



# On the Path to Net-Zero Communities: Integrating Land Use and Energy Planning in Ontario Municipalities

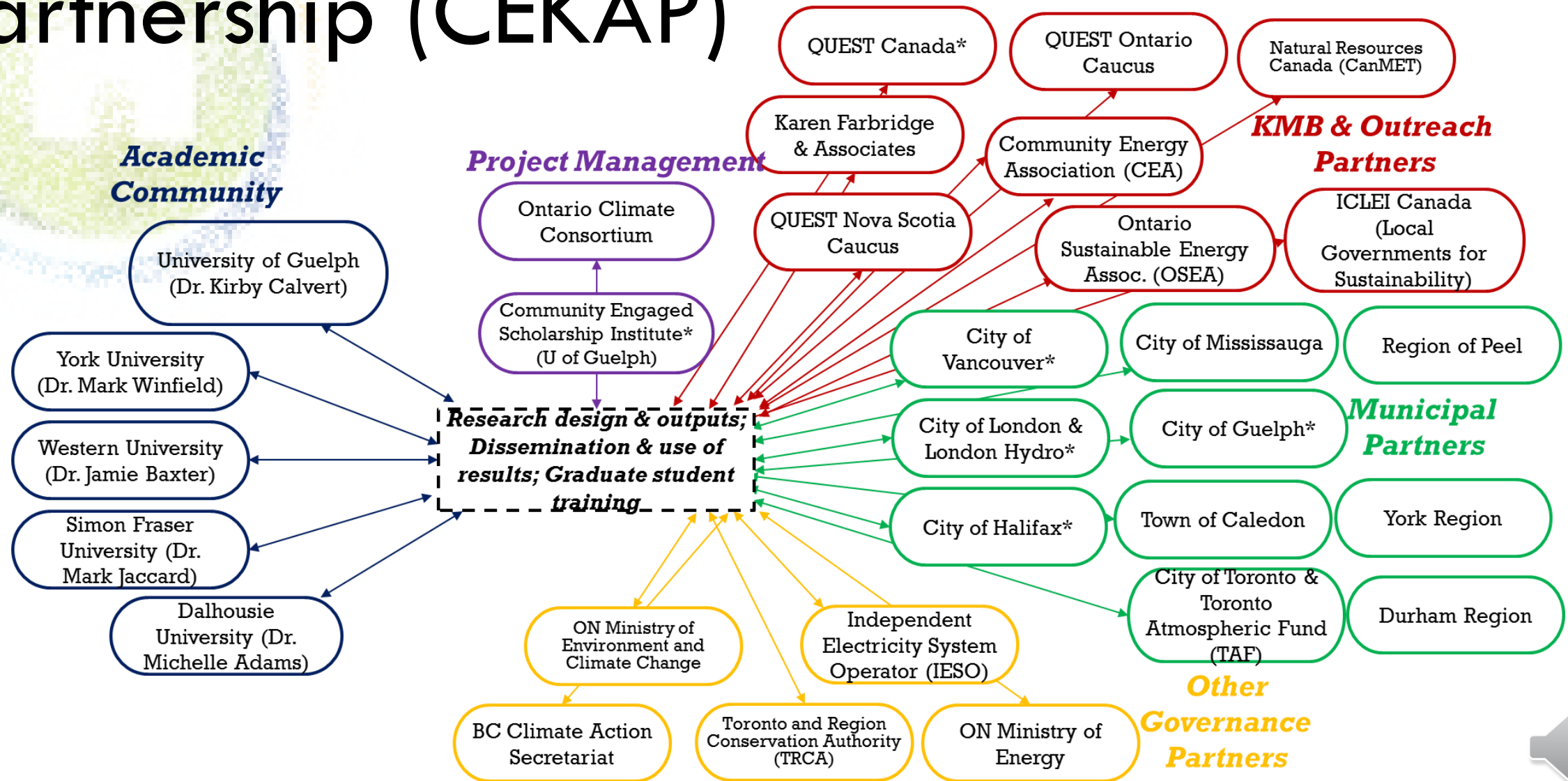
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## **Presentation to:**

Clean Air Council  
May 26, 2017

# Community Energy Knowledge Action Partnership (CEKAP)



# Presentation Overview

Part 1:  
Project Context,  
Objectives and  
methodology

Part 2:  
What *should* 'net-  
zero' mean?

