

Markham Centre Community Energy Plan

July 5 2023

SSG

The Climate Crisis

An aerial photograph showing a concrete bridge that has collapsed into a river. The bridge is tilted and partially submerged, with thick white smoke rising from the wreckage. The surrounding area includes a road with guardrails, trees, and a rocky shoreline. The sky is clear and blue.

Communications
Nova Scotia

Agenda

1. The Community Energy Plan
2. Findings
3. Recommendations
4. Risks

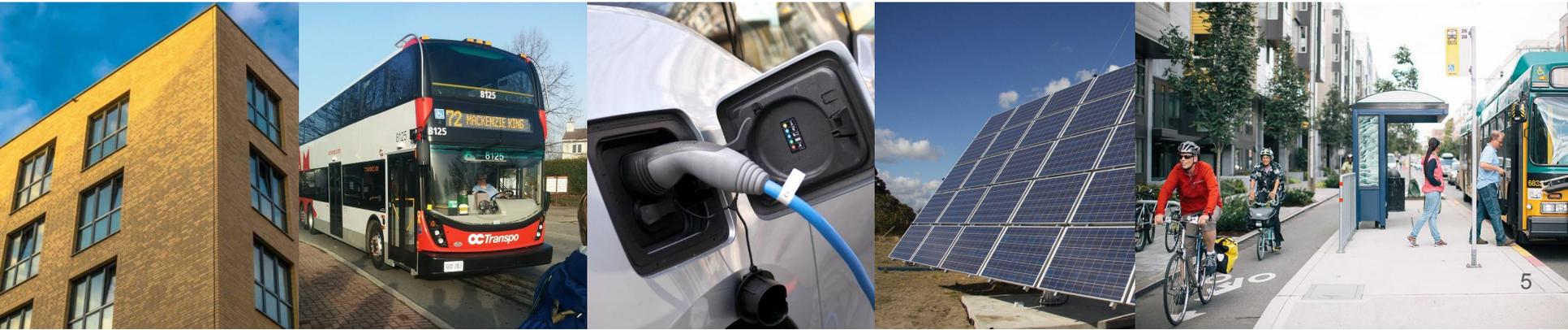


1. The Community Energy Plan

