



FCM/GMF Feasibility Study: Municipal Tools for Catalyzing Net-Zero Energy Development

June 4, 2019

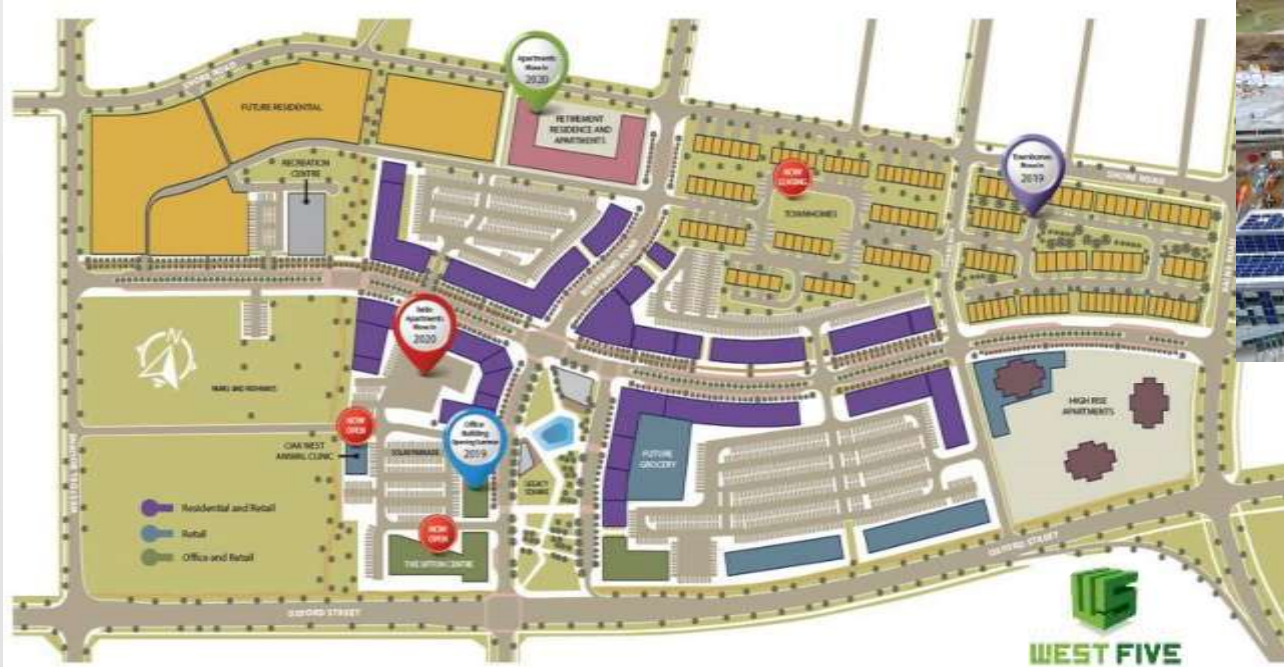
Municipal Tools for Catalyzing Net-Zero Energy Development