Part 3:  
How is 'net-zero'  
defined and  
approached in  
Ontario's planning  
policy framework?

Part 4:  
How has/is  
municipal  
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enabling (or not)  
net-zero  
developments?

Part 5:  
Recommendations



# Project Context

- Ontario's energy and carbon transition
- Buildings sector – particularly in a new-development context - will likely need to overachieve relative to other sectors where energy and emissions are “fixed”
- Government policy & planning indicates objective of “net zero communities”
  - Climate Change Action Plan (2016-2020)
  - Growth Plan for the Greater Golden Horseshoe (2017)
- NZ communities implies role for municipal land use planning and local energy utilities





# Objective and methodology

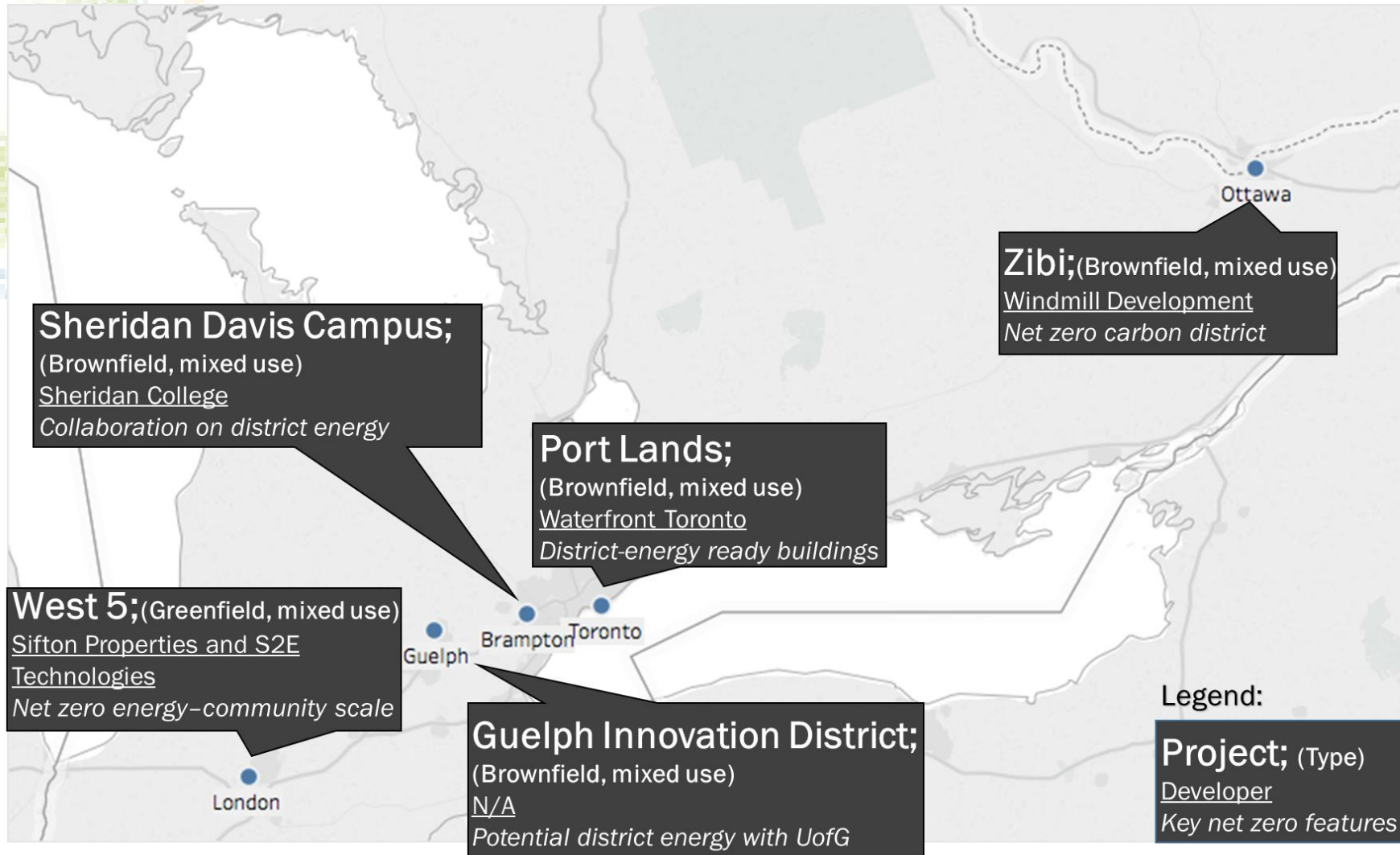
- **Objectives:**

1. Develop a practical definition of net-zero that is applicable to the (Ontario) municipal sphere of influence
2. Evaluate the role of municipal policy & planning in facilitating net-zero community development

- **Methodology:**

1. 5 case studies of Ontario municipalities with “net-zero” developments either proposed or in-progress
2. Desk-top review of net-zero definitions

# Case Studies





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# The 'net-zero' concept: from theory to practice

NET-ZERO ENERGY LEDGER			
Energy consumed		Energy Produced	
	Heat	Heat	
(+)	Residential	Renewable fuels	(-)
(+)	Commercial		
(+)	Industrial		
		Direct renewable heat	(-)
	Electricity	Electricity	
(+)	Residential	Renewable fuels	(-)
(+)	Commercial		
(+)	Industrial		
		Direct renewable electricity	(-)
	Transport	Transport	
(+)	Individual	Renewable fuels	(-)
(+)	Commercial		
		Direct renewable electricity	(-)
100	Sub-total	Sub-total	100
Energy consumed – Energy produced = 0			

## Benefits:

- Enhanced energy security
- More local economic development
- Greater certainty in cost of energy
- More efficient energy services
- Implies emissions reductions

NET-ZERO CARBON LEDGER			
Greenhouse Gases Emitted		Greenhouse Gases Sequestered	
(+)	Electricity Generation	Conservation areas	(-)
(+)	Heating	Urban forests	(-)
(+)	Transport	Agriculture	(-)