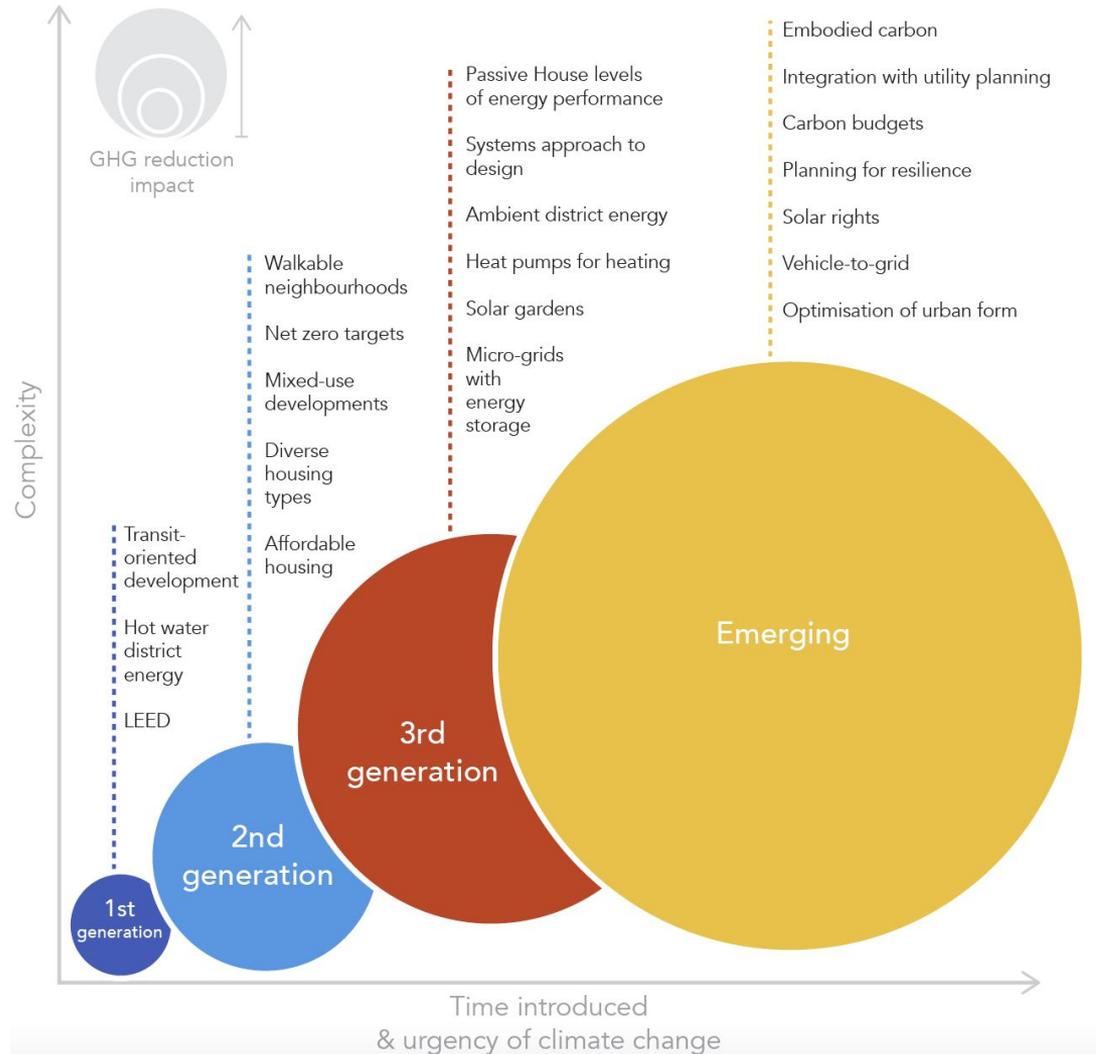
Community Energy Plan

Purpose

- Evaluate the impact on energy and GHG emissions
- Seek alignment with the Municipal Energy Plan.
- Evaluate sectors including buildings, land-use, energy and transportation.



Net Zero Emissions Future Proofing

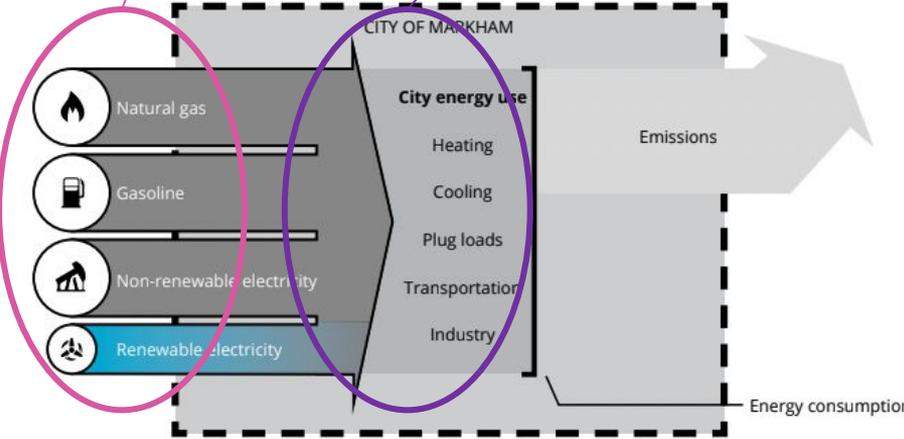


The Energy Transition

Fossil fuels

Total energy

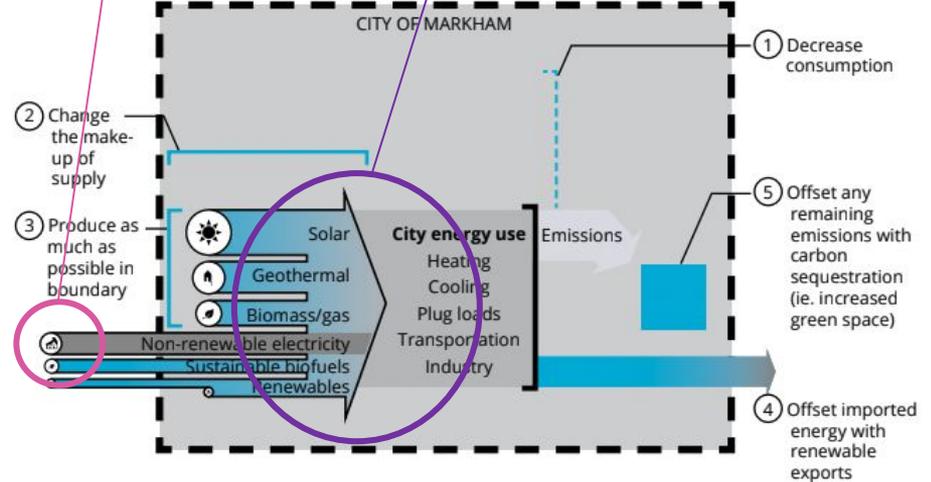
1a. CURRENT STATE (2016)



Fossil fuels decline

Total energy declines

1b. NET ZERO ENERGY & EMISSIONS (2050)