Federation of Canadian Municipalities – Green Municipal Fund



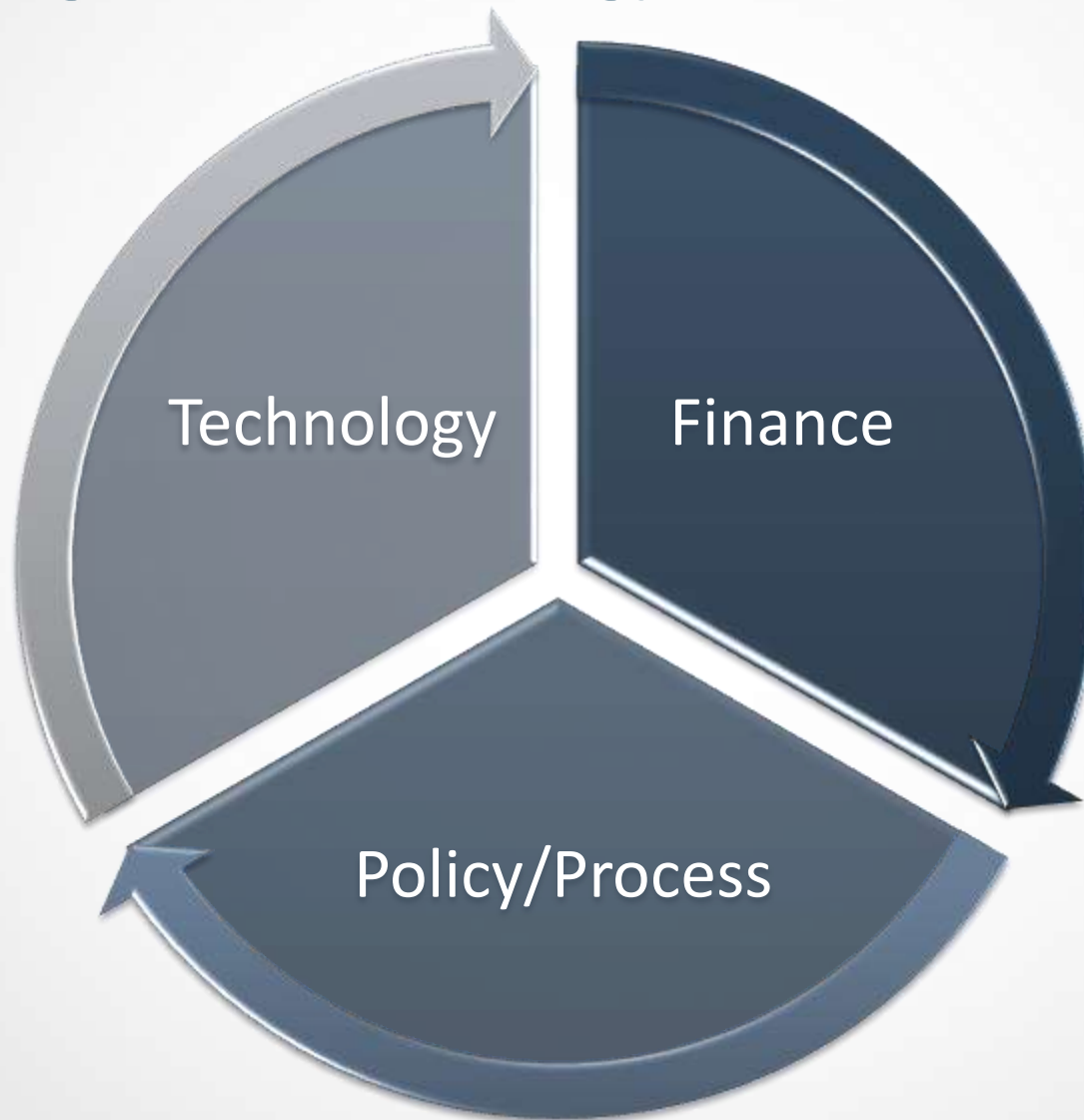
Net-Zero Energy Development

A building or project which produces all the energy it consumes on an annual basis, from on-site energy sources which are naturally renewable. The building / project may or may not be connected to a utility grid or energy storage system, but will have means to access and use its own energy over time – not necessarily exactly when it was generated.



Sifton Properties Limited
London, ON
www.West5.ca

Enabling Net-Zero Energy Development



- Conservation
 - Building Structure
 - Insulation
 - Air Barrier / Air Sealing
 - Windows
 - HVAC / Recovery
 - Lighting & Control
- Energy Storage
- Generation
- Performance Verification
- Vehicle Integration



Design Strategies for Achieving Net-Zero Energy:

Table 3-1: Sample Tech/Design Table

Technology / Design Type			
Description: A concise explanation of what exactly this technology is and how it works.			
Strengths: A brief exploration of where this technology or design approach is ideally intended to be used, and/or where it performs best.			
Limitations: A summary of some of the limitations of this technology or design approach, or of where it should not be applied.			
Availability: Is the technology Established , and readily available in industry or Emerging ?	Impact (★ to ★★★★★): a relative comparison of the degree to which this technology, properly applied, will reduce the impact or improve the performance of the building project. These impacts should always be verified by a local energy modeller.	Cost (\$ to \$\$\$\$\$): a relative comparison of the cost of this design strategy against standard building code, on a (loose) lifecycle basis <u>without incentives</u> . \$ = low cost and/or high IRR, \$\$\$\$\$ = high cost / low IRR. These costs should always be verified by a local project team.	Scope: Building / Neighbourhood Development (ND) / City

Design Strategies for Achieving Net-Zero Energy:

(Sample technology)

