GARDEN SUITES

Step to a Greener Future

sustainable.

Architecture for a healthy planet.

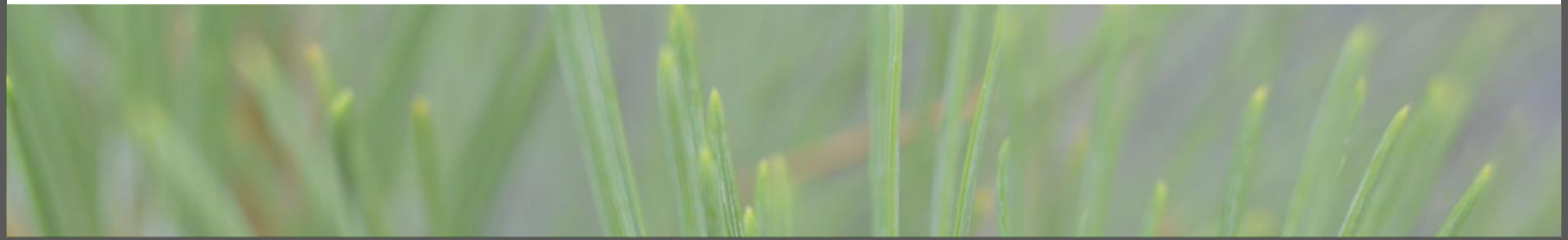
THE ARCHITECT
BUILDERS COLLABORATIVE Inc.

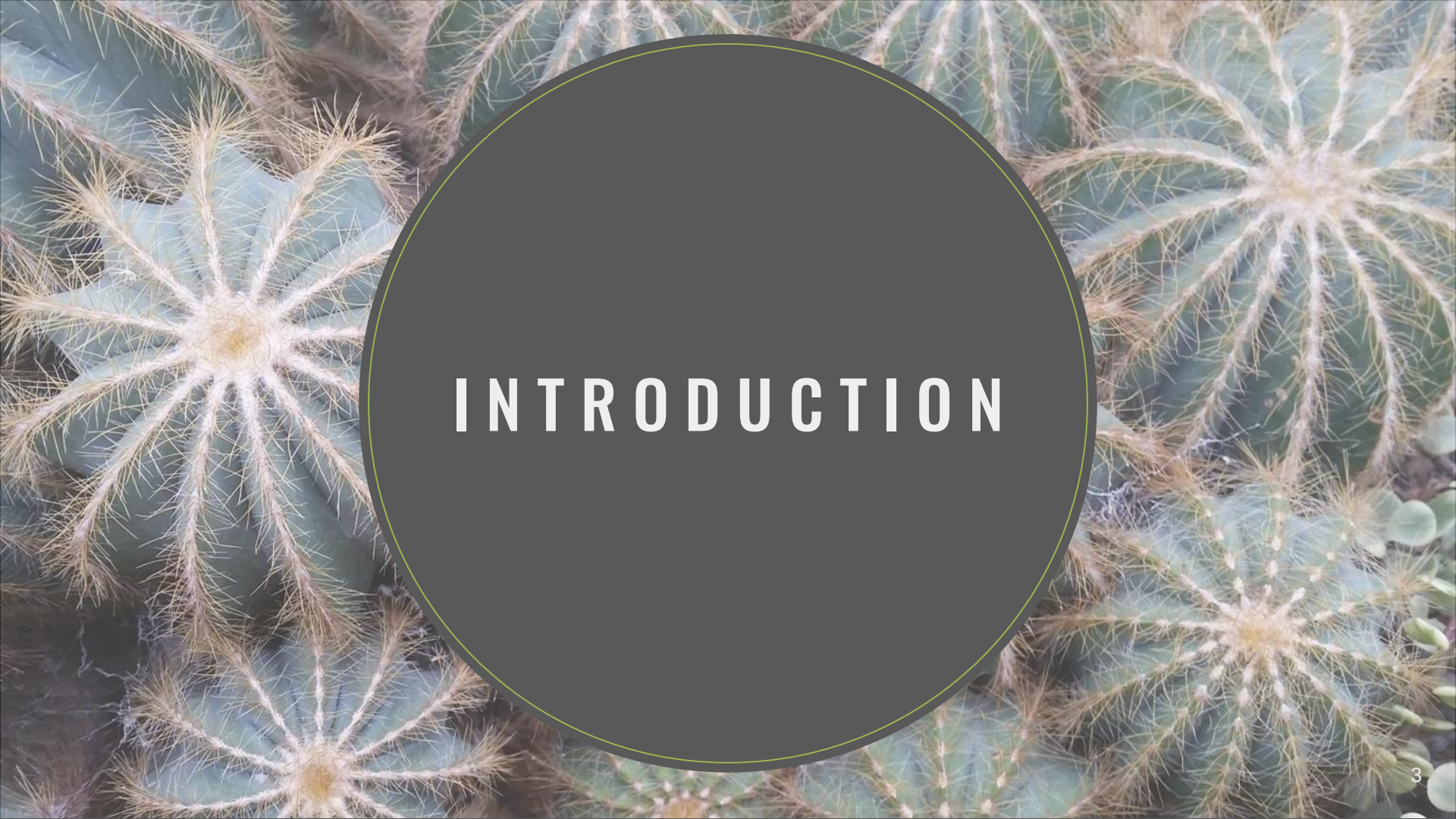
fighting climate change

with affordable green design

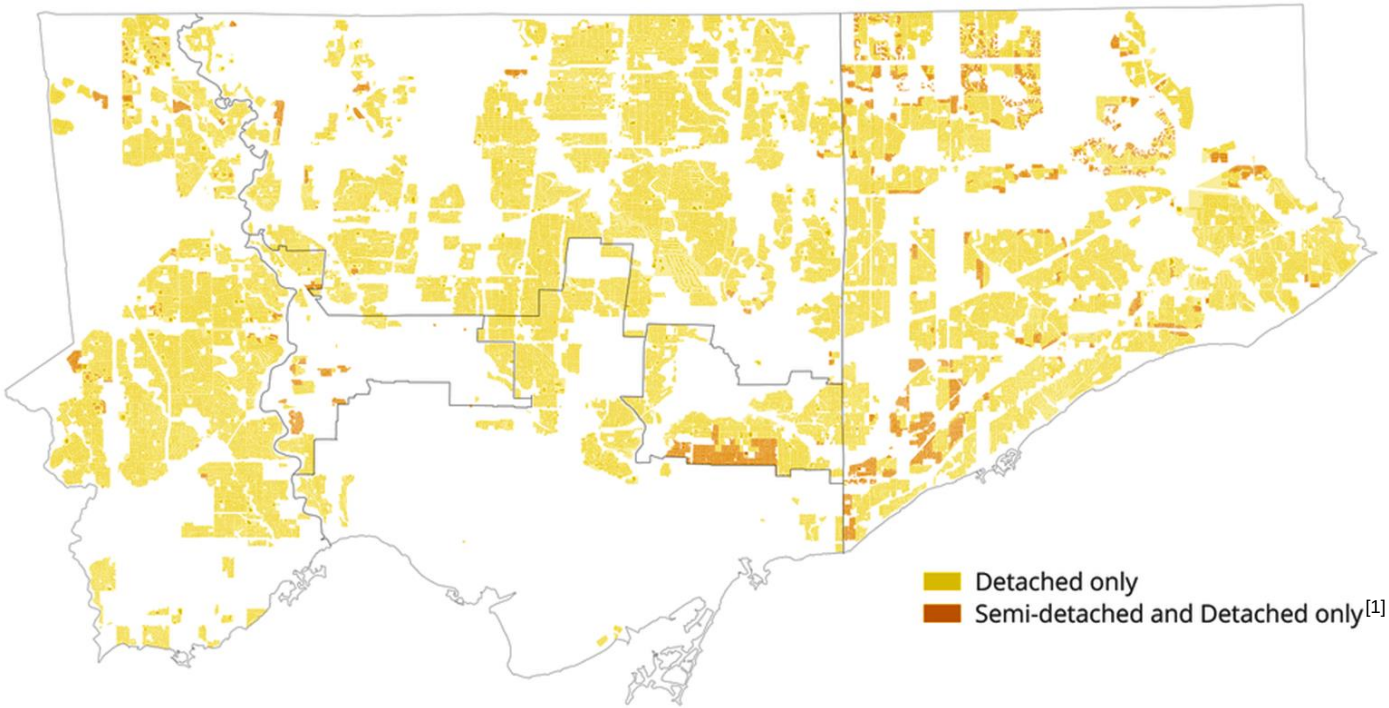
AGENDA:

- Introduction
- Methodology
- Team
- Results
- Recommendations
- Discussion

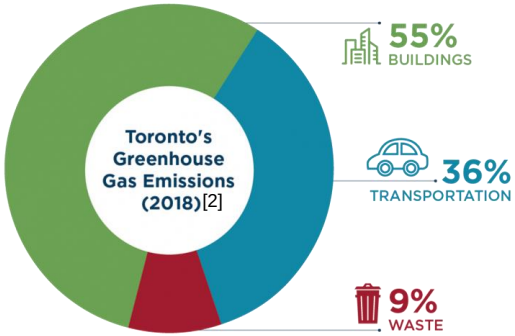


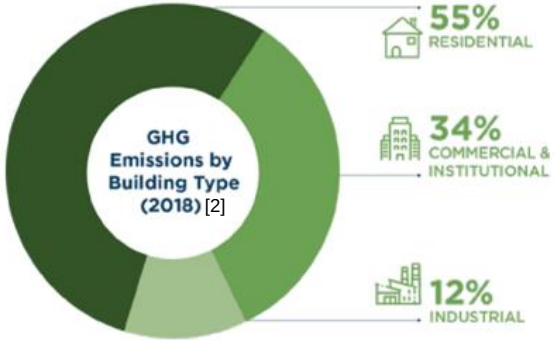

INTRODUCTION

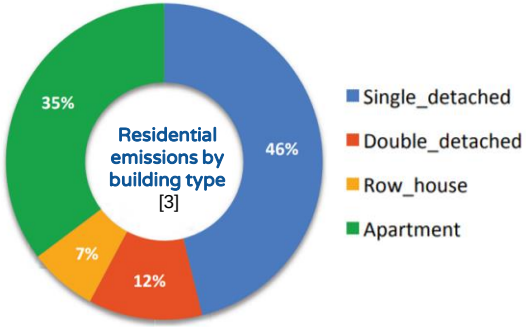
EXPANDING HOUSING OPTIONS IN NEIGHBOURHOODS:



RESIDENTIAL CARBON EMISSIONS:







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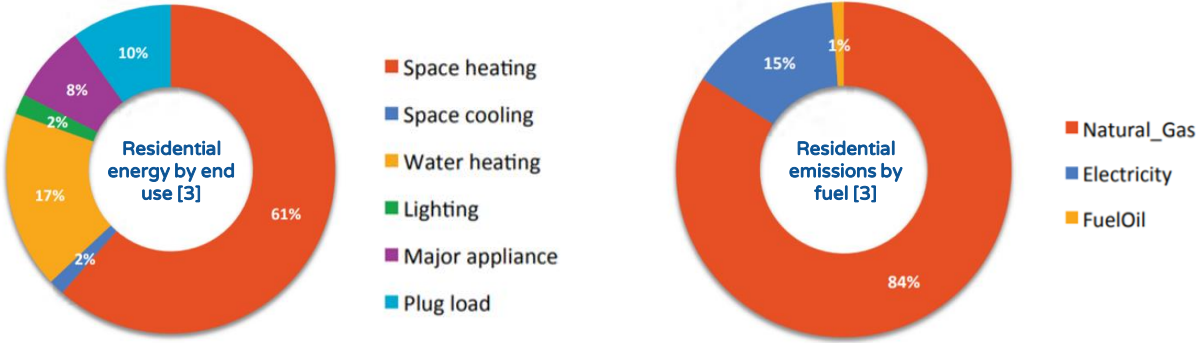
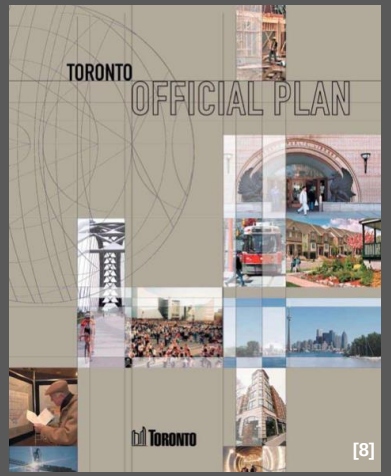


TRANSFORMING TORONTO:

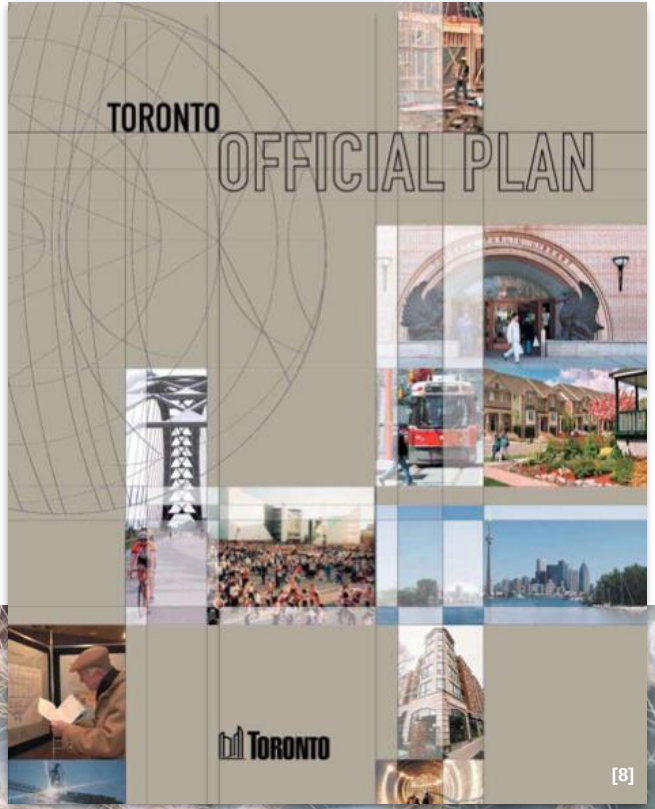
TORONTO [4]