(+)	Agriculture	Carbon capture and storage	(-)
(+)	Other	Other	(-)
100	Sub-total	Sub-total	100
GHG emitted – GHG sequestered = 0			

## Benefits:

- Mitigates climate change
- Encourages more green / open spaces
- Improves local air quality
- Implies more local, renewable energy and its benefits
- Implies more efficient, less costly energy services





# Alphabet Soup

Low-Carbon Community

Carbon Neutral Building

Net-Zero Energy Community

Near Net-Zero Carbon Community

Net-Zero Carbon Building

Carbon Neutral Community

Net-Zero Carbon Community

Net-Zero Site Energy Community

Net-Zero Energy Building

Net-Zero Energy Cost Community

Net-Zero Energy Cost Building

Net-Zero Site Energy Building

Near Net-Zero Community

Near Net-Zero Building

Net-Zero Source Energy Building

Net-Zero Source Energy Community

Near Net-Zero Carbon Building



# Alphabet Soup - Decoded

## ***PRIORITY***

Net-Zero Source Energy Building  
Near Net-Zero Energy Building  
Net-Zero Site Energy Building  
Net-Zero Energy Cost Building  
Net-Zero Energy Building

Carbon Neutral Building  
Net-Zero Carbon Building  
Near Net-Zero Carbon Building

## ***SCALE***

Net-Zero Energy Community  
Net-Zero Site Energy Community  
Net-Zero Source Energy Community  
Net-Zero Energy Cost Community  
Near Net-Zero Energy Community

Net-Zero Carbon Community  
Carbon Neutral Community  
Low-Carbon Community  
Near Net-Zero Carbon Community



# Alphabet Soup - Decoded

SCALE	<b>PRIORITY</b>		<b>SCOPE</b>	
	Net-Zero Energy Building Near Net-Zero Energy Building Net-Zero Energy Cost Building		Net-Zero Carbon Building Near Net-Zero Carbon Building	
	Net-Zero Source Energy Building Net-Zero Site Energy Building		<b>BOUNDARIES</b>	
	Net-Zero Energy Community Net-Zero Energy Cost Community Near Net-Zero Energy Community		Net-Zero Carbon Community <b>SCOPE</b> Low-Carbon Community Near Net-Zero Carbon Community	
	Net-Zero Site Energy Community Net-Zero Source Energy Community		<b>BOUNDARIES</b> Carbon Neutral Community	





# 4 Dimensions of Net-Zero Definition

Dimension	Consideration
Priorities	energy or carbon?
Scale	buildings, community, region?
Scope	which activities and sectors?
Boundaries	site or source? offsets?