Table 3-5: Batts - Cotton / Denim

Insulation Batts – Cotton / Denim			
Description: Comes in batt form like fiberglass and stone wool but is made from recycled clothing or waste products that are cotton/denim based.			
Strengths: Much like fibreglass or mineral wool in most practical respects. Typically has high recycled content and other environmental benefits (resistant to fungus, mold, and pests). Performs better than fibreglass at low temperatures and during high winds, and is exceptionally good at absorbing sound.			
Limitations: Not widely available in Canada and can thus be expensive.			
Emerging	Impact: ★★☆☆	Cost: \$\$ - \$\$\$	Building

Design Strategies for Achieving Net-Zero Energy:

(Summary table)

Table 3-2: Summary Overview of Design Strategies

Technology/Design Strategy			Established	Emerging	Impact (1 to 5)	Price (1 to 5)	Context		
							Bldg	ND	City
Conservation									
	Insulation								
		Batts - Fibreglass / Fibre Wool	x		★★★★	\$	x		
		Batts - Stone Wool / Mineral Fibre	x		★★★★	\$	x		
		Batts - Cotton / Denim		x	★★★★	\$\$-\$\$\$	x		
		Blown Cellulose	x		★★★★	\$	x		
		Exterior Insulated Finishing System (EIFS)	x		★★★★	\$\$\$\$	x		
		Rigid Foam Board (EPS / XPS)	x		★★★★	\$	x		

Financial Strategies for Achieving Net-Zero Energy:

- Reduce expenses (i.e. eliminate redundancy)
- Offset expenses (i.e. incentives/grants or net-metering)
- Externalizing expenses (i.e. micro-utilities or 3rd party operator)
- Non-traditional methods of financing (i.e. energy service agrmt)



