledge for a clear process template for retrofitting buildings.\*
- It is not certain that the skilled tradespeople to execute the retrofits are available in Alberta.\*
- We need to demonstrate potential through a deep retrofit project, which can serve as a case study in Calgary. This would help to leverage public, private, and institutional cooperation throughout all phases of the project - initiation/funding, design, procurement, construction, and ongoing operation and maintenance.
- The largest barrier appears to be timely access to funding at the scale required to achieve 2050 GHG emission targets.

# OUR KEY LEARNINGS DURING THE PROCESS (AND HOW WE CAN USE IT IN OUR FUTURE WORK)

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## Design-Thinking Methodology

- The phased process of defining the challenge, then identifying solutions and impacts allows for a deep dive into all of the aspects that should be addressed to appropriately solve the challenge.
- The process was a bit messy and chaotic at times, emphasizing that defining terms and constraints is important. Related to that, it was very helpful to identify what we do and don't know at this stage.\*
- It is very beneficial to have a facilitator who is knowledgeable in both the challenge area and design-thinking methodology.
- Using Mural combined with video chat allows for capturing and sharing knowledge, with a relatively comfortable environment for brainstorming.
- Short time frames limit input.
- It is useful where the facilitator writes contributions on the sticky notes, to use the actual participants' words.