



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

May 3, 2019



# Municipal Tools for Catalyzing Net-Zero Energy Development

*Federation of Canadian Municipalities – Green Municipal Fund*

The logo for the Federation of Canadian Municipalities (FCM), consisting of the letters "FCM" in a bold, red, sans-serif font.The logo for the City of Waterloo, featuring a stylized "W" icon above the text "THE CITY OF Waterloo".



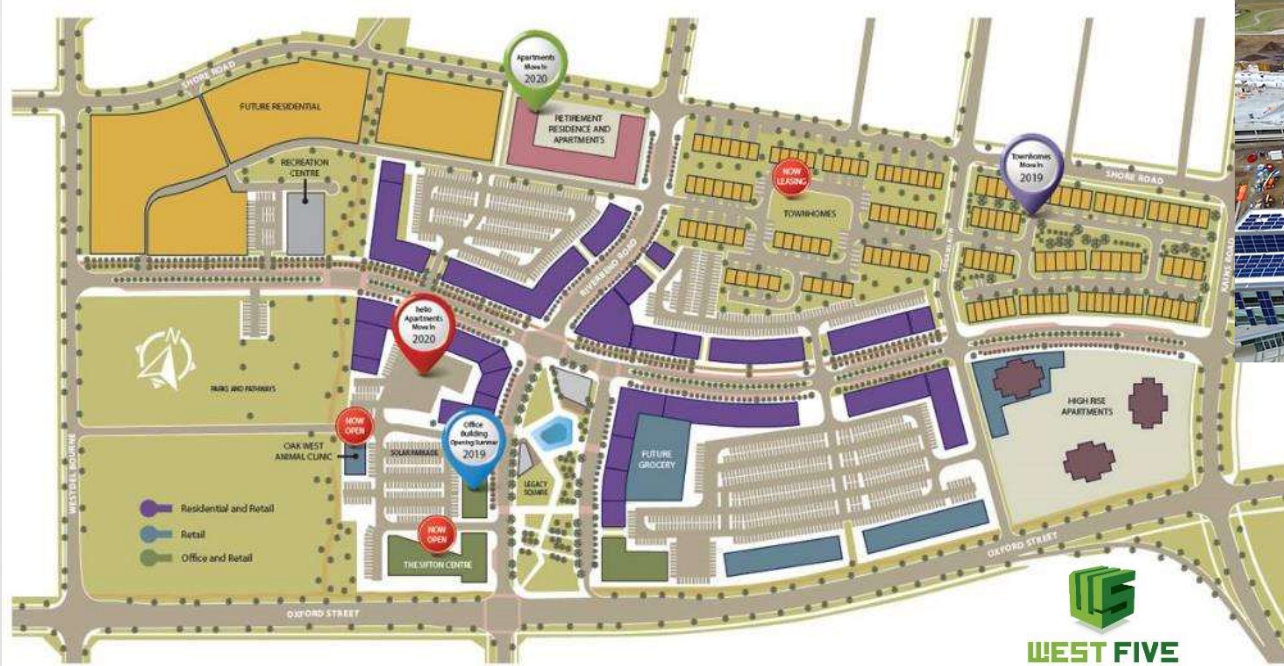
## **What is “Sustainable”?**

**Meeting our needs today without compromising the ability of the 7th generation of our descendants to meet their own needs.**