When developing a workable and practical definition for municipal land use planning and policy frameworks, the definition must consider, and be consistent across these four dimensions



# Net-Zero Energy Emissions Communities - Toward a ‘nested’ definition

	Development Industry Policies & Protocols	Municipal Energy & Land-Use Planning Policies	Provincial Energy & Land-Use Planning Policies
Priority	Energy-related GHG emissions		
Scale	Buildings	Communities	Regions
Primary Scope	Built environment	Plus municipal services (e.g., water/wastewater), and personal transportation within the city	Plus personal transportation within and between commuter-sheds, regional public transit, agriculture and other industries
Secondary Scope	‘Net-zero ready’ for transport options, consistent with municipal and provincial policies	‘Net-zero ready’ for intra-city commuters and commercial transport	‘Net-zero ready’ for regional personal and commercial transport
Boundaries	<ul style="list-style-type: none"> <li>Limited use of offsets;</li> <li>Source-based emissions accounting and emphasis on beneficial interface with grid/network;</li> <li>Exclusion of embodied energy in materials.</li> </ul>		
Policy context	Building code	Municipal act Planning Act & PPS	Growth Plan, LTEP, Climate change action plan



# Net-Zero Energy Emissions Community (NZEEC)

- a net-zero energy emissions community balances energy-related energy emissions from buildings (electricity plug loads, space and water heating), transportation (excluding longhaul freight and personal travel outside of regional boundaries), and municipal services (e.g. water treatment and distribution, wastewater management, and waste management).
- This balance is met through a combination of energy efficiency gains while procuring energy supply from sustainable zero GHG emission sources, ideally generated within community boundaries.
- Offsetting emissions are permitted only where alternatives are not feasible. The community is prepared to support 'net-zero energy emissions' regions, by preparing for net-zero initiatives in the heavy transport and agricultural sectors.



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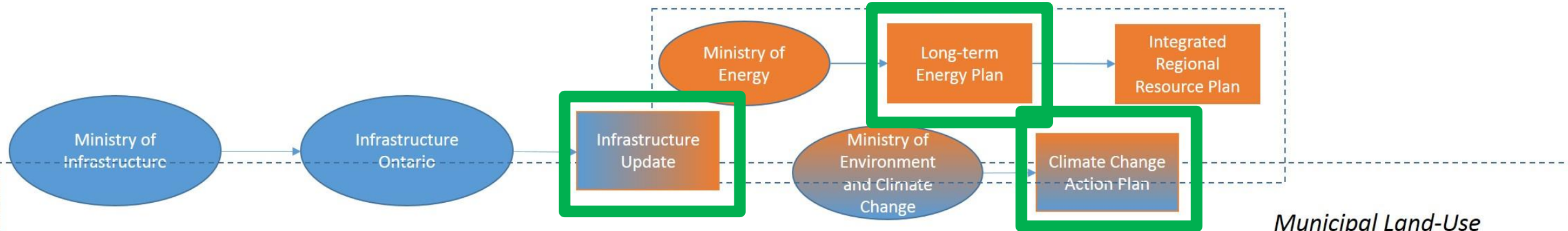
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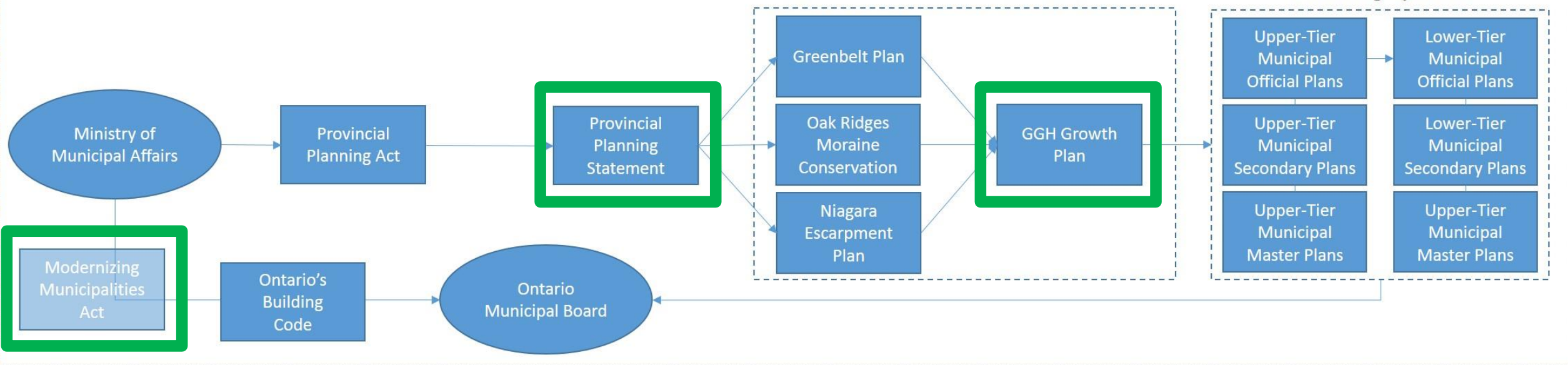