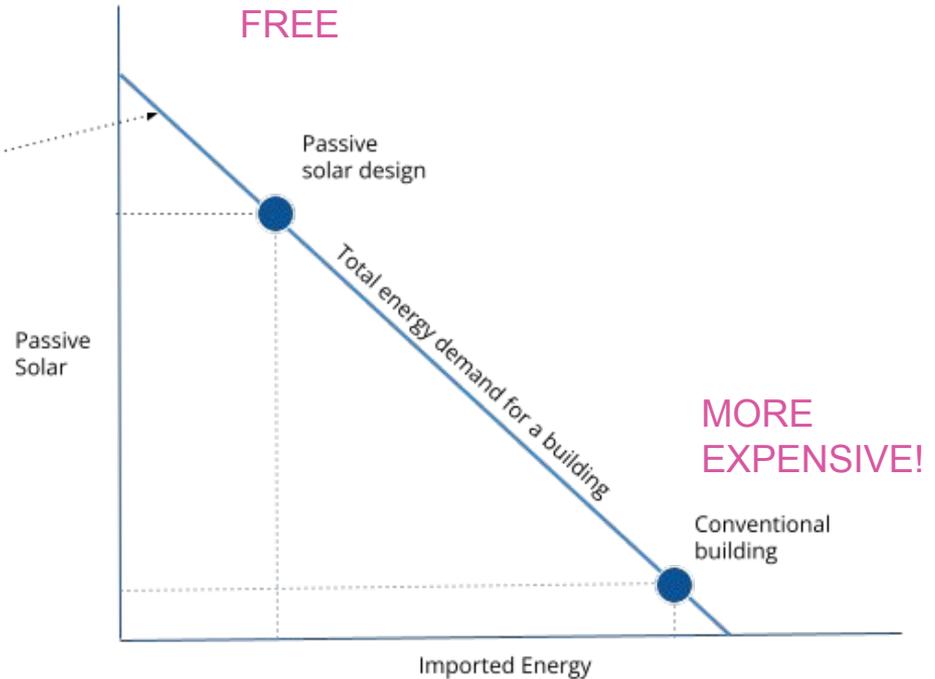
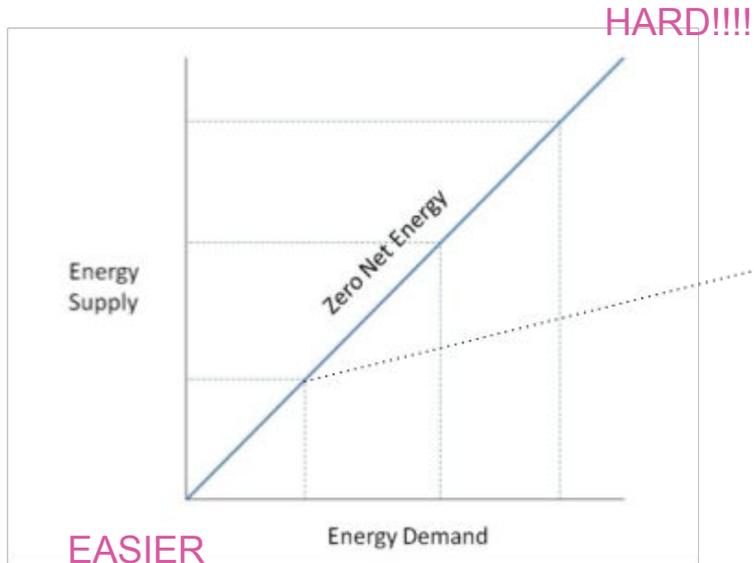
Under current plans Markham Centre will generate nearly 200,000 tCO₂e of emissions for buildings and transportation by 2050.

2. Findings

We identified opportunities to reduce GHG emissions by **88%**, energy consumption by **67%** and energy expenditures decrease by **58%**.