*(c. Great Law of Iroquois Confederacy)*

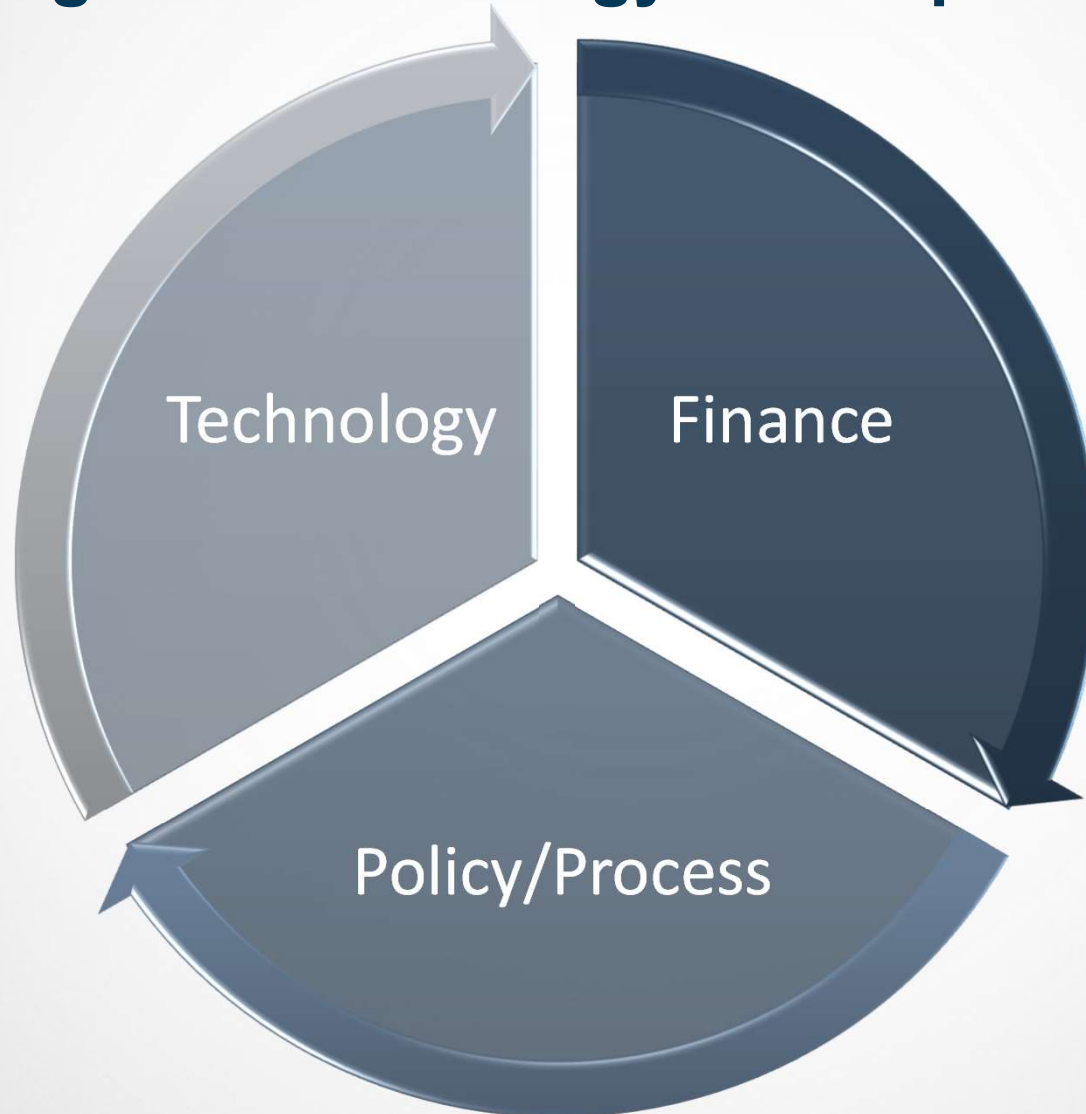
# Net-Zero Energy Development

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](http://www.West5.ca)

# Enabling Net-Zero Energy Development





# Design Strategies for Achieving Net-Zero Energy:

Table 3-1: Sample Tech/Design Table

|  |   |  |   |
|--|---|--|---|
| <b>Technology / Design Type</b>  |   |  |   |
| <b>Description:</b> A concise explanation of what exactly this technology is and how it works.   |   |  |   |
| <b>Strengths:</b> A brief exploration of where this technology or design approach is ideally intended to be used, and/or where it performs best. |   |  |   |
| <b>Limitations:</b> A summary of some of the limitations of this technology or design approach, or of where it should not be applied.            |   |  |   |
| <b>Availability:</b><br>Is the technology <b>Established</b> , and readily available in industry or <b>Emerging</b> ?                            | <b>Impact (★ to ★★★★★):</b><br>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. | <b>Cost (\$ to \$\$\$\$\$):</b> 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. | <b>Scope:</b><br>Building / Neighbourhood Development (ND) / City |