TransformTO [7]



TRANSFORMING TORONTO:

"We have to meet the needs of today without compromising the ability of future generations to meet their needs." (p. 1-1)



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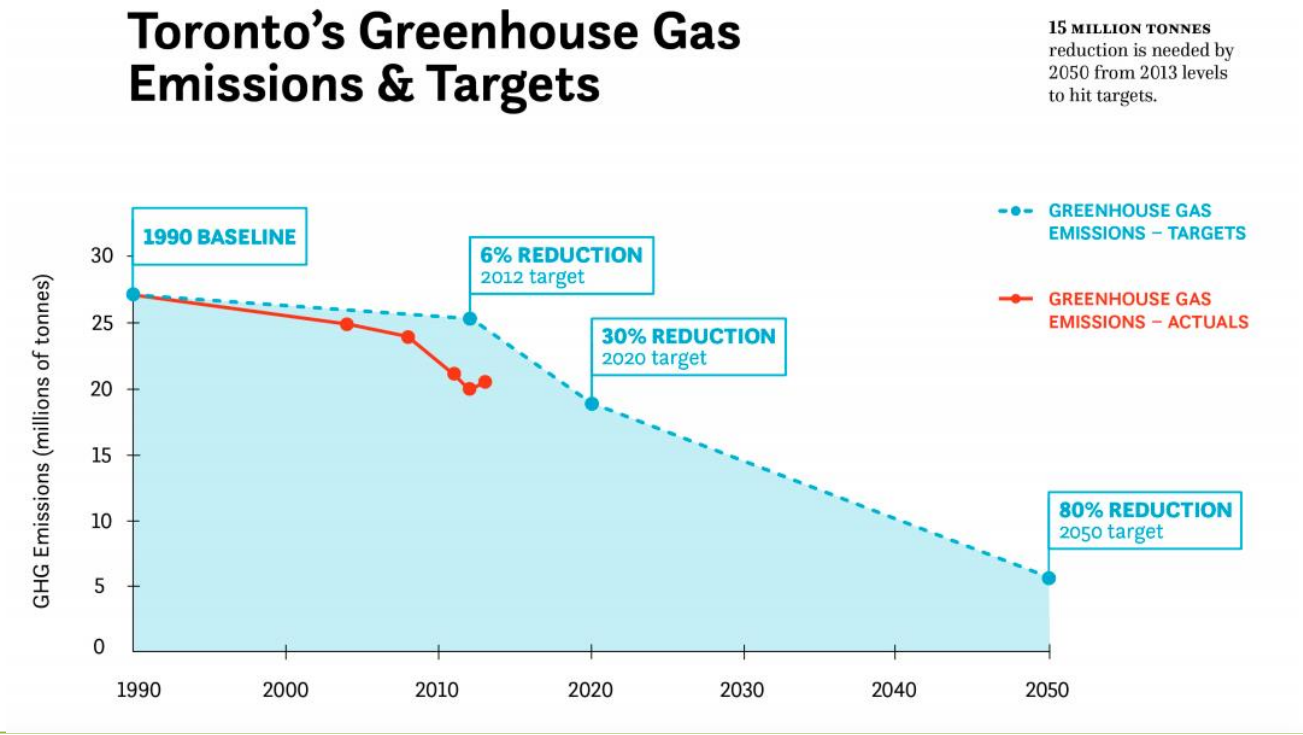
TRANSFORMING TORONTO:



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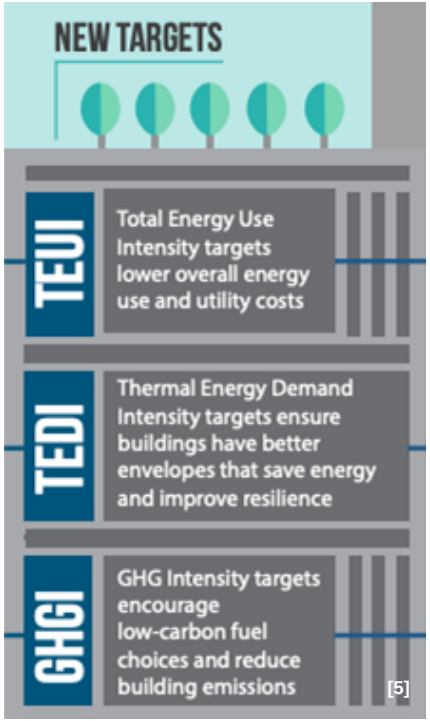
TRANSFORMING TORONTO:



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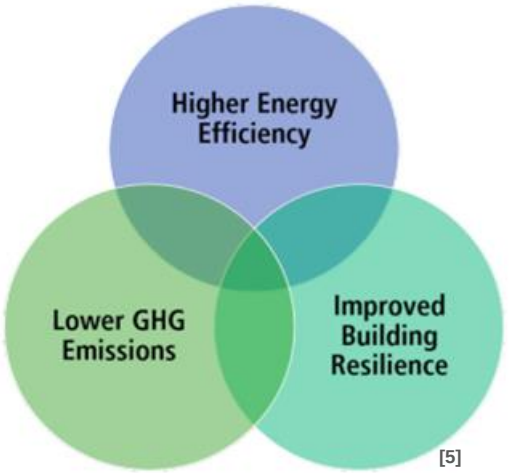


[5]

1. maximized operating efficiency;
2. minimized embodied carbon;
3. reliance on renewable energy; and
4. minimized lock in effects by delivering all of the above as soon as possible.

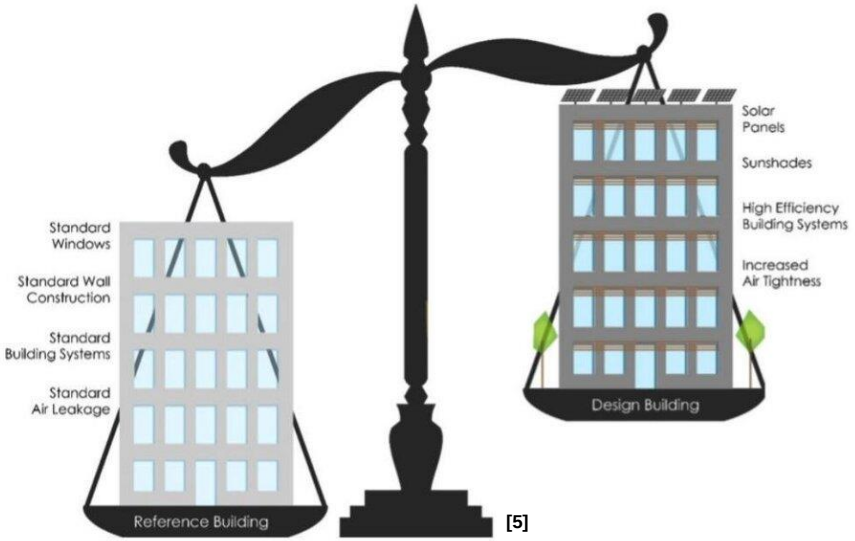
Source: Barnhardt, 2021, p. 4

TRANSFORMING TORONTO:

2018	2022	2026	2030
V3 Tier 1	--	--	--
V3 Tier 2	V4 Tier 1	--	--
V3 Tier 3	V4 Tier 2	V5 Tier 1	--
V3 Tier 4	V4 Tier 3	V5 Tier 2	V6 Tier 1

Off-site renewable energy procurement = Zero Emission Buildings

TRANSFORMING TORONTO:



[5]

TRANSFORMING TORONTO:


[10]


[11]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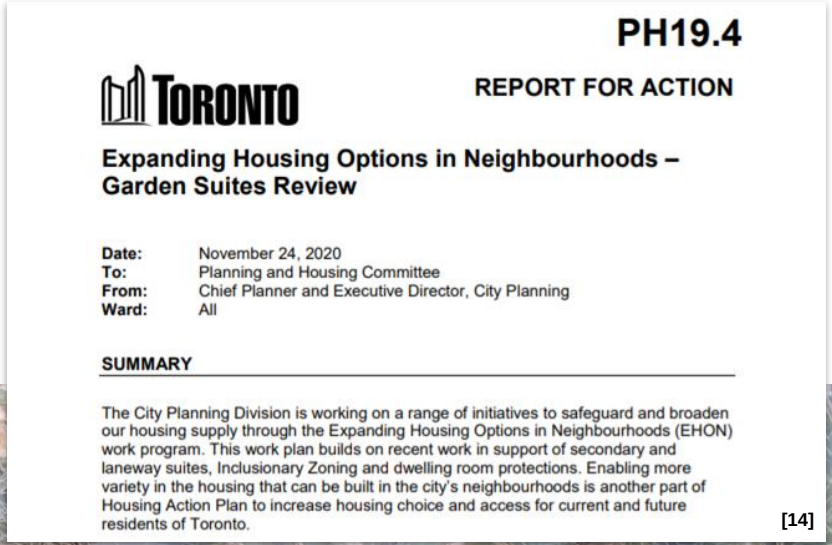
THE QUESTION:

How do we add more housing stock and reduce carbon emissions?

FINDING AN **ANSWER:**

- Low carbon Garden Suites
- Provide data and recommendations



PH19.4

TORONTO

REPORT FOR ACTION

Expanding Housing Options in Neighbourhoods – Garden Suites Review

Date: November 24, 2020
To: Planning and Housing Committee
From: Chief Planner and Executive Director, City Planning
Ward: All

SUMMARY

The City Planning Division is working on a range of initiatives to safeguard and broaden our housing supply through the Expanding Housing Options in Neighbourhoods (EHON) work program. This work plan builds on recent work in support of secondary and laneway suites, Inclusionary Zoning and dwelling room protections. Enabling more variety in the housing that can be built in the city's neighbourhoods is another part of Housing Action Plan to increase housing choice and access for current and future residents of Toronto.

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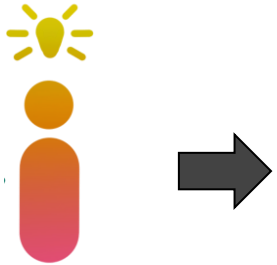
METHODOLOGY

AN IDEA:



sustainable.

Paul Dowsett
Principal Architect
OAA, FRAIC, LEED AP
CanPHI Passive House Planner

Local experience and international competition-winning housing of all scales and types, especially low-cost/low-energy housing.
Local highlights include net-zero /non fossil-fuel houses, laneway houses (pre/post-bylaw), and garden suites (pending approval).

THE ARCHITECT BUILDERS COLLABORATIVE Inc.

Daniel Hall
Director of Design
OAA, MRAIC, LEED AP

25 years of design and construction experience, primarily focused on affordable and sustainable housing of all typologies.
Local highlights include the completion of 62 laneway suite assessments, with 9 laneway suite projects currently in-progress.

AND AN INTERNSHIP:

Allison Evans
Student Intern
Technologist OAAAS
MES Planning 2021,
York University

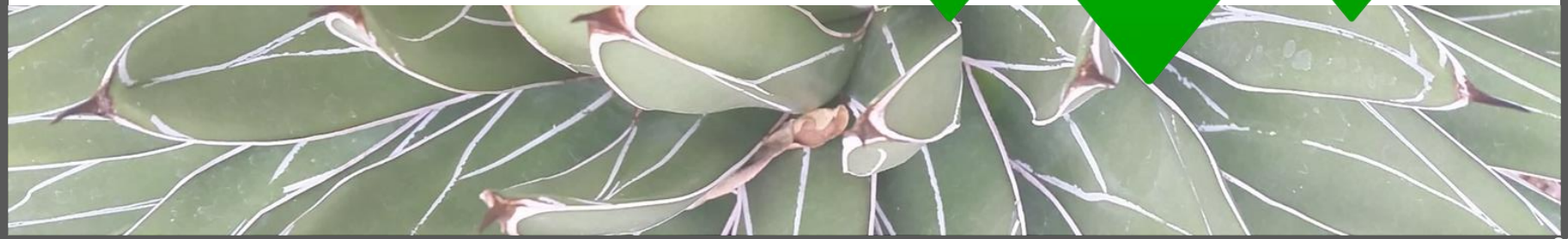
Allison practiced residential architecture for nearly a decade, working professionally with Daniel for several years before pursuing environmental studies and planning.