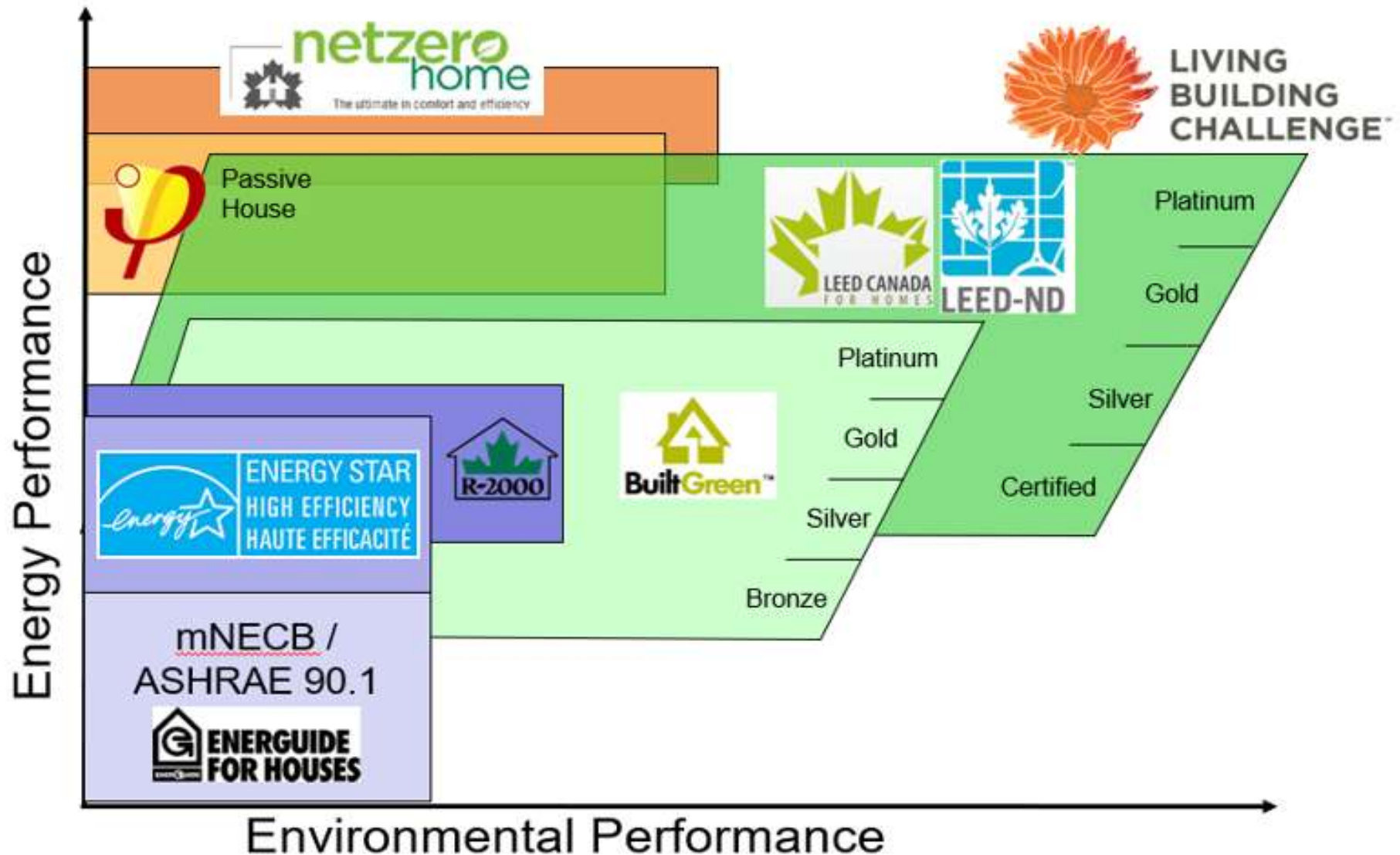
Courtesy: mfoa.on.ca

Policies and Programs that Support Net-Zero Energy:

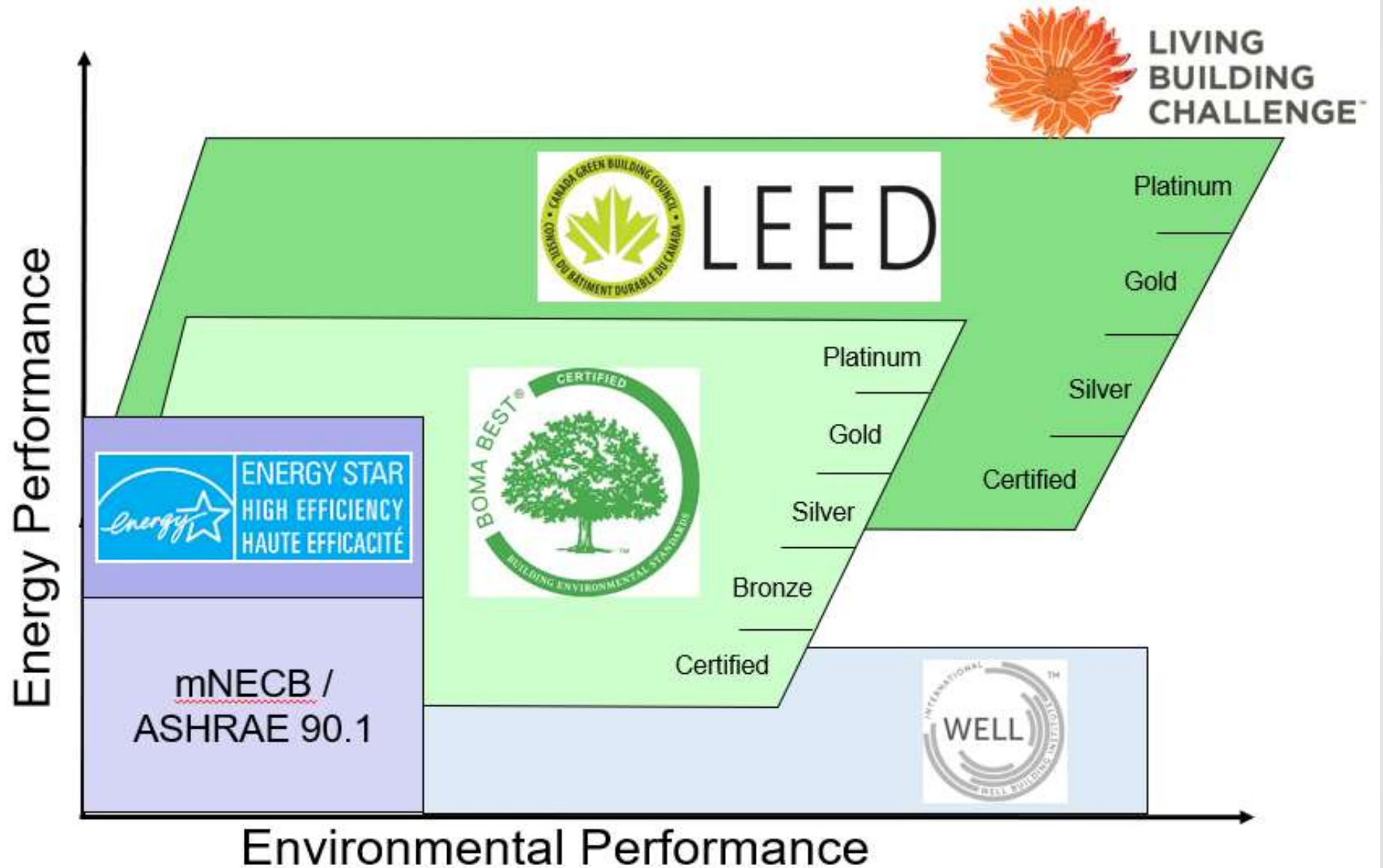
- Solar enablement
- District energy
- Incentives:
 - Municipal Programs and Incentives (i.e. Tax-Increment Grant)
 - Provincial Programs and Incentives (i.e. SMART Green Program)
 - Utility Incentives (i.e. IESO Save ON Energy)
 - Federal Programs, Incentives, Climate Initiatives (i.e. GIF)
 - Programs and Incentives outside of Canada
 - Industry Programs