### Provincial Energy Planning System



### Regional Land-Use Planning System



### Municipal Land-Use Planning System



### Provincial Land-Use Planning System



# Proposed Growth Plan net-zero definition

Communities that meet their energy demand through low-carbon or carbon-free forms of energy and offset, preferably locally, any releases of greenhouse gas emissions that cannot be eliminated.

Net-zero communities include a higher density built form, and denser and mixed-use development patterns that ensure energy efficiency, reduce distances travelled, and improve integration with transit, energy, water and wastewater systems.

# Findings

- Lacking Clarity
  - Sectors within scope?
  - Only energy-related GHGs, or all GHGs?
- Lacking Consistency
  - Climate Change Action Plan focuses on NZ buildings, GGH plans focus on NZ communities
- Lacking certainty
  - No mention in PPS and therefore no backbone for municipalities



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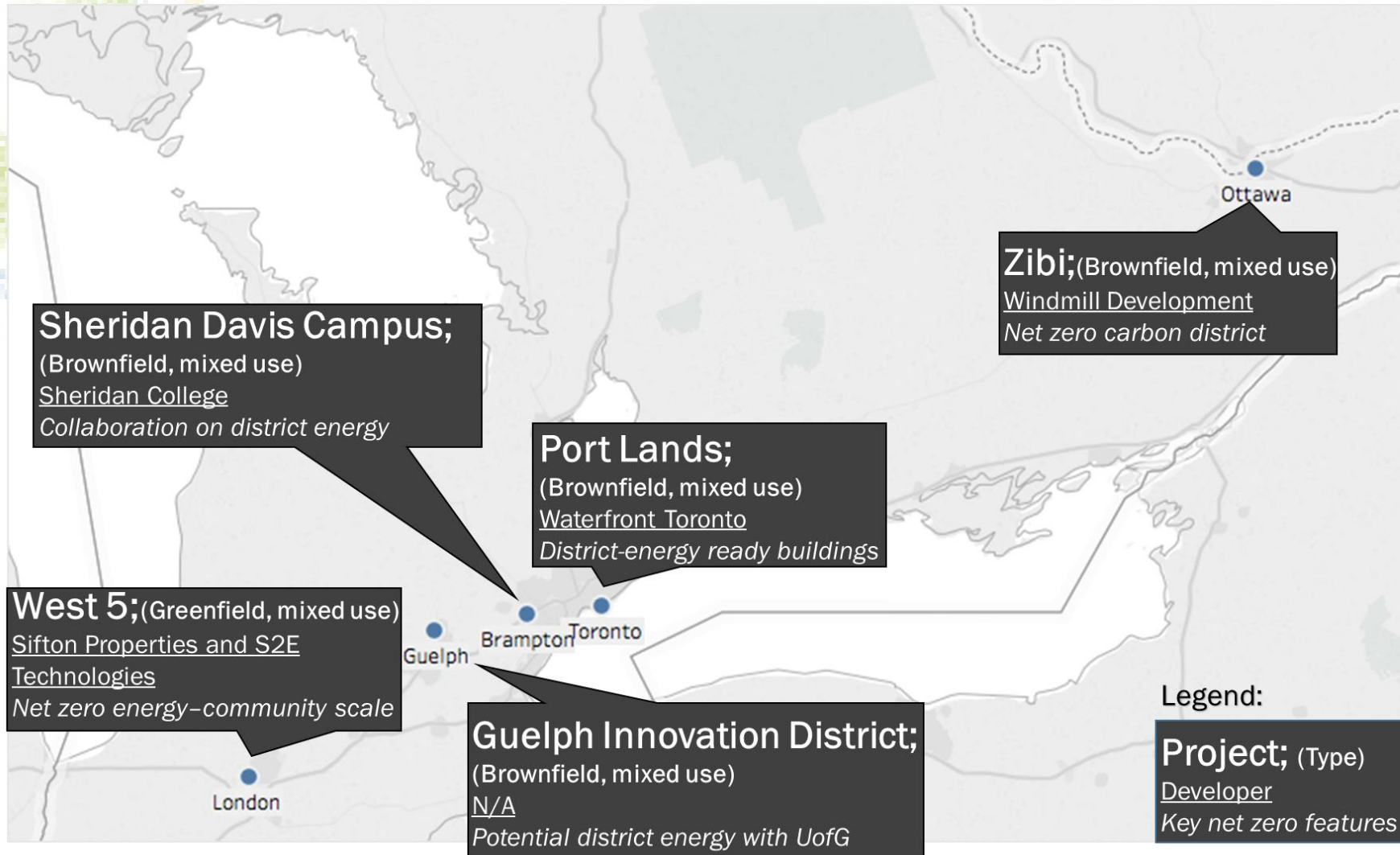
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# Case study approach