Katie Rand
Research Assistant / Junior Designer
MSc Sustainability and Adaptation in the Built Environment
BA (Hons) Architecture

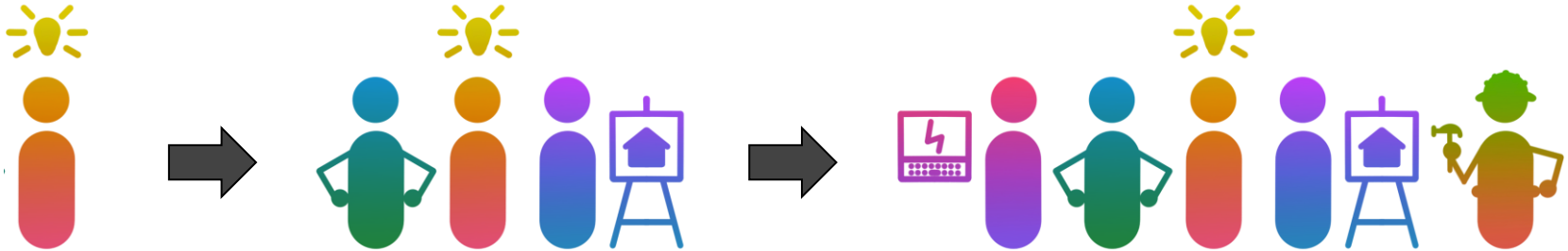
Katie studied architecture in the UK before transitioning to Sustainability and Adaptation in the Built Environment for her masters. She is assisting Allison and is working with Daniel.

WORKING **HYPOTHESIS:**

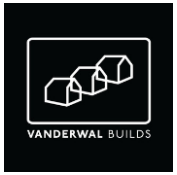
A better-than-code (i.e., better than OBC SB-12 minimum requirement for energy efficiency) Garden Suite can be cost-effective and affordable.



BRING IN EXPERT ASSISTANCE:

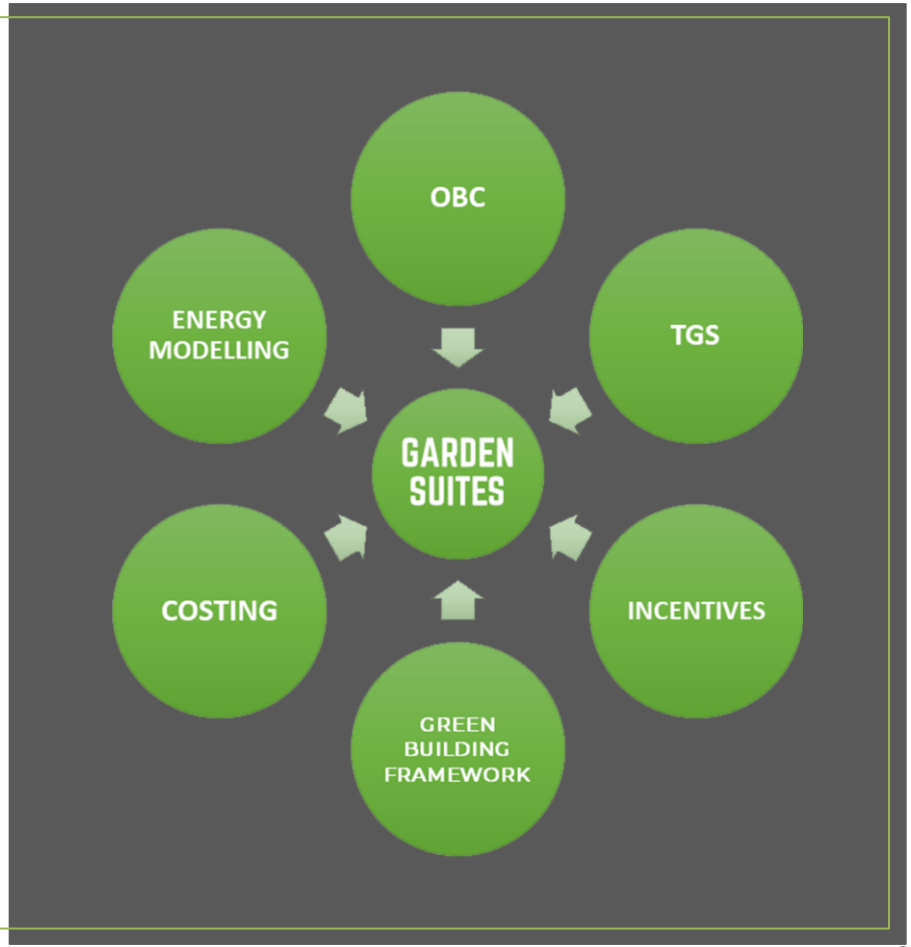


THE EXPERT ASSISTANCE:



DEVELOP AN ENERGY EFFICIENCY CONTINUUM:

- Create from existing green building frameworks?
- Adapt TGS to smaller-scale buildings?



STEP 1

OBC SB-12

Base case

STEP 2

ENERGY STAR

+20% efficiency

STEP 3

NET ZERO READY

+50-80% efficiency

STEP 4

PASSIVE HOUSE STANDARD

+80% efficiency

STEP 1

OBC SB-12

Base case

[15]


STEP 1
OBC SB-12
Base case
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STEP 4

PASSIVE HOUSE STANDARD

+80% efficiency

STEP 4

PASSIVE HOUSE STANDARD

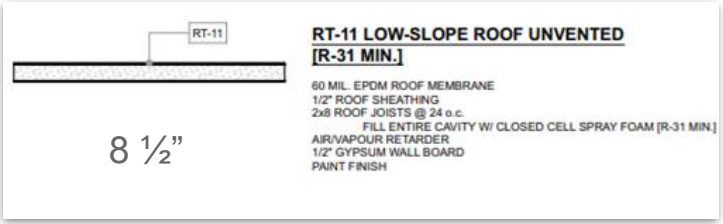
+80% efficiency

PRESCRIPTIVE CHART:

Garden Suite Energy Step Scenarios (based on OBC SB-12)					**But not TEDI (SHD) require
		STEP 1	STEP 2	STEP 3	STEP 4
Component	Thermal Values	OBC Min. (base case, Zone 1, 3.1.1.2.A)	TGS Tier 1 (Energy Star, 20% above code)	TGS Tier 3 (CBHA NZr, up to 80% above code)	TGS Tier 4, (Passive House Standard) from Russell
Ceiling w/out Attic Space	Min. Nominal R	31	44	65	85
	Clearfield	**26.35**	**37.4**	**55.25**	**72.25**
Walls above grade	Min. Nominal R	22	30	47	58
	Clearfield	**18.7**	**25.5**	**39.95**	**49.3**
Basement Walls	Min. Nominal R	20	28	47	58
	Clearfield	**17**	**23.8**	**39.95**	**49.3**
Below grade slab (>600 mm below grade)	Min. Nominal R	—	15	30	30
	Clearfield	-	12.75	25.5	25.5
Heated slab or slab (≤600 mm below grade)	Min. Nominal R	10	15	30	30
Edge of below grade slab (≤600 mm below grade)	Min. Nominal R	10	15	35	30
Windows - Fixed	Max. U	0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.12 Btu/(h•ft²•F)	0.12 Btu/(h•ft²•F)
Windows - Operable		0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)
SHGC		0.35	0.35	0.35	0.4
Doors		0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)
Space Heating Equipment	Min. AFUE	96% gas furnace	Hybrid system: 96% AFUE ENERGY STAR gas furnace, w/ ASHP (HPSF 8.2) Operation: Furnace <-5C ASHP >-5C	Mini-split ASHP, 7.1 HPSF, SEER 14	Mini-split ASHP, 7.1 HPSF, SEER 14
Heating Airflow	cfm	550.00	400.00	included in COPs	
Fan Power	W/cfm	0.30	0.30	included in COPs	
Space Cooling Equipment		EER 11 Window Shaker	SEER 14? 2 stage compressor (not AS crappy)	Mini-split ASHP, 7.1 HPSF, SEER 14	Mini-split ASHP, 7.1 HPSF, SEER 14
HRV Efficiency	Min. SRE	75%	75%***	89%*	93%
HRV Outdoor Air	cfm	low speed = 50 High speed = 100	low speed = 50 High speed = 100	low speed = 50 High speed = 100	low speed = 50 High speed = 100
HRV fan power	W/cfm	1.10	1.10	0.60	0.60
Domestic Water Heater (min. efficiency)	Min. EF	Gas: 0.8	Gas: 0.80 Electric: 0.93	Electric 0.93	Residential DHW-HP COP 2.5
Window to Wall Ratio		17%	20% max	20% max	25% max
Air Tightness	ACH @ 50Pa	3.0 ACH @50pa*	2.5 ACH @50pa;	1.0 ACH @50pa*	0.6 ACH @50pa
Solar Capacity****		x	x	Y	Y
Lighting (% LED vs CFL)**		50	75	100	100
Lighting power density	w/ft2	suite = .46 crawlspace= 0.14	suite = .38 crawlspace= 0.12	suite = .28 crawlspace= 0.1	suite = .28 crawlspace= 0.1
Operating Timeframe	Years	20	20	20	20

BUILDING **ENVELOPE:**

STEP 1 Wall and Roof Assembly



STEP 4 Wall and Roof Assembly

MECHANICAL SYSTEMS:

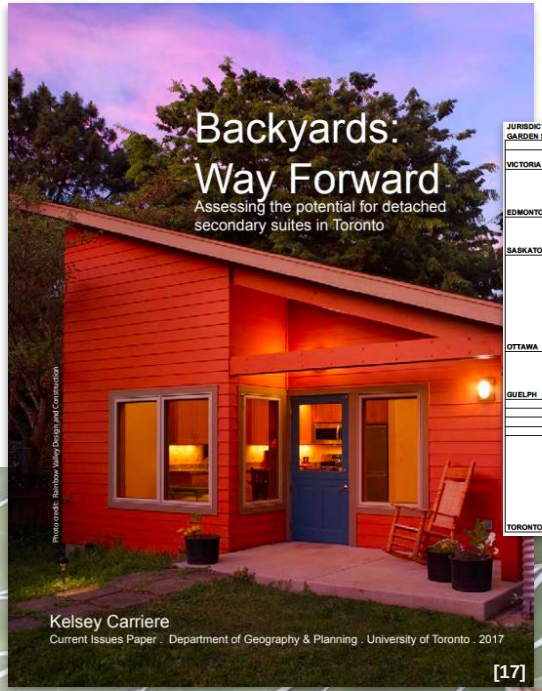
[16]

MITSUBISHI ELECTRIC *Changes for the Better*	Dettson	iFLOW
		

MATERIAL CONSIDERATIONS:

7	**Thermal & Moisture Protection**				
	EXTERIOR CLADDING				
	Vinyl siding & trim				
	Cement board panels (e.g., Hardie)	x			
	Wood siding (e.g., Accoya)		x	x	x
	EPDM roofing		x	x	x
		x			
	REFER TO DRAWINGS FOR ASSEMBLY DETAILS				
	AIR/ VAPOUR BARRIER				
	Tyvek (or similar)	x			
	Polyethelene vapour barrier	x	x		
	Smart vapour barrier (e.g., Certainteed)		x	x	x
	Smart air vapour barrier			x	x
	INSULATION				
	Batt, fibreglass	x			
	Mineral wool, blown		x	x	x
	Stone wool, batt		x	x	x
	Stone wool, rigid (Stone Board in drawings)		x	x	x
	Stone wool, semi-rigid		x	x	x
	XPS, rigid	x			
	Spray foam, closed cell	x			

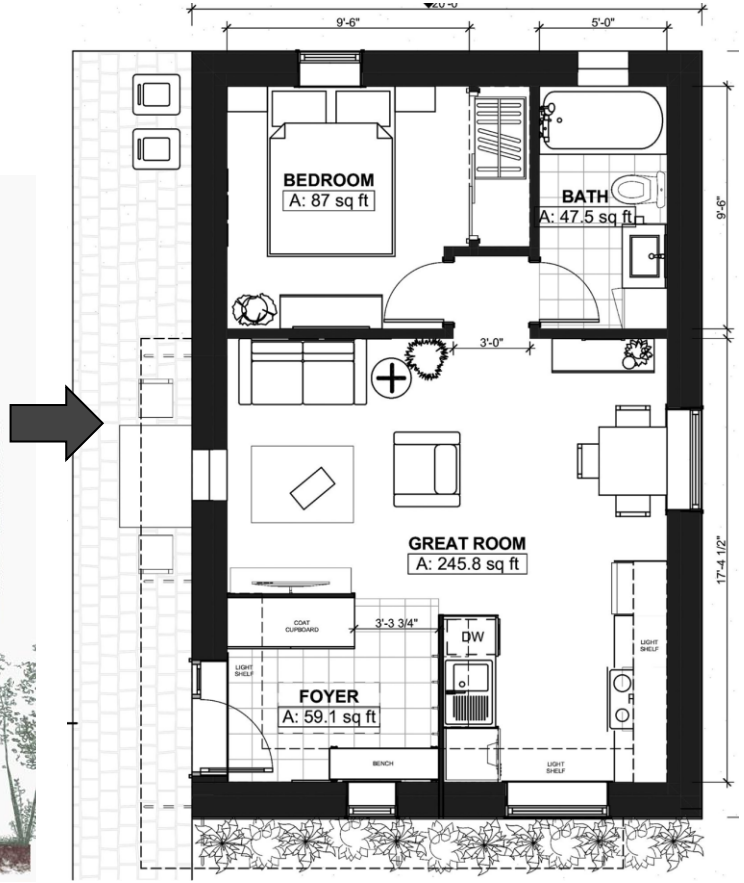
DESIGN A GARDEN SUITE:



JURISDICTIONAL SCAN - GARDEN SUITE ZONING

	SIDE	REAR	MAX TOTAL FLR AREA (m2)	MAX 2ND FLOOR AREA	LOT COVERAGE	MAX. HEIGHT	SECOND FLOOR ALLOWED	ADDITIONAL NOTES
VICTORIA	0.6M	0.6M	37m2		30-40% MAX, DEPENDING ON EXISTING ZONE REQUIREMENT	3.5M	UNSURE	
EDMONTON	REQ'D. SETBACK FOR ZONE	0.6M	130m2	50-60m2 DEPENDING ON ZONE	18% FOR GARDEN SUITE & OTHER ACCESSORY BUILDINGS, TOTAL SITE COVERAGE INCLUDING ACCESSORY AND PRINCIPAL DWELLING SHOULD NOT EXCEED THE TOTAL MAX. COVERAGE BY MORE THAN 2% OF SITE AREA	1. 6.5M WHERE ROOF SLOPE IS 4/12 OR GREATER 2. 6.2M LESS THAN 4/12 SLOPE 3. NO LANE 4.3M MAX. RULES FOR PARAPETS	Y BUT W/CONDITIONS	
SASKATOON	0.75 BUT MIN 1.0M ON ONE SIDE	2M	CANNOT EXCEED 77m2 OR THE AREA OF THE PRINCIPAL DWELLING, WHATEVER IS LESS	GFA OF SECOND FLOOR SHALL NOT EXCEED 80% OF THE GFA OF THE FIRST STOREY	REAR YARD COVERAGE 50% MAX	6.6M INCREASED TO 6.2M TO MEAN HT BETWEEN EAVES AND RIDGE ON BUILDINGS WITH GABLE, HIP, GAMBREL ROOF	Y BUT W/CONDITIONS	
OTTAWA	REAR & INTERIOR SIDE LOT LINE: URBAN AREA: 1M MAX/MUM **OR** URBAN & RURAL AREA: 4M MIN/MUM	REAR & INTERIOR SIDE LOT LINE: URBAN AREA: 1M MAX/MUM **OR** URBAN & RURAL AREA: 4M MINIMUM			**URBAN AREA:** 1. CANNOT EXCEED 80M2 FOOTPRINT IN THE URBAN AREA 2. NOT BE GREATER IN SIZE THAN 40% OF THE FOOTPRINT OF THE PRINCIPAL DWELLING UNIT 3. EXCEED A LOT COVERAGE OF 40% OF THE YARD IT IS LOCATED	**URBAN AREA:** 1.MAX. HT. NOT TO EXCEED BLDG HT. OF EXIST. PRIMARY DWELLING 3.6M, MAX. HT. BUT FLAT ROOF NOT TO EXCEED 3.2M 3. NOT PERMITTED TO HAVE SHED STYLE ROOF IN THE URBAN AREA	**Urban 2-Storey Coach Houses OP Policy 3.1:** An application to allow the height of up to a two storey coach house in the urban area through a minor variance may be considered where the conditions for minor variances have been considered and the coach house is proposed to contain a garage on the main level.	**NOTE:** Where windows are desired, the Zoning By-law performance standard requires a coach house to be 4 metres from a rear and interior side lot line.
GUELPH	CONTACT FOR MORE INFO/SITE SPECIFIC	CONTACT FOR MORE INFO/SITE SPECIFIC	80m2 OR 45% OF GFA OF MAIN BUILDING		30% INCLUDING ADDITIONAL ACCESSORY BUILDINGS ON LOT	5M, 6.1M WITH GARAGE BELOW, CANNOT EXCEED OVERALL HEIGHT OF MAIN DWELLING	UNSURE	**NOTE:** Not allowed in houses with more than 2 units (triplex, four-plex etc.). Additional min. 1 parking required per dwelling unit; 1 off street min 3m X 6m; exterior min 2.5m X 5.5m. Not allowed in R.3A zones (Cluster townhouses).
TORONTO LANEWAY SUITE	1. 0.0M IF SIDE LOT LINE DOES NOT ABUT A STREET OR LANE & NO OPENINGS (DOORS, WINDOWS) 2. REQD MIN. SIDE YARD SETBACK FOR RESIDENTIAL DWELLING IF ABUTTING STREET 3. IN ALL OTHER CASES, 1.5M	0.0M IF REAR LOT LINE DOES NOT ABUT STREET OR LANE AND THERE ARE NO OPENINGS (DOORS, WINDOWS) IN ALL OTHER CASES 1.5M	MUST BE LESS THAN THE GFA OF THE RESIDENTIAL BUILDING ON THE LOT		MAY NOT EXCEED 30% OF THE LOT AREA	4M OR 6M DEPENDING ON DISTANCE FROM RESIDENTIAL BUILDING	Y	

DESIGN A GARDEN SUITE:



ZONING SUMMARY:

LOT DETAILS	Existing	Bylaw	Proposed
Area [m2]:	335.02		335.02
Lot Width [m]:	9.14		9.14
Frontage [m]:	9.14		9.14
Lot Depth [m]:	36.58		36.58
Rear Yard Area:	**188.13**		**188.13**

GARDEN SUITE DETAILS				
DIMENSIONS	Existing	Bylaw	Proposed	Notes
Length:			9.14	
Width:			6.10	
Height:		4.0m max.	4.00	10.5.60.40 (2) assumed zoning
Storeys:			1	

SETBACKS & SEPARATION DISTANCE	Existing	Bylaw	Proposed	Notes
Rear Yard:		0.30	1.2	10.5.60.20 (2)(C) assumed by-law
Side Yard North:		0.30	1.2	10.5.60.20 (3)(C) assumed by-law
Side Yard South:		0.30	1.9	10.5.60.20 (3)(C) assumed by-law
Separation from House:		Min 7.50	10.2	assumed from laneway by-law
COVERAGES				
Building Footprint [m²]:			55.7	
Lot Coverage (%):		10% max	17%	7% over per 10.5.60.70 (1)(B) assumed by-law
Rear Yard Coverage (%):			30%	
SOFT LANDSCAPING				
Rear Yard Soft Landscaping [m2]:	**188.13**	50% required	**132.39**	10.5.50.10 (3) residential buildings other than an apartment building
Rear Yard Soft Landscaping (%):			**70%**	min. 50% rear yard soft landscaping required for lot frontages > 6.0m
MAXIMUM FLOOR AREAS [m²]		Max 40m2	55.74	15 m2 over per 10.5.60.50 (2)(B) assumed by-law

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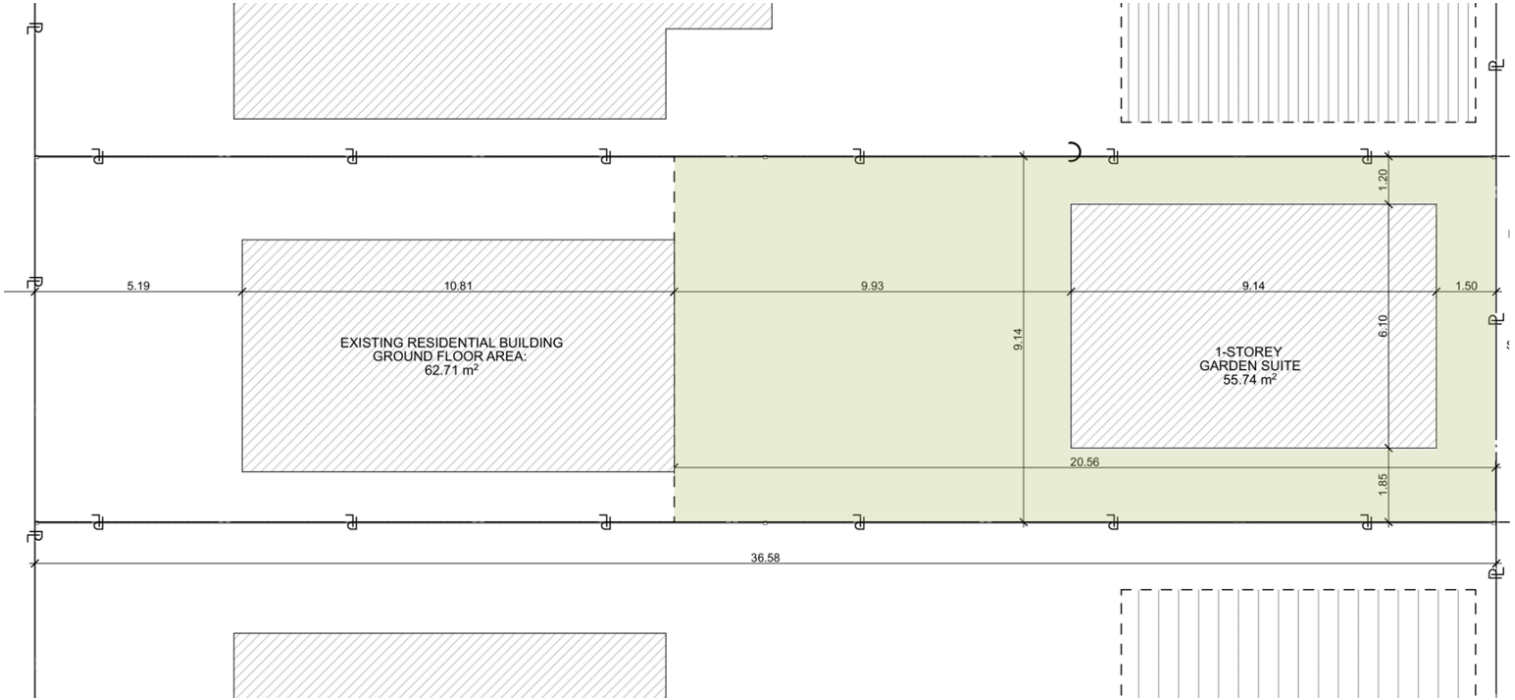
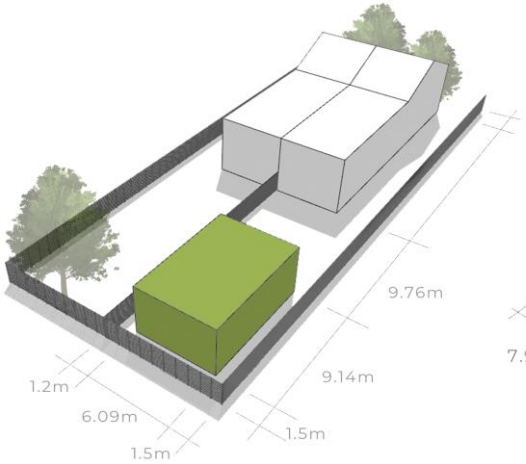
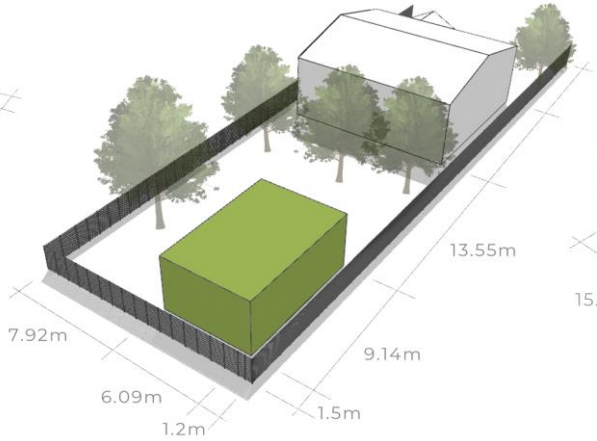


LOT STUDY:



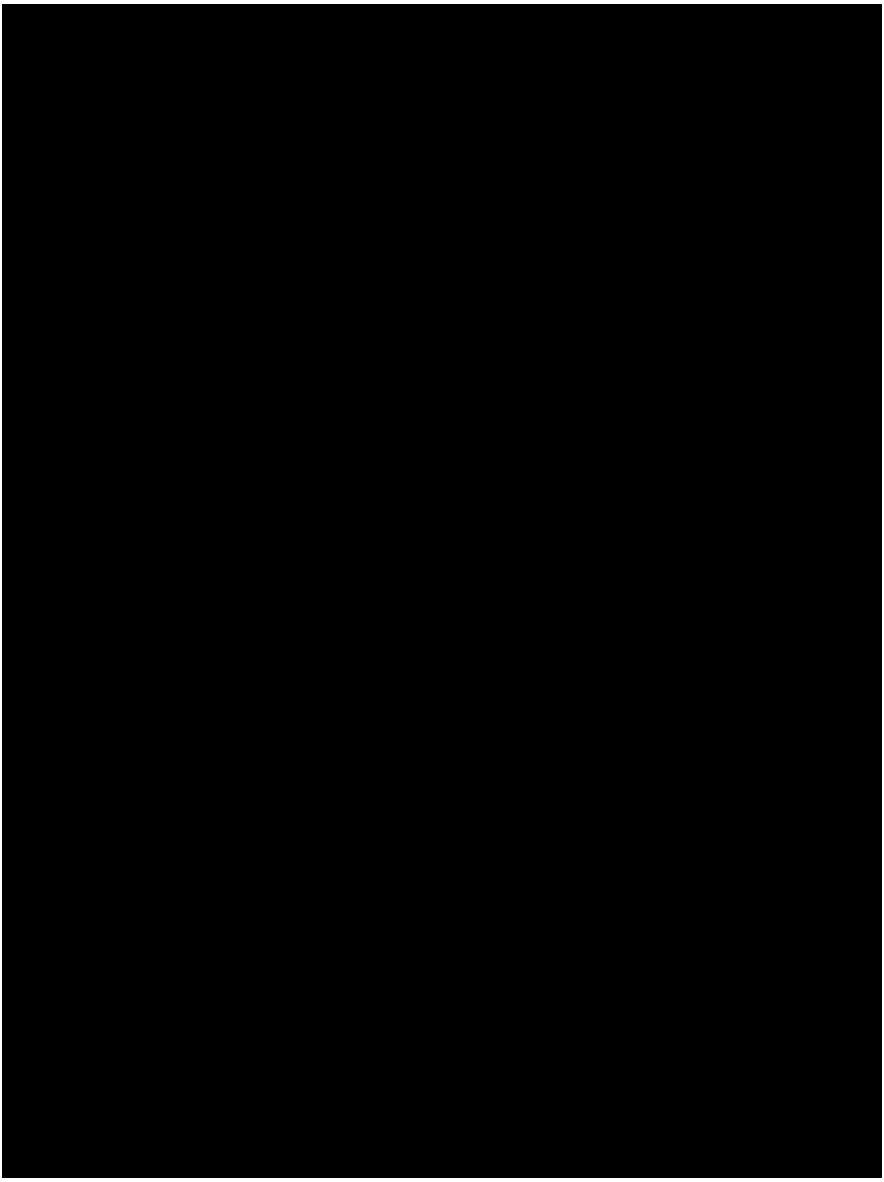
MEDIUM



LARGE

EXTRA LARGE

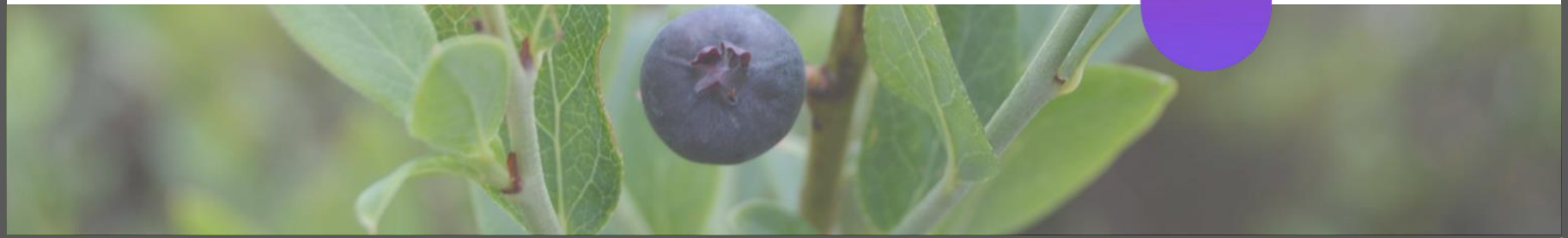
1-STOREY GARDEN SUITE:



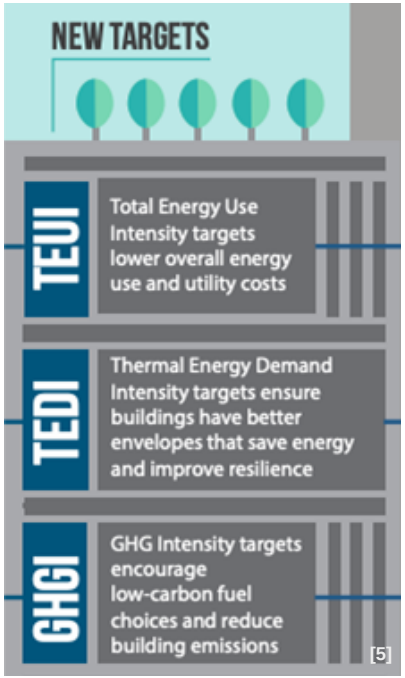
RESULTS

ENERGY PERFORMANCE COMPARISONS:

What is the estimated energy performance and carbon intensity of each Energy Step?



ENERGY PERFORMANCE COMPARISONS:



ENERGY PERFORMANCE COMPARISONS:

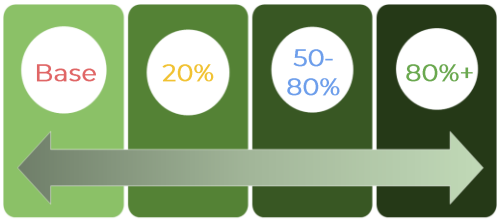
TARGETS

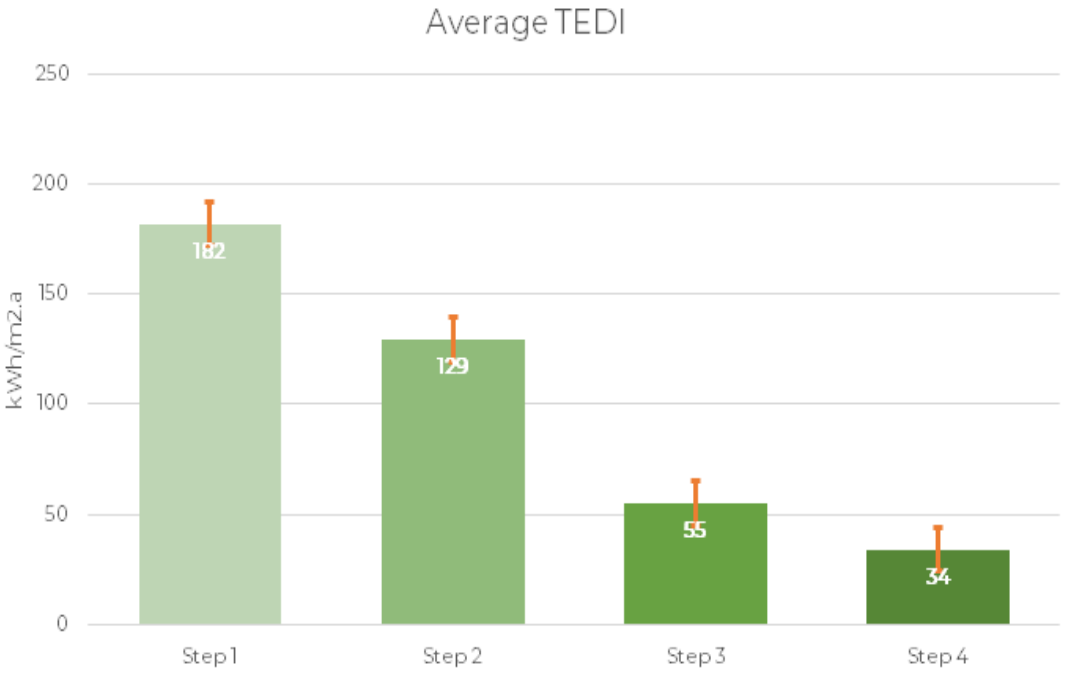
Step 1 = 182

Step 2 = 145

Step 3 = 109-36

Step 4 = 36





ENERGY PERFORMANCE COMPARISONS:

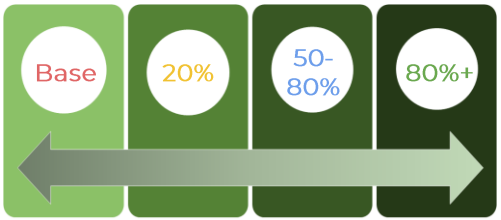
TARGETS

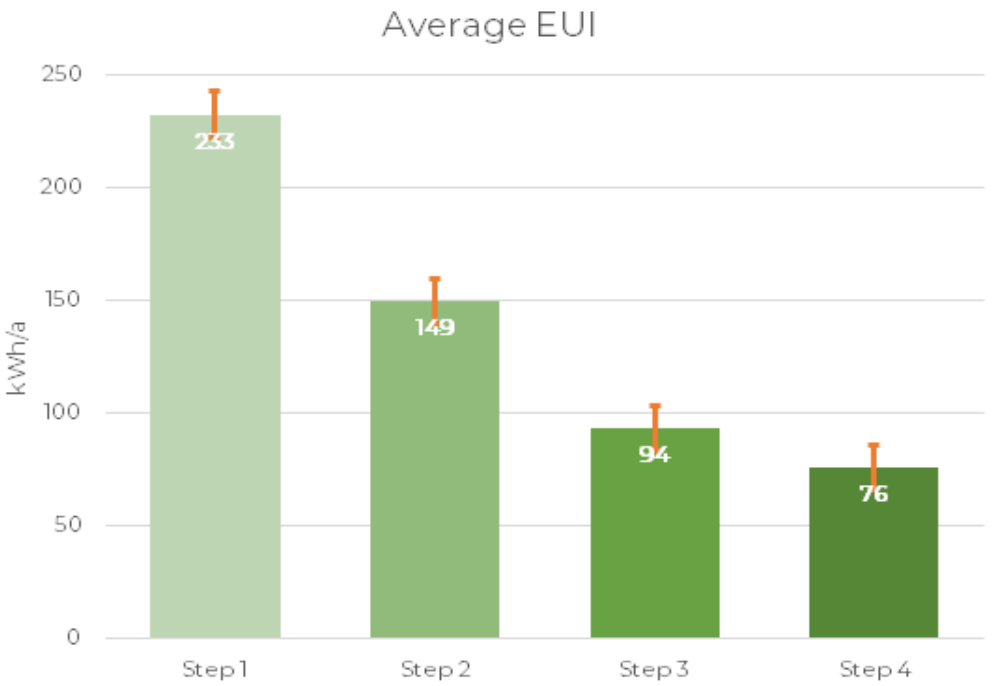
Step 1 = 233

Step 2 = 185

Step 3 = 139-46

Step 4 = 46





ENERGY PERFORMANCE COMPARISONS:

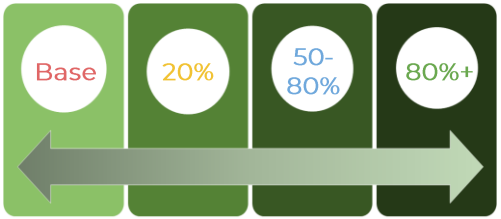
TARGETS

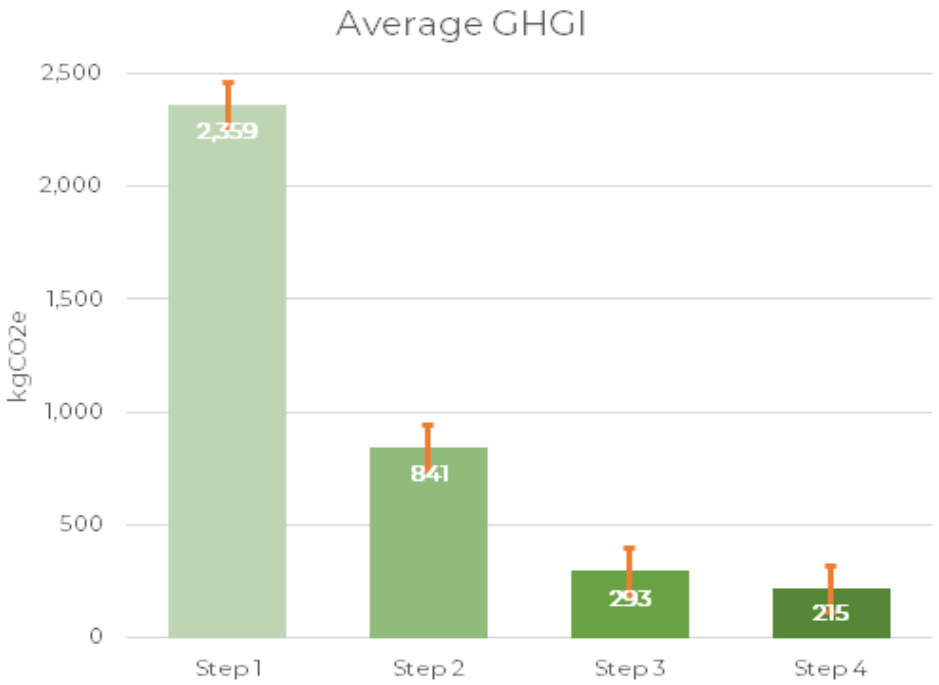
Step 1 = 2359

Step 2 = 1887

Step 3 = 1415-471

Step 4 = 471





ENERGY PERFORMANCE COMPARISONS:

Equivalency Results How are they calculated?