Green Housing Programs



Green Building Programs





Site One: West 5
(greenfield, mixed-use development)

Site Two:
McCormick Candy
Factory (urban,
mixed use
redevelopment)



Site One: Block 4
(urban, mixed use
redevelopment)

Site Two: Davis
Tannery (residential
[re]development)



Site One: Bramm
Yards (urban, mixed
use redevelopment)

Site Two: Greenfield
Demonstration Site



Site One: Philip St
(urban, commercial
redevelopment)

Site Two: Frobisher
Dr (industrial infill)

A large, light gray double-headed arrow spanning the width of the four case study boxes, with the text "Lessons Learned" centered above it.

Lessons Learned



Figure 6-20: Aerial View of Bramm Yards within the Innovation District, Kitchener, ON

Legend:

1. Main St. w/ Separated Cycling Lanes
2. Covered / Underground Parking
3. Courtyard / Fountain / Park Space
4. Education Centre
5. PV/EV Parking
6. Commercial Towers
7. Residential Towers
8. Food Store (not shown)



Figure 6-21: Bramm Yards Conceptual Neighbourhood Design



Figure 6-23: Conceptual Master Plan for a Greenfield Demonstration Site, Kitchener

Trends and Key Lessons Learned

1. Process is Secondary to Vision
 2. Conflicting Policies
 3. Death by a Thousand Meetings
 4. Context, Context, Context
 5. Experience is King
 6. Institutional Inertia
 7. Incentives are Enablers, Not Less or More
- (continued)...



Trends and Key Lessons Learned

- 8. Money Talks
- 9. Technology is Not the Issue
- 10. It's All About Design
- 11. Solar Access
- 12. District Energy
- 13. Optimizing the Underground
- 14. Permits and Approval



Conclusions

Benchmarking

Training

Continuous
Learning

Consider Solar
Right-to-Light

District /
Distributed
Energy

Community
Improvement
Plan

Celebrate

Appendices and Sample Initiatives

- A. Incentives: Municipal, Provincial, Utility, Federal
- B. Solar Energy: Policies, program, by-law
- C. District Energy: Policies, easement, access agreement
- D. Community Improvement Plan and Programs



Kitchener Operations Facility – solar roof

Recommended Incentive Programs: Overview

1. Green Housing Incentive Program
2. Green Building Incentive Program
3. Property Tax Reduction Incentive Program
4. Advanced Queuing Incentive Program
5. Property Assessed Payments for Energy Reductions (PAPER) Program
6. Development Charge Reduction Program
7. Building Permit Fee Reduction Program

Incentive Program Summary

METHODS OF INCENTING		INCENTIVE TOPICS															Totals:
		Land Use						Energy					Water				
		Brownfield	Mixed Use Development	Non-Brownfield	Greenfield	Green Roof	Urban Agriculture	Green Building Standards	Net Zero Building	Electric Vehicle	On-Site Renewables	Cool Roof	Indoor Conservation	Storm Water	Rainwater	Greywater	
Feasibility Study Grant	A	5		1				1									5
Environmental Site Assessments	B	26		1													26
Tax Assistance Plan	C	19		8				1									26
Development Charge Rebate	D	13		6			1	2									22
Property Tax Exemption/ Rebate	E	18	1	1				1									20
Building Permit Rebate	F	3	1	3													9
Remediation Loan	G	2		1				1			1						2
Density Bonus	H			1			1	1									3
Cash Rebate	I	14	7	15		1	2	6			3	1	6	2	3	2	25
Totals Assessed:		100	9	37	0	1	4	13	0	0	4	1	6	2	3	2	182