# Design Strategies for Achieving Net-Zero Energy:

*(Sample technology)*

Table 3-5: Batts - Cotton / Denim

|  |               |                     |          |
|--|---------------|---------------------|----------|
| <b>Insulation Batts – Cotton / Denim</b>   |               |                     |          |
| <b>Description:</b> Comes in batt form like fiberglass and stone wool but is made from recycled clothing or waste products that are cotton/denim based.  |               |                     |          |
| <b>Strengths:</b> 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. |               |                     |          |
| <b>Limitations:</b> 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<br>(1 to 5) | Price<br>(1 to 5) | Context |    |      |
|--|-------------|----------|--------------------|-------------------|---------|----|------|
|  |             |          |                    |                   | Bldg    | ND | City |
| <b>Conservation</b>                        |             |          |                    |                   |         |    |      |
| <b>Insulation</b>                          |             |          |                    |                   |         |    |      |
| 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 3<sup>rd</sup> party operator)
- Non-traditional methods of financing (i.e. energy service agrmt)



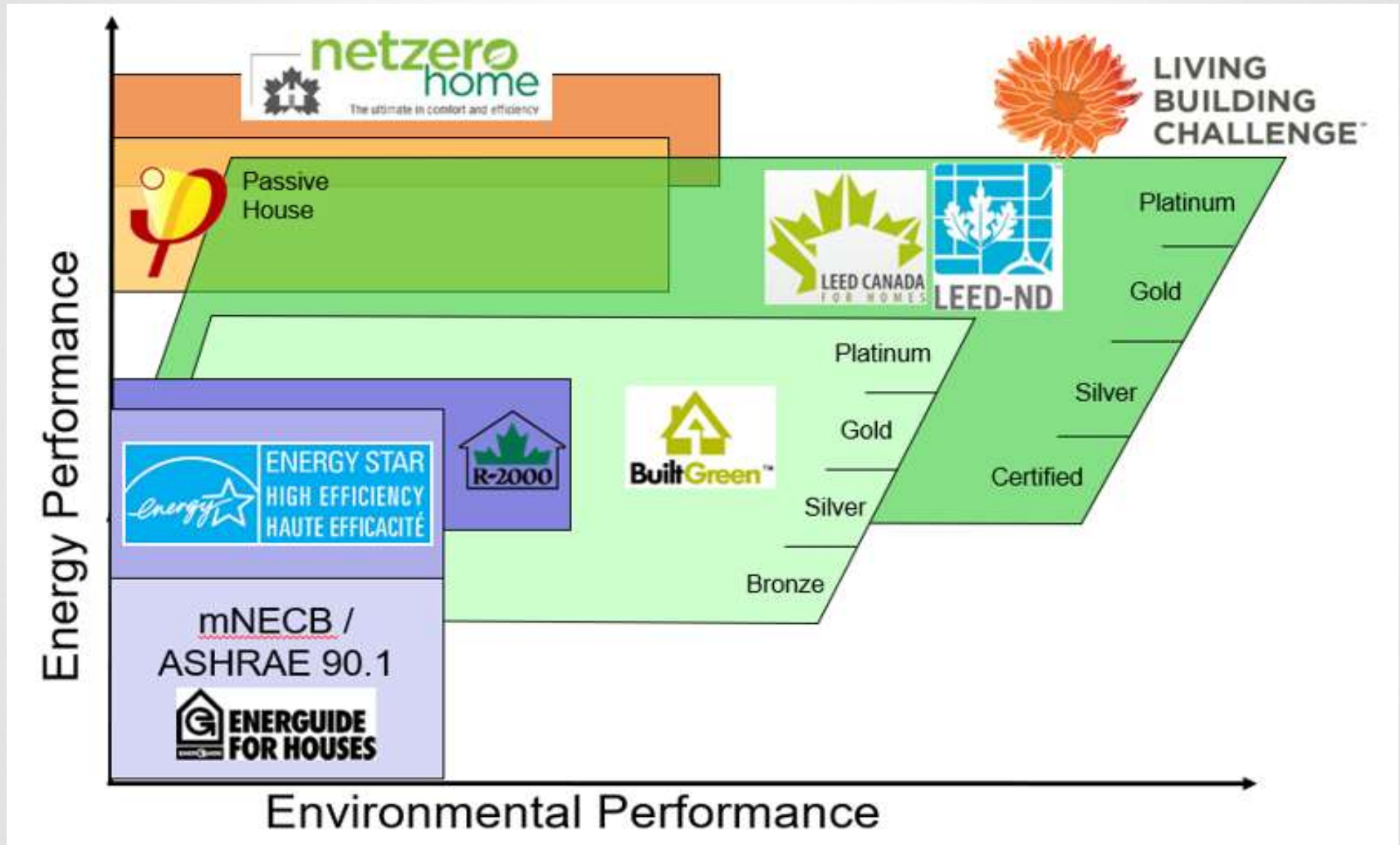
Courtesy: mfoa.on.ca

## **Policies and Programs that Support Net-Zero Energy:**

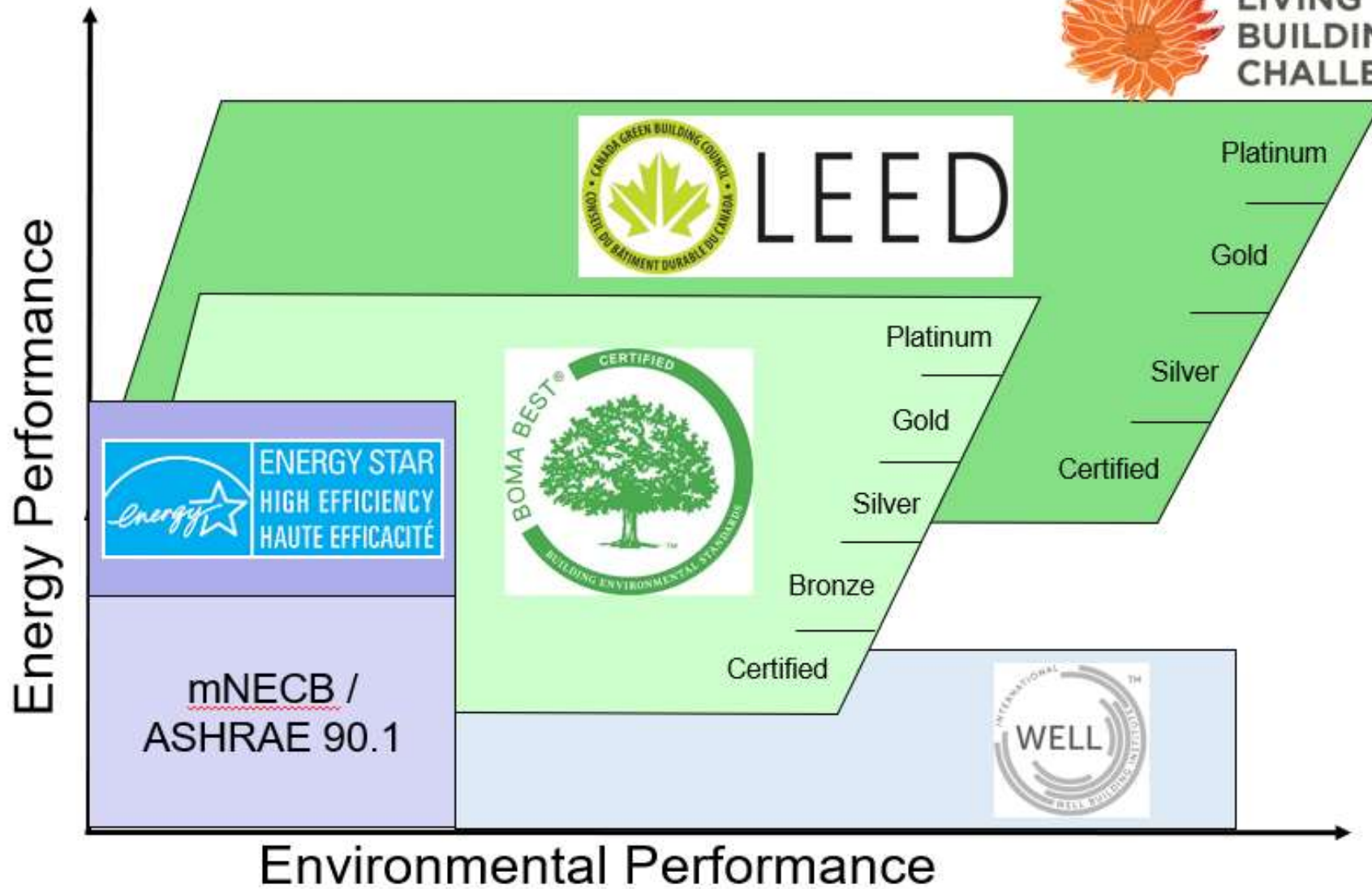
- Solar enablement
- District energy
- Incentives:
  - Municipal Programs and Incentives (i.e. Tax-Increment Grant)
  - Provincial Programs and Incentives (i.e. SMART Green Program)
  - Utility Incentives (i.e. IESO Save ON Energy)
  - Federal Programs, Incentives, Climate Initiatives (i.e. GIF)
  -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