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

1,984 **Kilograms**

Greenhouse gas emissions from

0.432

Passenger vehicles driven for one year

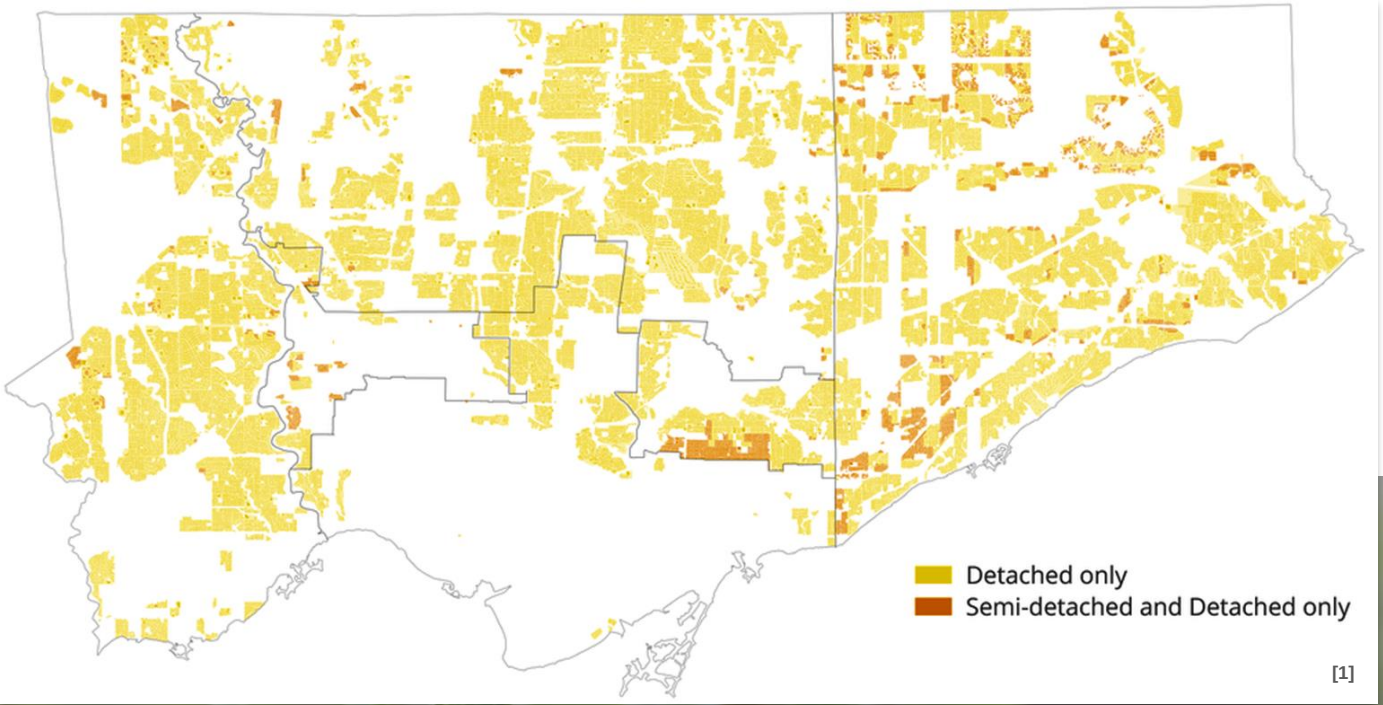
-or-

4,987

Miles driven by an average passenger vehicle

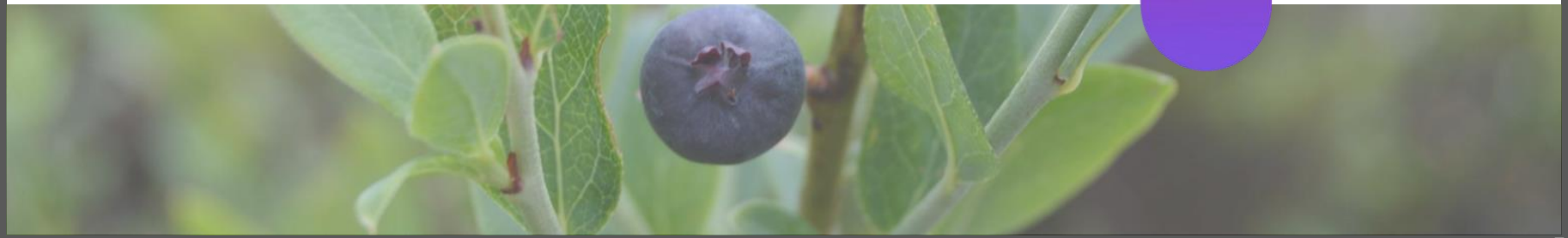
[18]

ENERGY PERFORMANCE **COMPARISONS:**

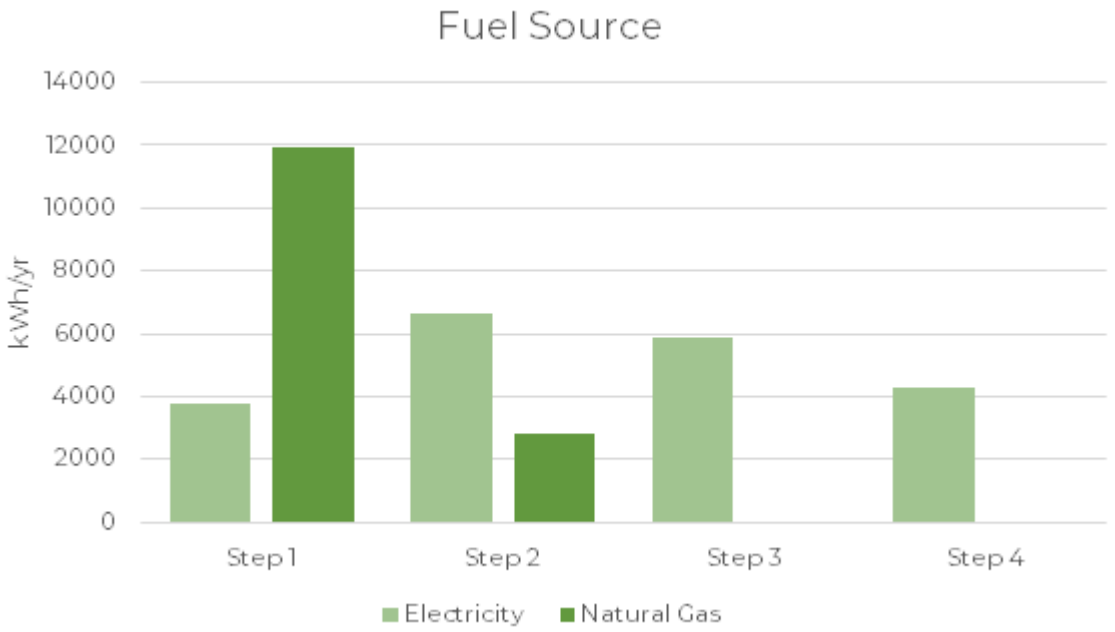


OPERATIONAL **COST COMPARISONS:**

What is the estimated operational cost over time for each Energy Step?



OPERATIONAL **COST COMPARISONS: 1 Year**



OPERATIONAL **COST COMPARISONS: 1 Year**

TOU period	Hours	Price
Off-peak	Weekdays from 7 p.m. to 7 a.m. and all day weekends and holidays	8.2 ¢ per kWh
Mid-peak	Weekdays from 7 a.m. to 11 a.m. and 5 p.m. to 7 p.m.	11.3¢ per kWh
On-peak	Weekdays from 11 a.m. to 5 p.m.	17.0¢ per kWh

	on-peak	mid-peak	off-peak
price per kWh	$0.17	$0.11	$0.08
regulatory charge	0.00208	0.00208	0.00208
Delivery Charge	0.06104	0.06104	0.06104
HST	0.01404	0.01404	0.01404
Total price per kWh	$0.25	$0.19	$0.16

SAMPLE MONTHLY BILL STATEMENT

Toronto Hydro-Electric System Limited - RESIDENTIAL

Account Number: 000 000 000 0000
Meter Number: 0000000

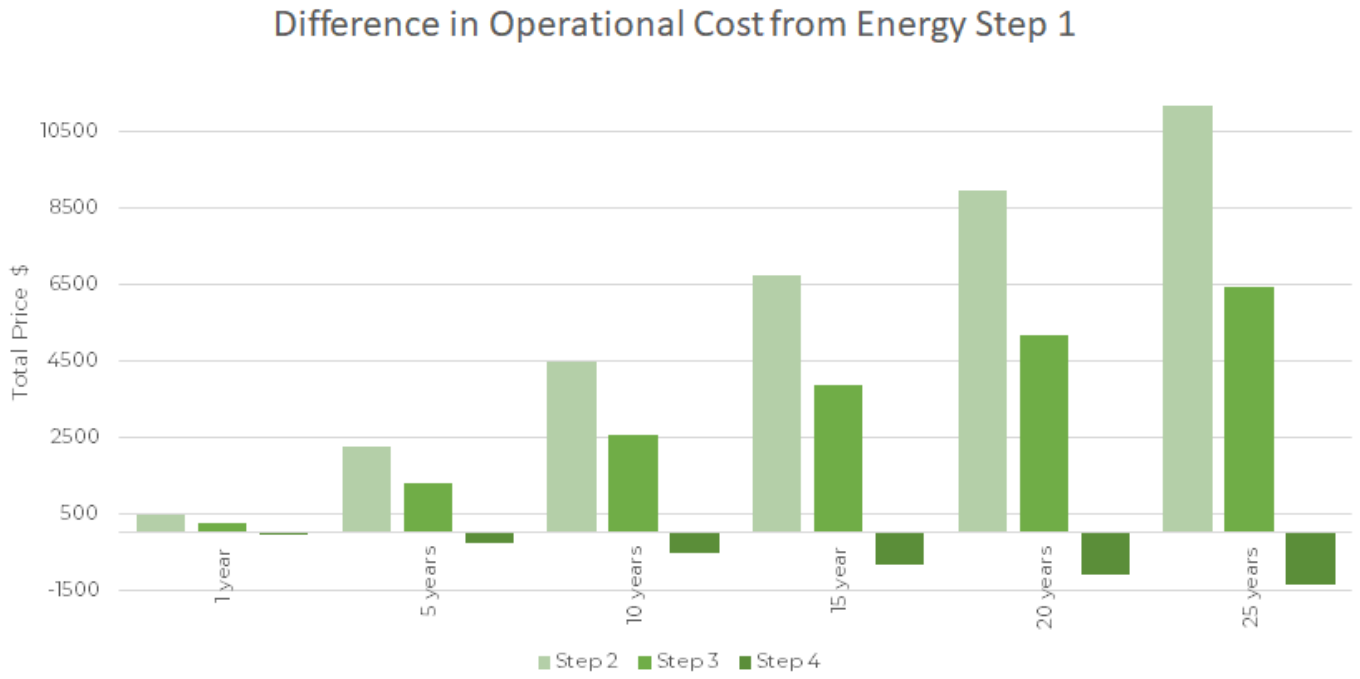
Your Electricity Charges

Electricity	
Off-Peak @ 8.2 ¢/kWh	$16.64
Mid-Peak @ 11.3 ¢/kWh	$6.45
On-Peak @ 17 ¢/kWh	$9.70
Delivery	$44.56
Regulatory Charges	$1.52
Total Electricity Charges	**$78.86**
HST	$10.25
Ontario Electricity Rebate	**(-$14.90)**
Total Amount	**$74.21**

OPERATIONAL **COST COMPARISONS:**

OPERATIONAL **COST COMPARISONS:**

OPERATIONAL **COST COMPARISONS:**



CONSIDER UPFRONT EMBODIED CARBON:

"Buildings contribute to climate change in three distinct ways:"