Green Housing Incentive Program

Performance Level		Yr. 3+ Incentive Levels		
		1 st dwelling	2 nd dwelling	3 rd dwelling +
	Yr. 1-2 Incentive Levels			
	1 st dwelling	2 nd dwelling	3 rd dwelling +	
Net-Zero, EnerGuide 0 or less	\$7,500	\$6,000	\$5,000	\$4,000
LEED Platinum, Passive House, EnerGuide 30 or less	\$6,000	\$4,500	\$3,000	\$2,500
LEED Gold, Built Green Platinum, Net-Zero Ready, EnerGuide 50 or less	\$5,000	\$3,500	\$2,000	\$1,500
LEED Silver, Built Green Gold, EnerGuide 65 or less	\$3,000	\$2,250	\$1,500	\$1,000*
EnerGuide 80 or less, ENERGY STAR, LEED Certified, or Built Green Silver	Pre-required			Pre-required

**The need for this incentive level should be re-evaluated based upon the success of the program as it progresses.*

Green Building Incentive Program

Performance Level*		\$/m ²
5	Living Building, EUI of 0 (zero) or less	15.00
4	LEED Platinum, BOMA Net Zero Challenge, EUI 50%<building code	12.50
3	LEED Gold, BUILT GREEN Platinum, BOMA BEST Platinum, EUI 30%<building code	10.00
2	LEED Silver, BUILT GREEN Gold, BOMA BEST Gold, EUI 20%<building code	7.50
1	LEED Certified, BUILT GREEN Silver, BOMA BEST Silver, EUI 10%<building code	5.00

**Jurisdictions with Step Codes should also consider including higher steps / levels from those Codes in this table.*

Property Tax Reduction Incentive Program

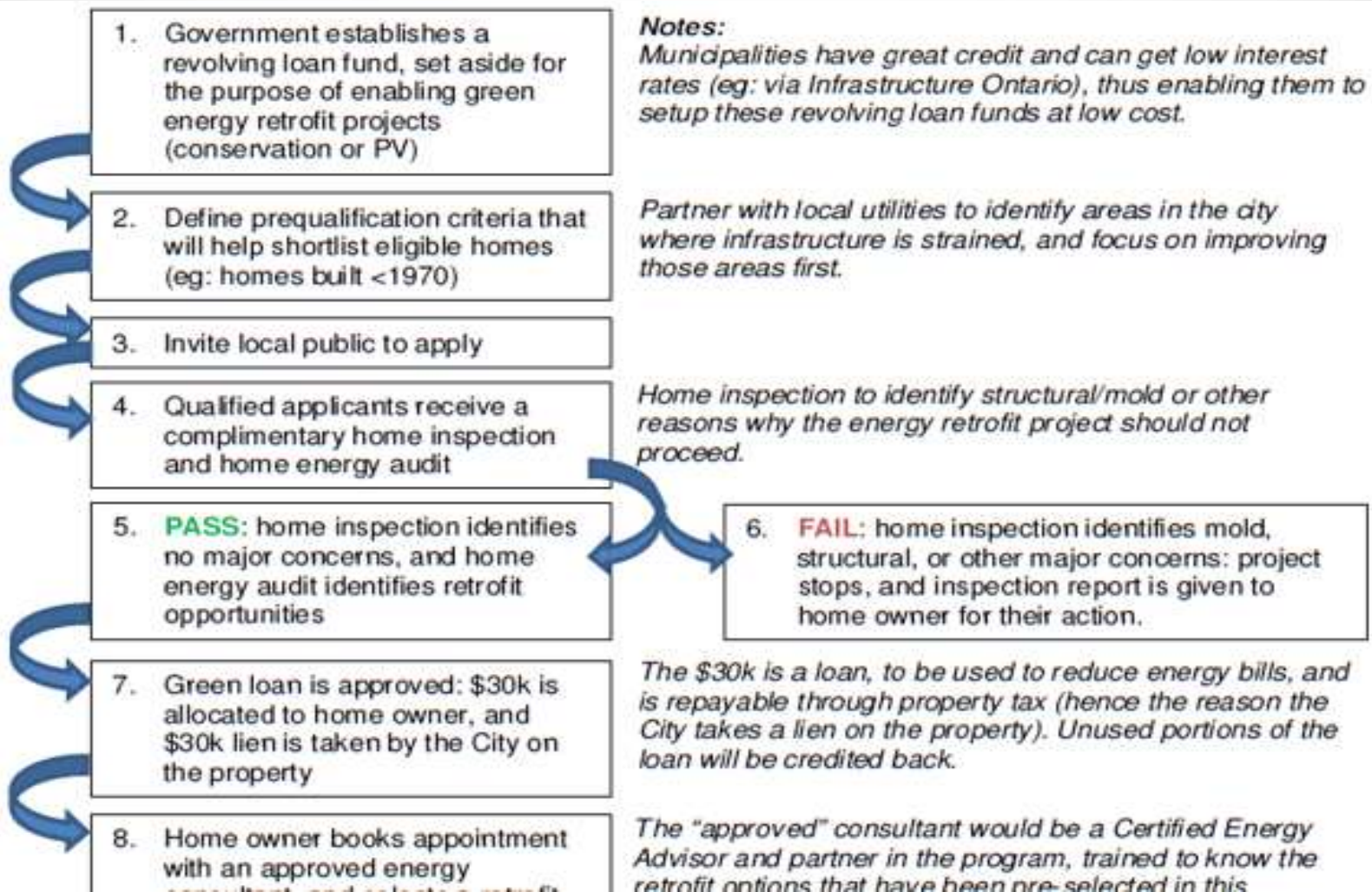
Tax Reduction	New Homes: Green Building Certification Levels	New Buildings: Green Building Certification Levels
20%	EnerGuide 80 or less, ENERGY STAR, LEED Certified, or Built Green Silver	LEED Certified, BUILT GREEN Silver, BOMA BEST Silver, EUI 10% < building code
40%	LEED Silver, Built Green Gold, <u>EnerGuide 65 or less</u>	LEED Silver, BUILT GREEN Gold, BOMA BEST Gold, EUI 20% < building code
60%	LEED Gold, Built Green Platinum, Net-Zero Ready, EnerGuide 50 or less	LEED Gold, BUILT GREEN Platinum, BOMA BEST Platinum, EUI 30% < building code
70%	LEED Platinum, Passive House, EnerGuide 25 or less	LEED Platinum, BOMA Net Zero Challenge, EUI 50% < building code
80%	Net-Zero, EnerGuide 0 or less	Living Building, EUI of 0 (zero) or less