Urban Form

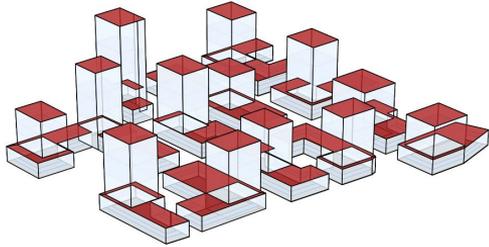
Solar Optimisation



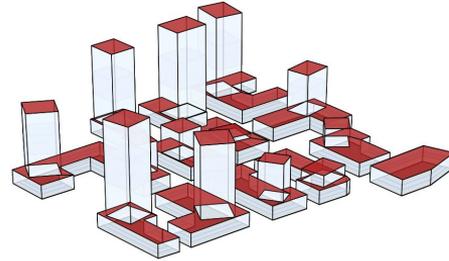
Urban Form

Access to Sun





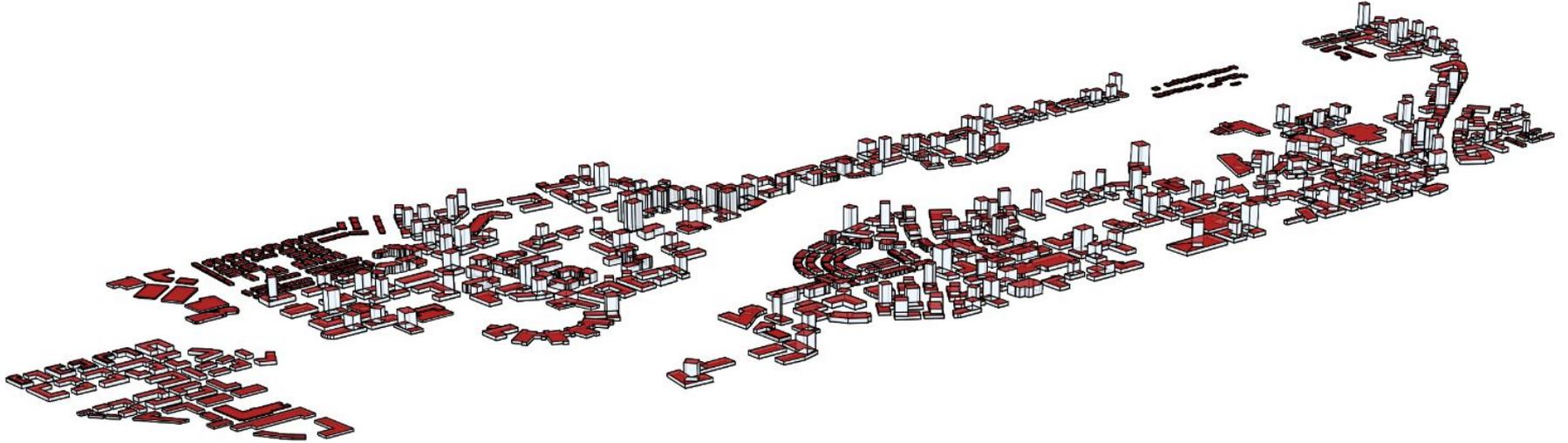
Baseline
Solar Gain:
39,623 MWh



Optimization Run
Solar Gain:
43,249 MWh
+8.38%

Optimised Urban Form

Access to Sun



3. Recommendations

Solar

1. Ensure the configuration of buildings in Markham Centre **optimizes solar harvesting**
2. Develop a **solar access bylaw** for Markham Centre
3. Require that all **new construction is net zero emissions**, with **Passive House** levels of energy performance.
4. Incorporate **passive solar design into the secondary plan and require a passive solar analysis** as a building permit submission.

Transportation

4. Embed the principle of **compact, complete communities** into land-use policies in the Secondary Plan and use a transect analysis for design and evaluation purposes.
5. Deploy **on-street EV charging** in Markham Centre
6. Require **charging infrastructure for new residential parking**
7. Develop and implement a **vehicle-to-grid charging system**

Buildings

9. Develop urban design guidelines for energy and climate performance
10. Develop a zero combustion bylaw for Markham Centre

Innovation

11. Develop a **zero emissions construction pilot**
12. Require an **embodied carbon report for large buildings** and introduce embodied carbon requirements
13. Require the use of **low carbon concrete** in new construction
14. Develop a **24/7 Carbon Free Electricity** strategy for Markham Centre with the energy utilities

Energy

15. Introduce a **mandatory DE connection bylaw** with specifications for building design to enable low temperature/ambient temperature systems.

16. Require that MDE in Markham Centre be **zero emissions by 2035**.

17. Require the installation of **rooftop solar systems** and encourage the installation of BIPV for new construction.

18. Develop **a microgrid** in Markham Centre

Integration into the Secondary Plan

Objectives	Requirements	Initiatives
<ol style="list-style-type: none">1. Complete, compact communities2. Solar harvesting3. Zero combustion zone4. High performance buildings5. EV infrastructure (private and public charging)6. 24/7 Clean Energy including microgrids and district energy7. Zero emissions district energy	<ol style="list-style-type: none">1. Embodied carbon2. High performance construction3. Passive solar design4. Solar PV installations5. Connection to zero emissions district energy6. EV charging stations	<ol style="list-style-type: none">1. Zero Emissions District Energy2. Microgrid3. EV Infrastructure4. Integrated utility and land-use planning

4. Risks

Risks

Doing Nothing

Risk	Overall Risk
Stranded assets	Very high
Reputation is negatively impacted	High
Vulnerability to energy price shocks	Very high
Infrastructure damage from extreme weather	High
Cumulative energy expenditures are greater than they would be under strategy implementation	Moderate
GHG emissions increase or stabilize	Very high
Operational costs increase	High

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