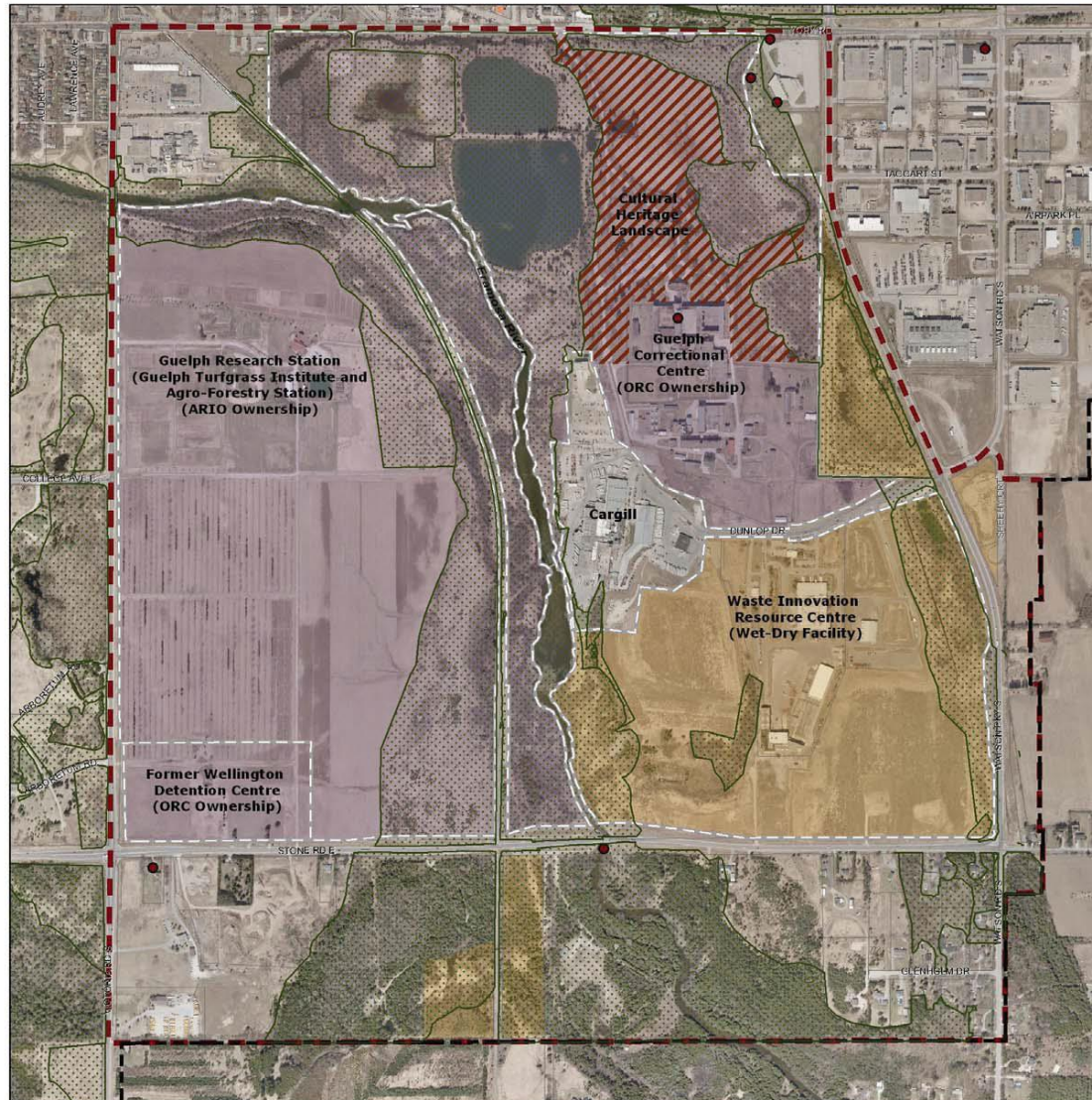


# London West 5





# Guelph Innovation District



## Guelph Innovation District

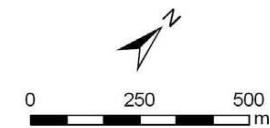
### Contextual Map

#### Legend

- Guelph Innovation District Study Area
- Major Ownership Boundaries
- Natural Heritage System (January 2010)
- Corporate Boundary
- Heritage Resources**
  - Cultural Heritage Landscape (Excluding the Natural Heritage System)
  - Cultural Heritage Resources