# Green Housing Programs



# Green Building Programs



# Case Studies



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)

Lessons Learned

# Case Studies - Kitchener



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 |
| Summarized from all ~40 municipalities studied in Table 4-1 above. |   |                  |                       |                |            |            |                   |                          |                   |                  |                    |           |                     |             |           |         |           |
| 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 <sup>st</sup> dwelling | 2 <sup>nd</sup> dwelling   | 3 <sup>rd</sup> dwelling + |
|   | Yr. 1-2 Incentive Levels |                          |                            |                            |
|   | 1 <sup>st</sup> dwelling | 2 <sup>nd</sup> dwelling | 3 <sup>rd</sup> dwelling + |                            |
| <b>Net-Zero,<br/>EnerGuide 0 or less</b>  | \$7,500                  | \$6,000                  | \$5,000                    | \$4,000                    |
| <b>LEED Platinum,<br/>Passive House,<br/>EnerGuide 30 or less</b>                           | \$6,000                  | \$4,500                  | \$3,000                    | \$2,500                    |
| <b>LEED Gold,<br/>Built Green Platinum,<br/>Net-Zero Ready,<br/>EnerGuide 50 or less</b>    | \$5,000                  | \$3,500                  | \$2,000                    | \$1,500                    |
| <b>LEED Silver,<br/>Built Green Gold,<br/>EnerGuide 65 or less</b>                          | \$3,000                  | \$2,250                  | \$1,500                    | \$1,000*                   |
| <b>EnerGuide 80 or less,<br/>ENERGY STAR,<br/>LEED Certified,<br/>or Built Green Silver</b> | 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 <sup>2</sup> |
|--------------------|--|-------------------|
| 5                  | Living Building,<br>EUI of 0 (zero) or less  | 15.00             |
| 4                  | LEED Platinum,<br>BOMA Net Zero Challenge,<br>EUI 50%<building code                  | 12.50             |
| 3                  | LEED Gold,<br>BUILT GREEN Platinum,<br>BOMA BEST Platinum,<br>EUI 30%<building code  | 10.00             |
| 2                  | LEED Silver,<br>BUILT GREEN Gold,<br>BOMA BEST Gold,<br>EUI 20%<building code        | 7.50              |
| 1                  | LEED Certified,<br>BUILT GREEN Silver,<br>BOMA BEST Silver,<br>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