Advanced Queuing Incentive Program

Prioritizes developments that will be Green Building Certified. All hard project costs are covered through related permit fees paid by applicants. Buildings will obtain higher performance, providing increased revenue on collected municipal property taxes.



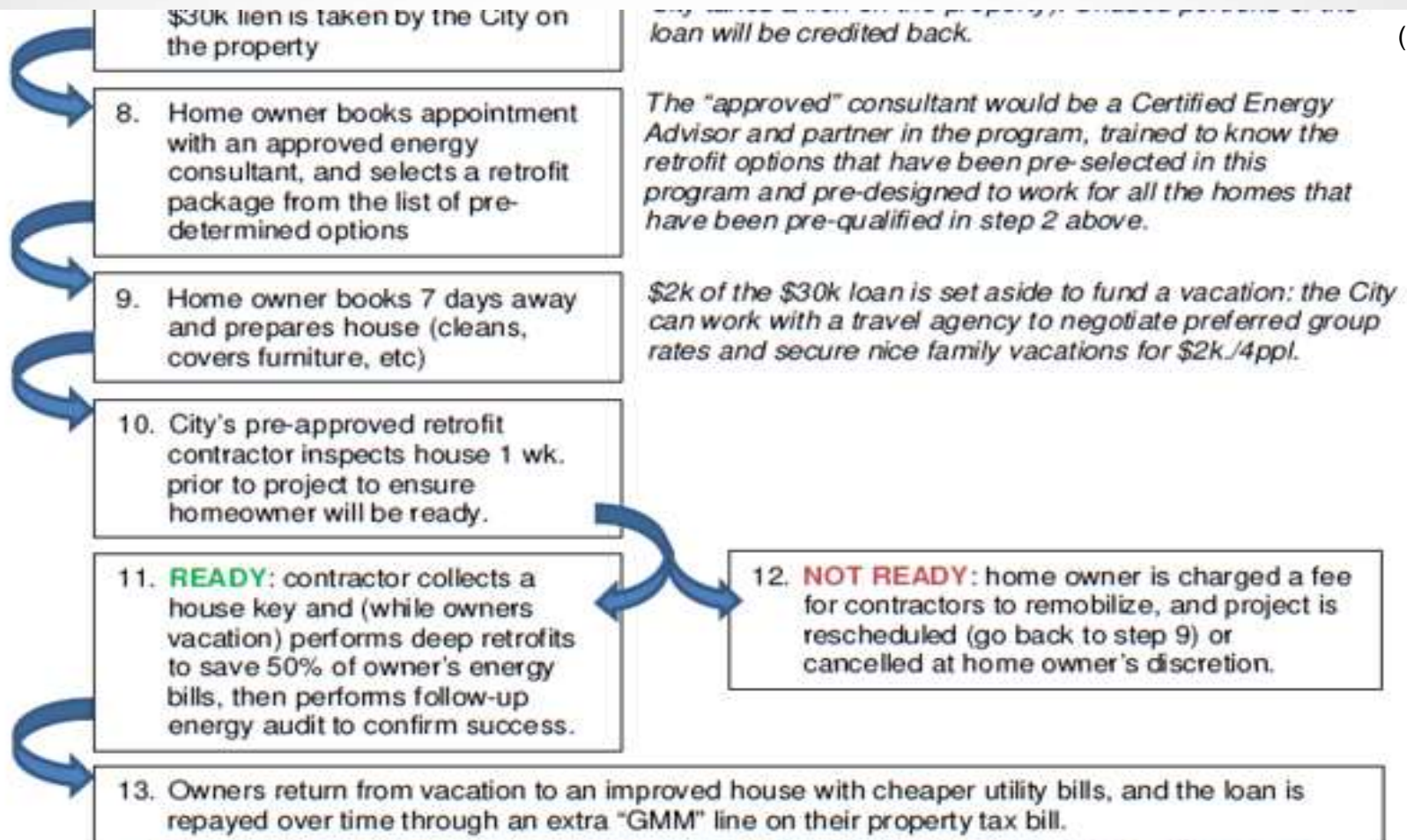
Property Assessed Payments for Energy Reductions (PAPER) Program (pg 1)



Property Assessed Payments for Energy Reductions (PAPER) Program (cont.)

(Cont...)

(Cont...)



Everybody wins! The City gets the loan repaid, the owner gets a better house, utilities save energy, the environment is happy, and the owners even get a vacation along the way!

Development Charge Rebate Incentive Program

DC Rebate	New Homes: Green Building Certification Levels	New Buildings: Green Building Certification Levels
10%	EnerGuide 80 or less, ENERGY STAR, LEED Certified, or Built Green Silver	LEED Certified, BUILT GREEN Silver, BOMA BEST Silver, EUI 10% < building code
20%	LEED Silver, Built Green Gold, EnerGuide 65 or less	LEED Silver, BUILT GREEN Gold, BOMA BEST Gold, EUI 20% < building code
30%	LEED Gold, Built Green Platinum, Net-Zero Ready, EnerGuide 50 or less	LEED Gold, BUILT GREEN Platinum, BOMA BEST Platinum, EUI 30% < building code
40%	LEED Platinum, Passive House, EnerGuide 25 or less	LEED Platinum, BOMA Net Zero Challenge, EUI 50% < building code
50%	Net-Zero, EnerGuide 0 or less	Living Building, EUI of 0 (zero) or less

Building Permit Fee Reduction Program

Permit Fee Rebate	New Homes: Green Building Certification Levels	New Buildings: Green Building Certification Levels
20%	EnerGuide 80 or less, ENERGY STAR, LEED Certified, or Built Green Silver	LEED Certified, BUILT GREEN Silver, BOMA BEST Silver, EUI 10% < building code
30%	LEED Silver, Built Green Gold, EnerGuide 65 or less	LEED Silver, BUILT GREEN Gold, BOMA BEST Gold, EUI 20% < building code
40%	LEED Gold, Built Green Platinum, Net-Zero Ready, EnerGuide 50 or less	LEED Gold, BUILT GREEN Platinum, BOMA BEST Platinum, EUI 30% < building code
50%	LEED Platinum, Passive House, EnerGuide 25 or less	LEED Platinum, BOMA Net Zero Challenge, EUI 50% < building code
60%	Net-Zero, EnerGuide 0 or less	Living Building, EUI of 0 (zero) or less

Key Strengths of the Incentive Programs

- Education and Experience
- Social Benefits
- Environmental Benefits
- Direct Financial Returns





Thank you!

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