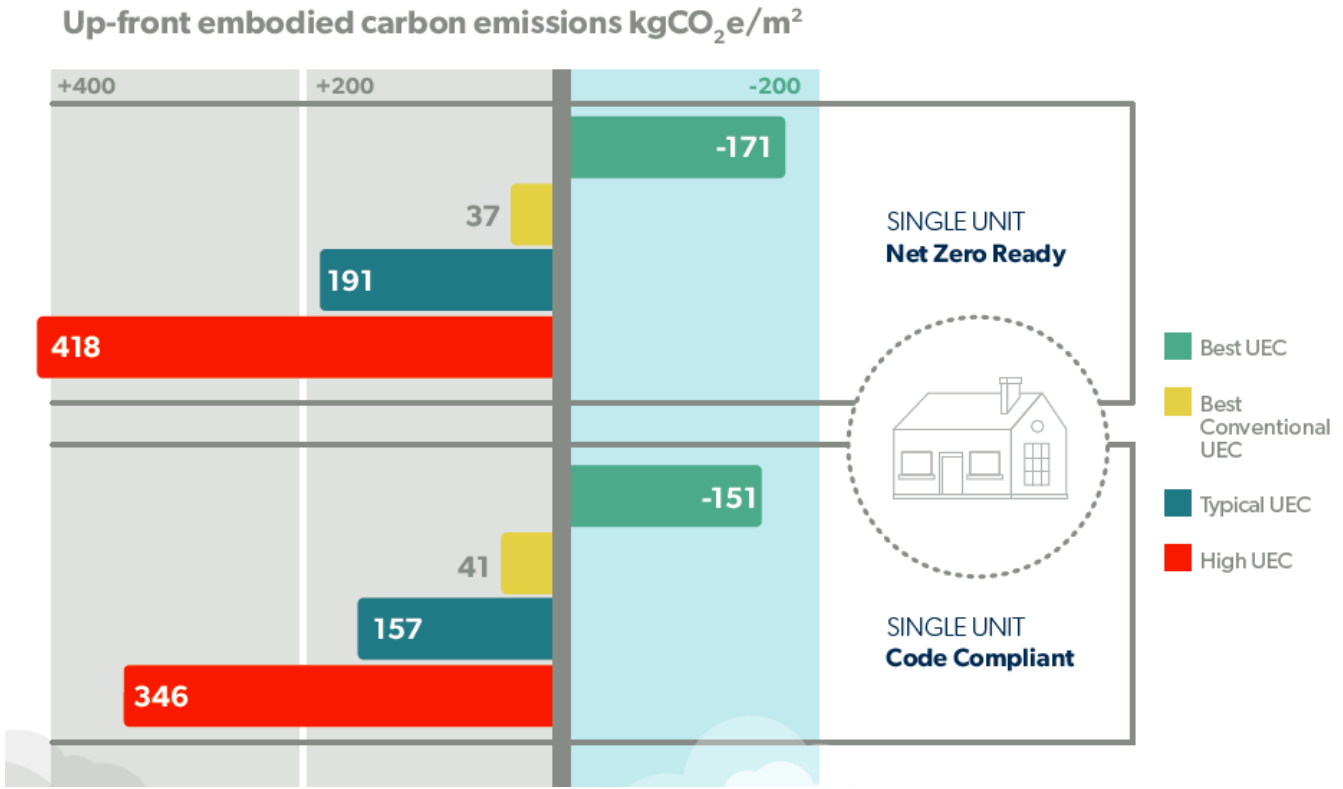
1. Up-front embodied carbon

1. Energy efficiency

1. Fuel source emissions

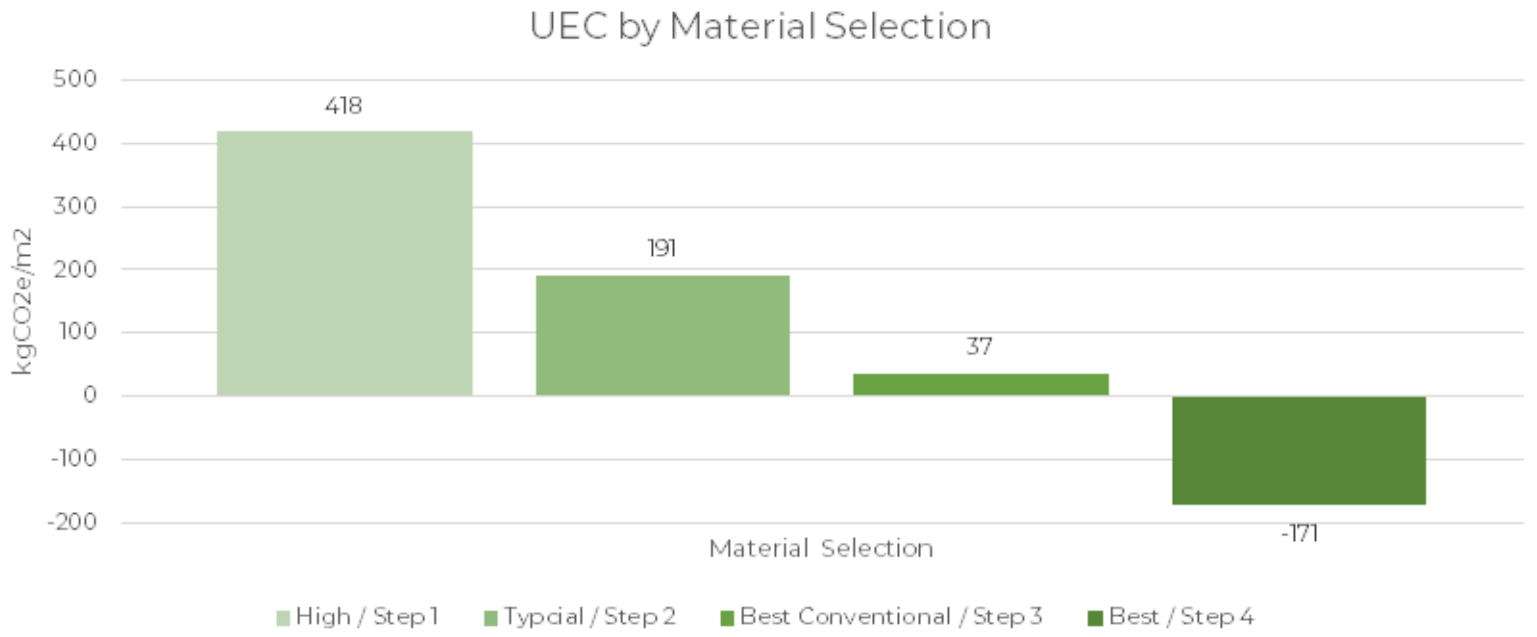
STEP 3

STEP 1



[19]

MATERIALS **MATTER:**



CARBON **PAYBACK ANALYSIS:**

Chart 1 – Carbon Payback Analysis Natural Gas Heating Scenario (0-16 Years)

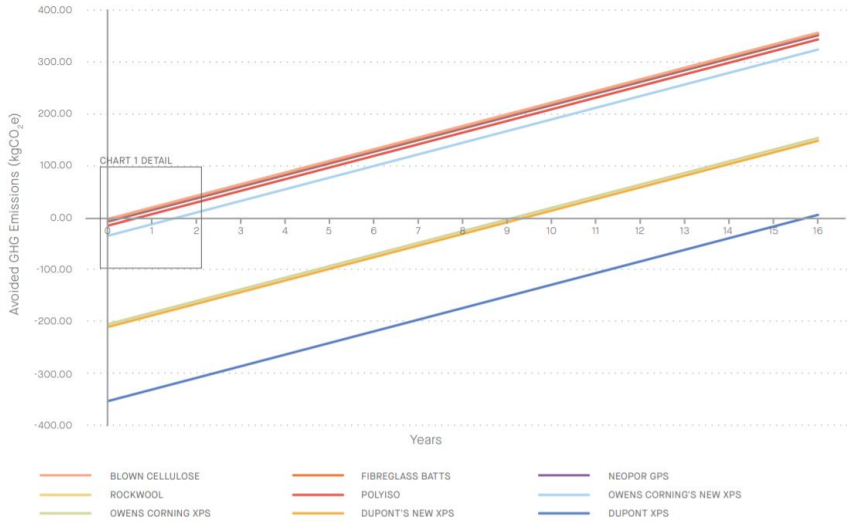
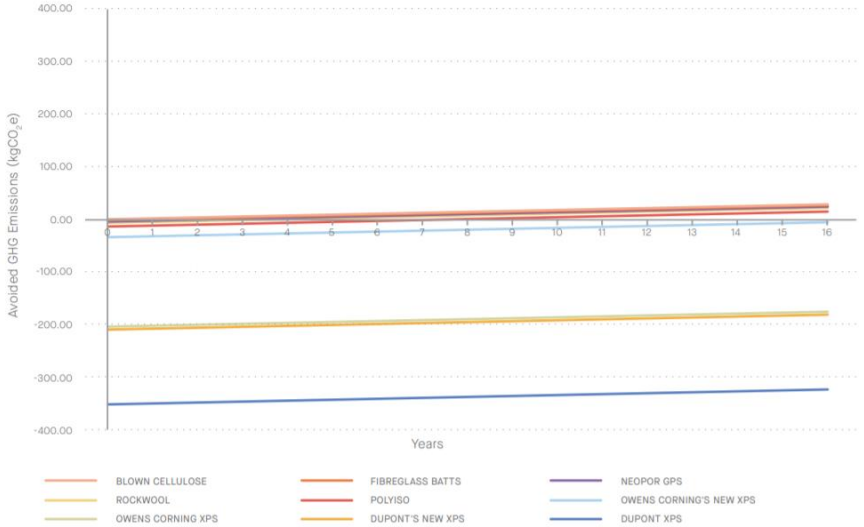
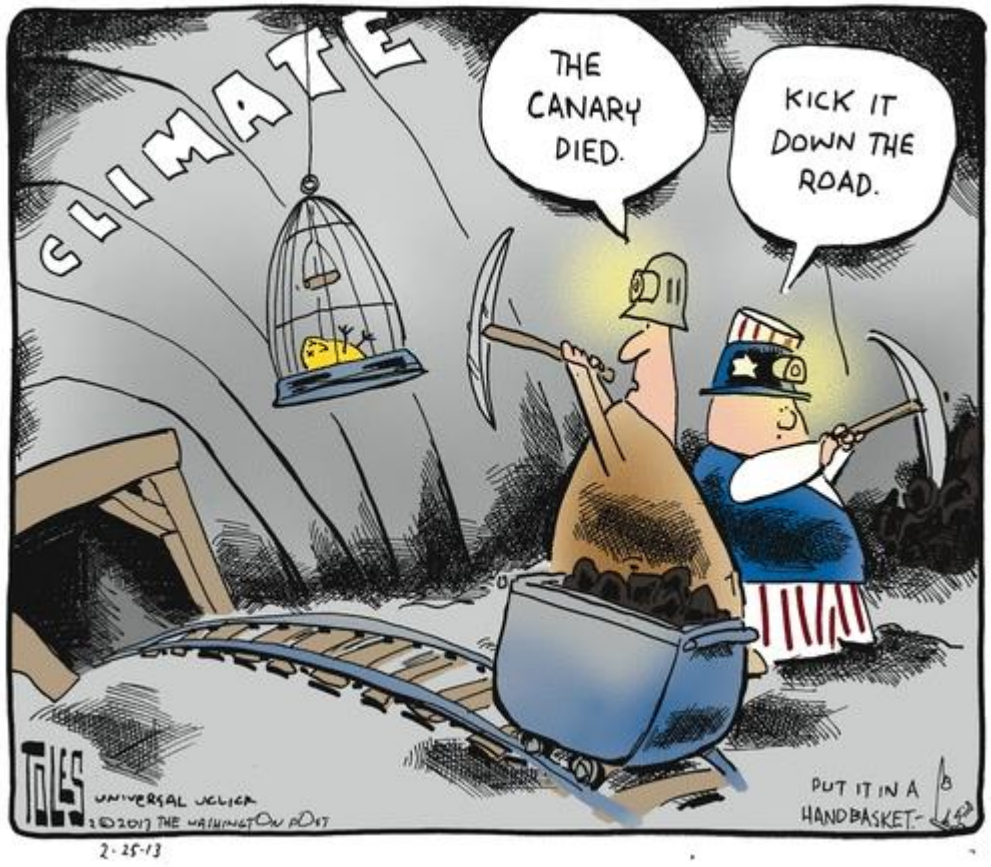


Chart 2 – Carbon Payback Analysis Heat Pump Scenario (0-16 Years)



[20] *Source: Canadian Architect*

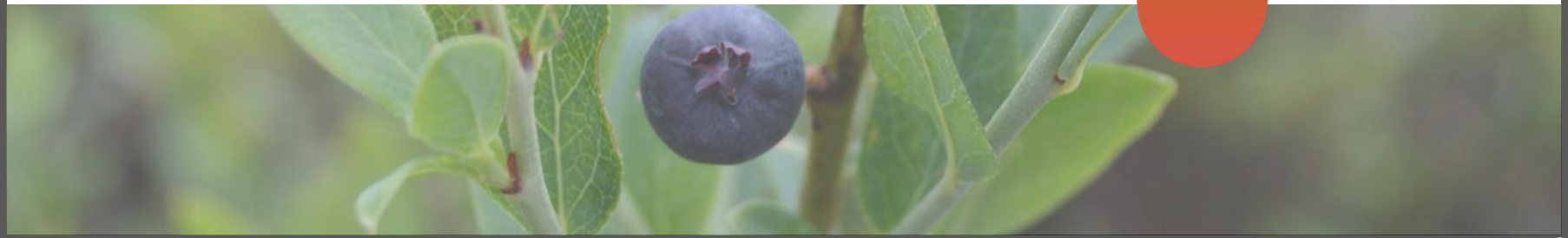

CLIMATE
THE CANARY DIED.
KICK IT DOWN THE ROAD.
PUT IT IN A HANDBASKET.
TOLES
UNIVERSAL UCLICK
©2013 THE WASHINGTON POST
2-25-13

[21]

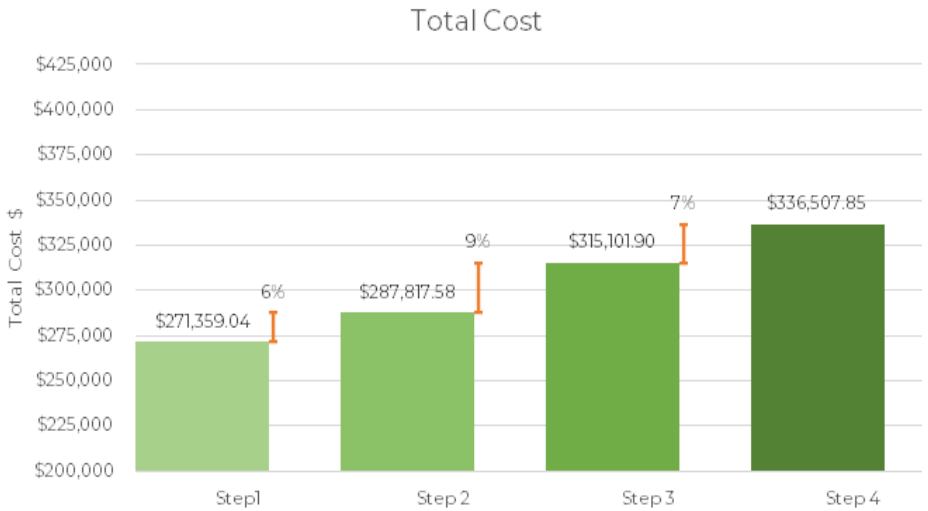
BUILDER COST ESTIMATE

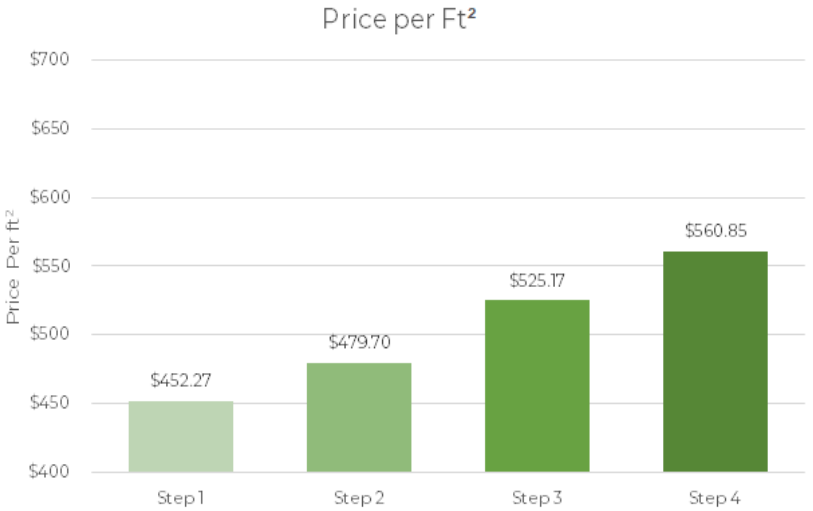
COMPARISONS:

What are the estimated costs to build each Energy Step model?