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

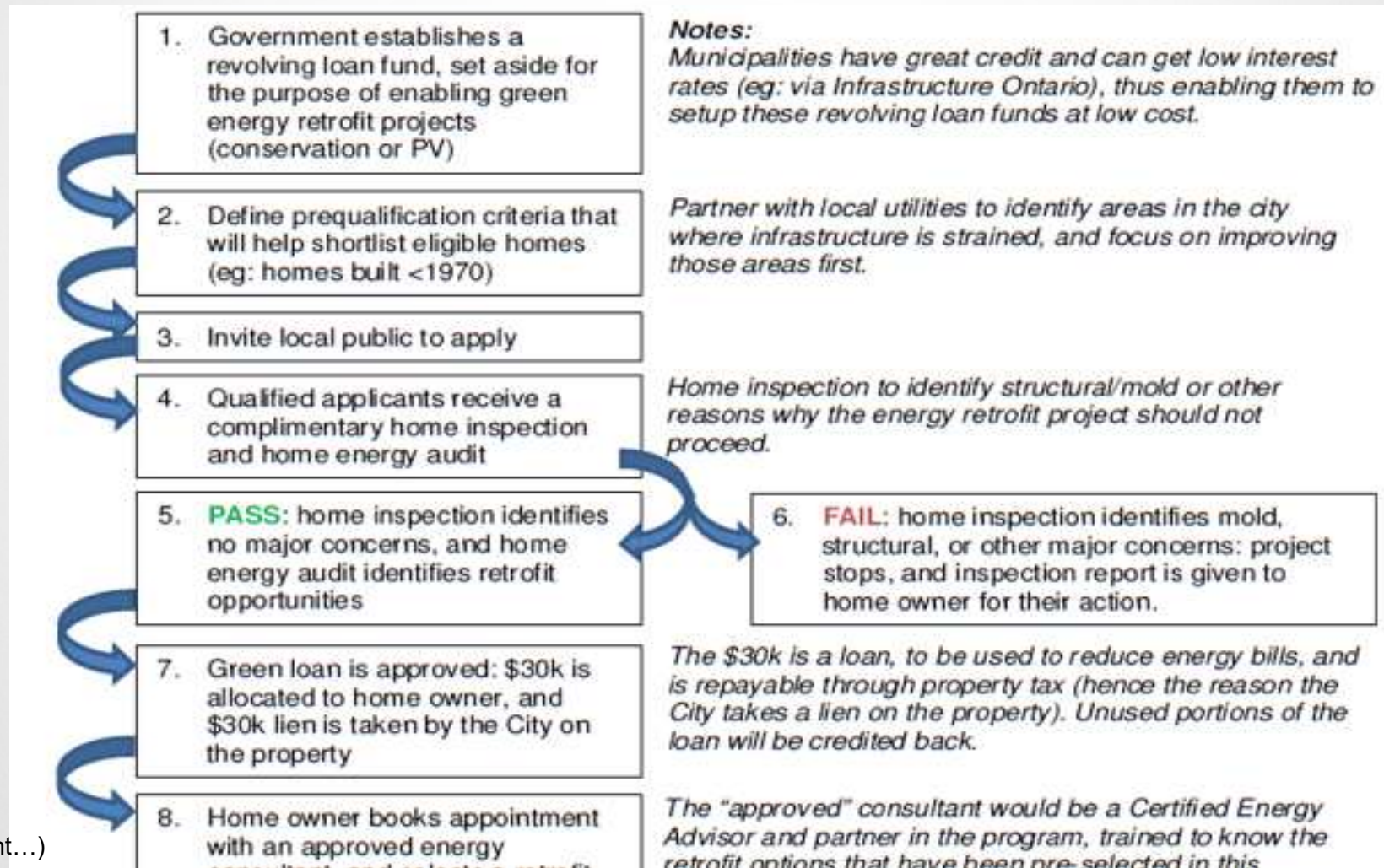


## Advanced Queuing Incentive Program

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)