#### Parcel Ownership

- Privately Owned
- City Owned
- Provincially Owned



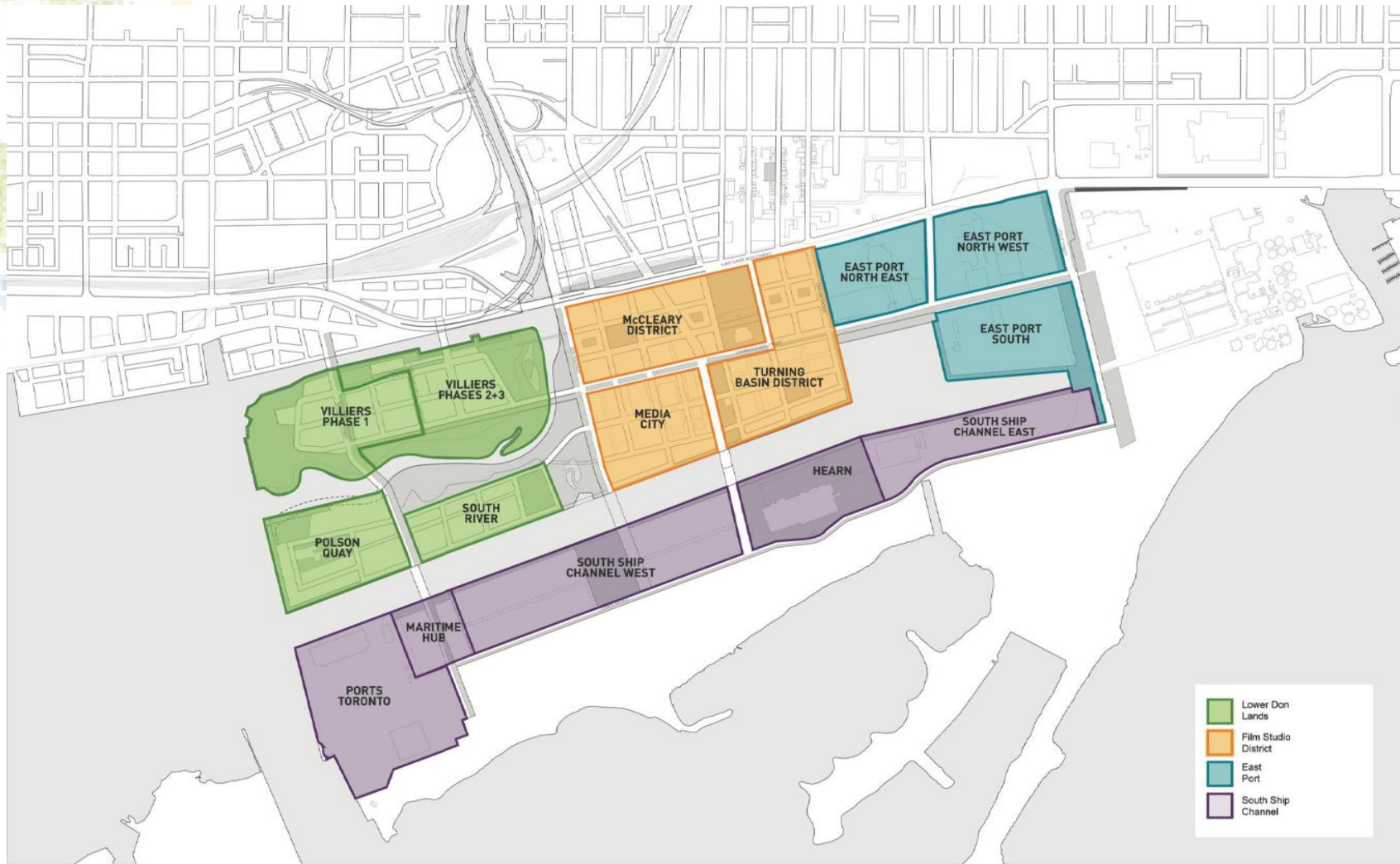
Produced by the City of Guelph  
Community Design and Development Services  
January 2010



# Brampton – Sheridan Davis Campus



# Toronto Port Lands



# Ottawa Zibi





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# Enabling net zero community development – Municipal Role

- Create a supportive high-level policy context
- Use authority provided by Planning Act and Municipal Act to incent low carbon and net zero development
  - E.g. Site Plan approval authority under the Planning Act
- Use major redevelopment area opportunities (e.g. Brownfields) to create a test-bed for policy and technology innovation
- Where LDC is municipally-owned, support business model innovation to develop community-scale energy generation and distribution networks

# Enabling net zero community development – Provincial Role

- Complementary (and consistent) amendments to Building Code, Municipal Act, Planning Act, etc. to mainstream net zero objective
- Enable municipalities to require beyond code-minimum in new development and major redevelopments (e.g. BC Step code)
- Revise energy planning and regulatory framework to enable innovation in Local Distribution Company (LDC) business models
- Invest in community-energy solutions (e.g. district energy and microgrids)
- Multi-level collaboration in major urban redevelopment projects (Infrastructure Ontario)
- Workforce training and skills development



# Enabling net zero community development – Developer Role

- Engage early and often with key municipal stakeholders
- Demonstrate marketability of net zero communities
- Collaborate with utilities on micro-utility business models







# Presentation Summary

- Adopt a nested approach to net-zero
- Differentiate based on mandate & jurisdiction, but be consistent

- Formally integrate the land-use planning policy framework with the energy planning policy framework
- Embed 'net-zero' into PPS, but don't restrict urban dynamism

- Bring utility to the front-end of land-use planning discussions
- Tie Infrastructure Ontario land dispositions to net-zero developments

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# THANK YOU!

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