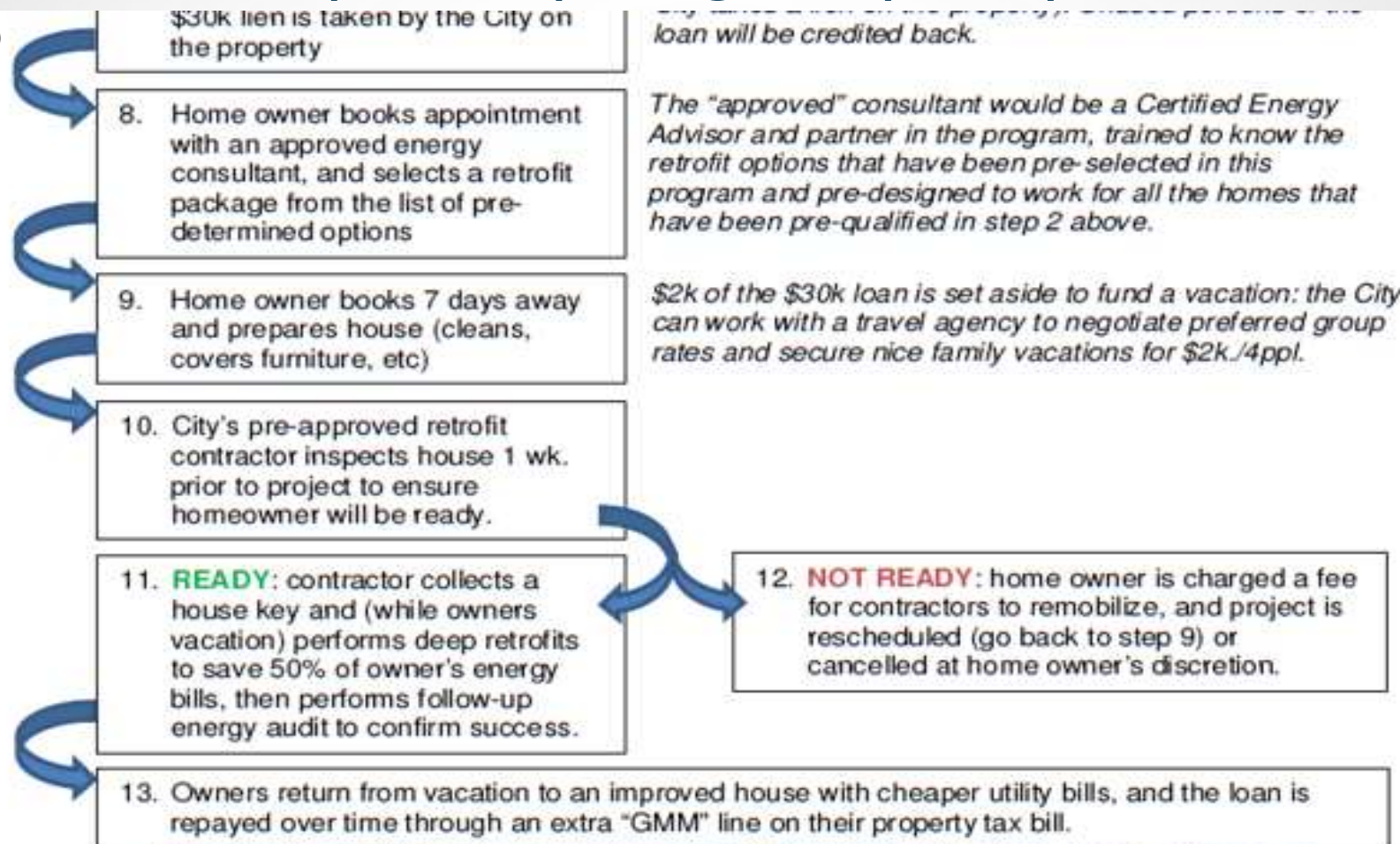


(Cont...)

(Cont...)

# 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

| <b>DC Rebate</b> | <b>New Homes:<br/>Green Building Certification Levels</b>                | <b>New Buildings:<br/>Green Building Certification Levels</b>                 |
|------------------|--|---|
| 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

| <b>Permit Fee Rebate</b> | <b>New Homes: Green Building Certification Levels</b>                    | <b>New Buildings: Green Building Certification Levels</b>                     |
|--------------------------|--|---|
| 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!**

**[www.s2etech.com/fcm-gmf](http://www.s2etech.com/fcm-gmf)**