BUILDER A:


Total Cost
$425,000
$400,000
$375,000
$350,000
$325,000
$300,000
$275,000
$250,000
$225,000
$200,000
Total Cost $
$271,359.04
6%
$287,817.58
9%
$315,101.90
7%
$336,507.85
Step1
Step 2
Step 3
Step 4


Price per Ft²
$700
$650
$600
$550
$500
$450
$400
Price Per ft²
$452.27
$479.70
$525.17
$560.85
Step 1
Step 2
Step 3
Step 4

BUILDER B:


Total Cost
$425,000
$400,000
$375,000
$350,000
$325,000
$300,000
$275,000
$250,000
$225,000
$200,000
Total Cost $
$402,892
Step 1
Step 2
Step 3
Step 4

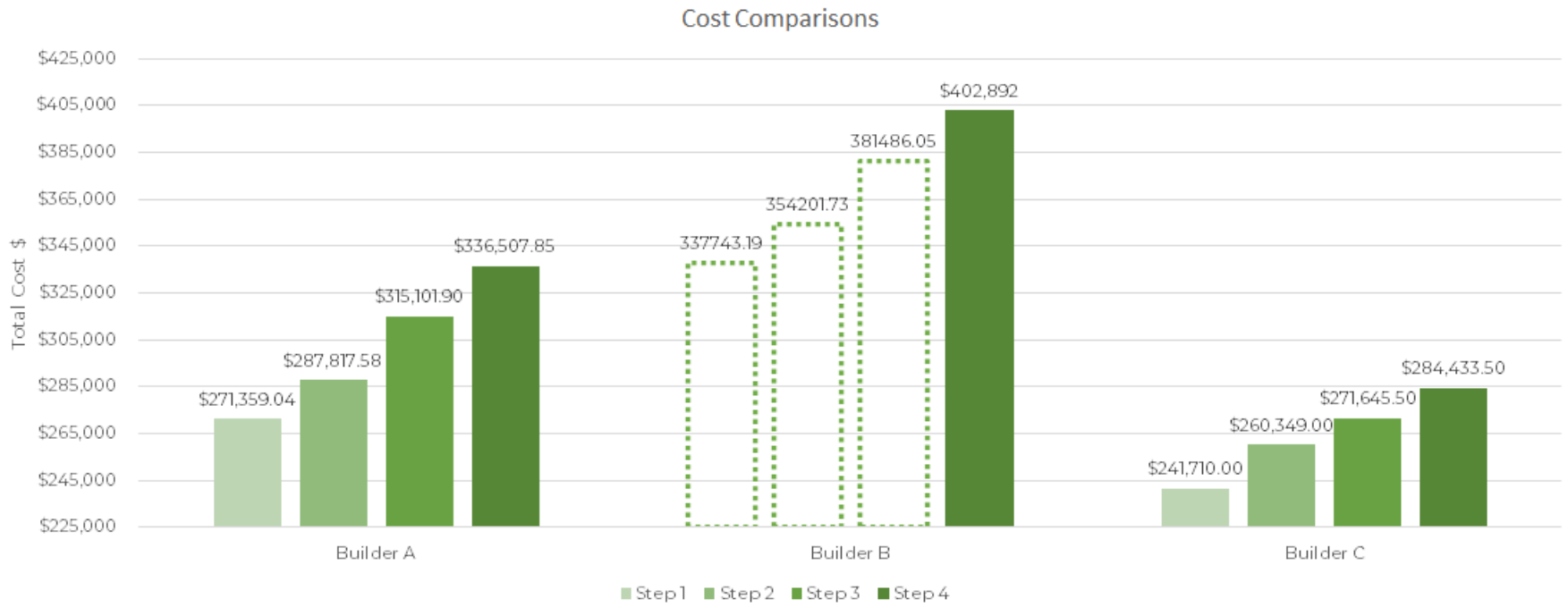

Price per ft²
$700
$650
$600
$550
$500
$450
$400
Price per ft²
$671.49
Step 1
Step 2
Step 3
Step 4

BUILDER C:

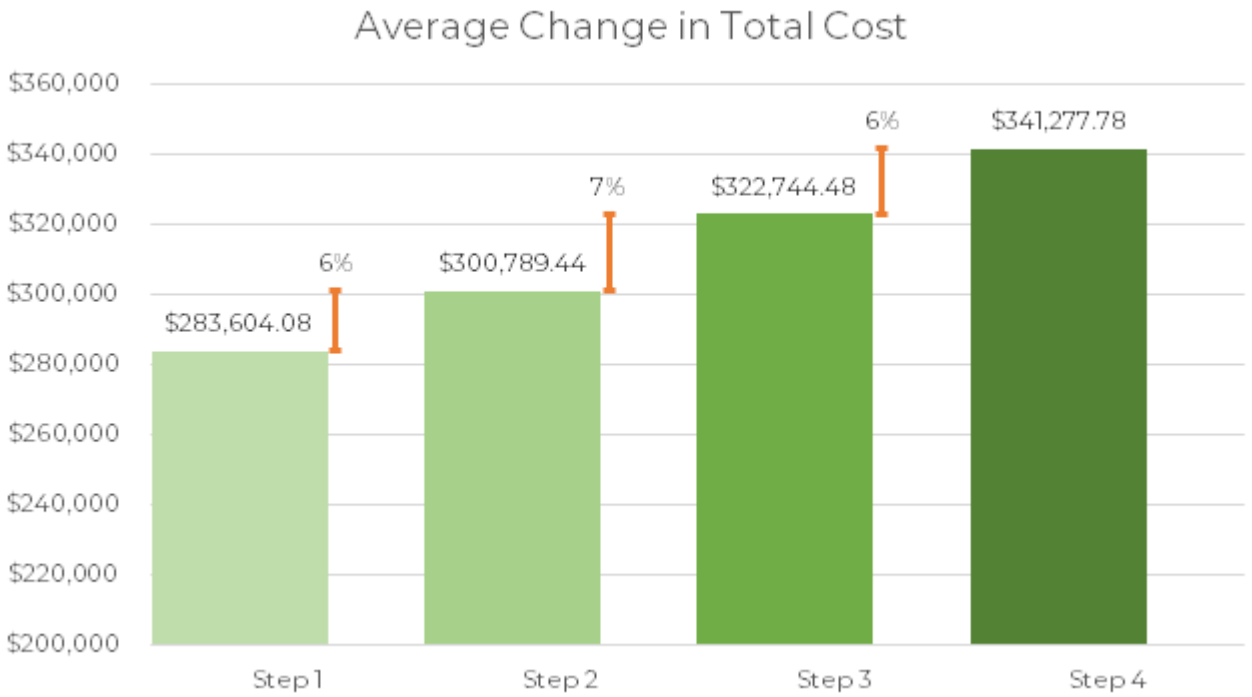

Total Cost
Total Cost $
$425,000
$400,000
$375,000
$350,000
$325,000
$300,000
$275,000
$250,000
$225,000
$200,000
$241,710.00
8%
$260,349.00
4%
$271,645.50
5%
$284,433.50
Step1
Step 2
Step 3
Step 4


Price per ft²
Price Per ft²
$700
$650
$600
$550
$500
$450
$400
$402.85
$433.92
$452.74
$474.06
Step1
Step 2
Step 3
Step 4

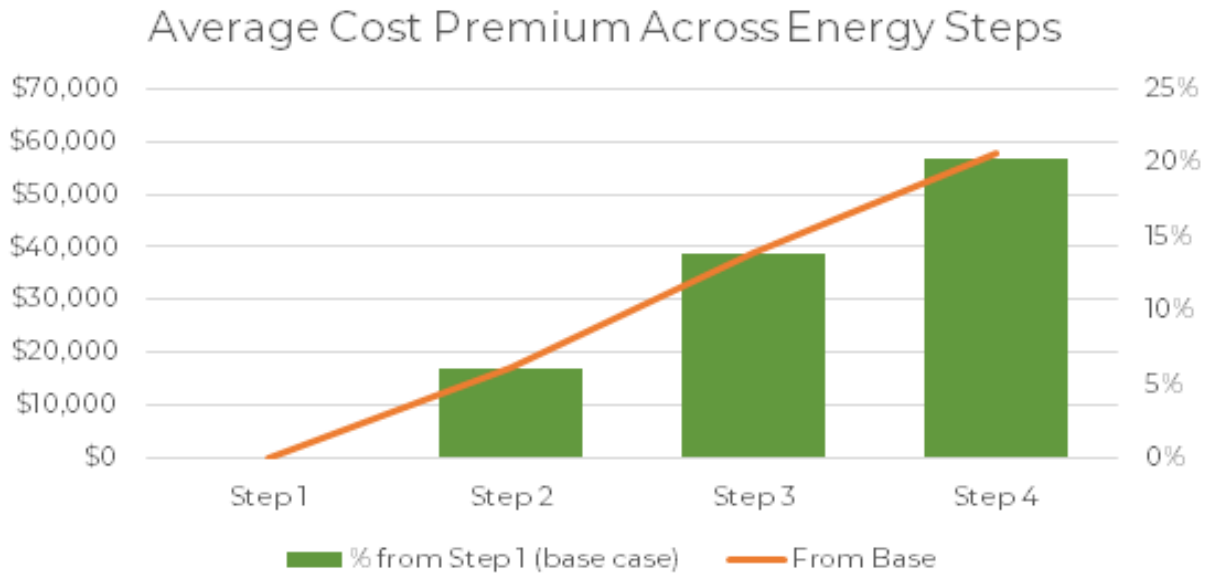
COMPARISON: **BUILDERS A + B + C**



COMPARISONS: **AVERAGE** COST



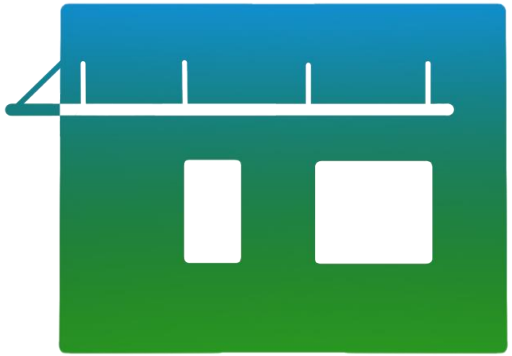
COST **PREMIUMS:**



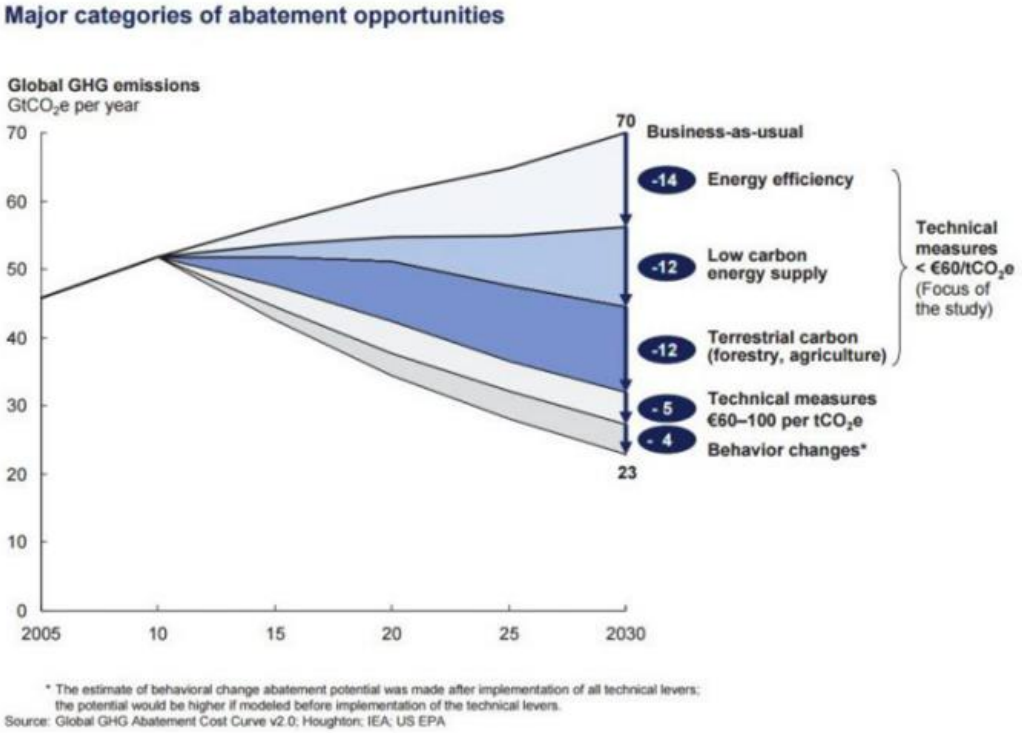
COST **COMPARISON NOTES:**

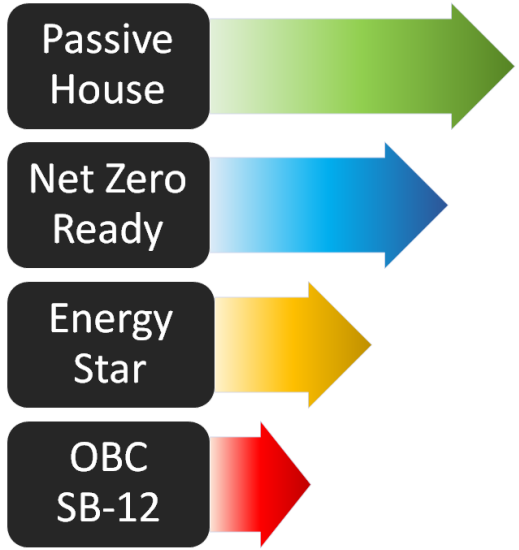
"Most teams experience reduced costs with each project."

Source: Barnhardt, 2021, p. 9



ENERGY EFFICIENCY NOTES:





SOLAR **STUDY:**

Figure 2 - Model A (Site Specific)

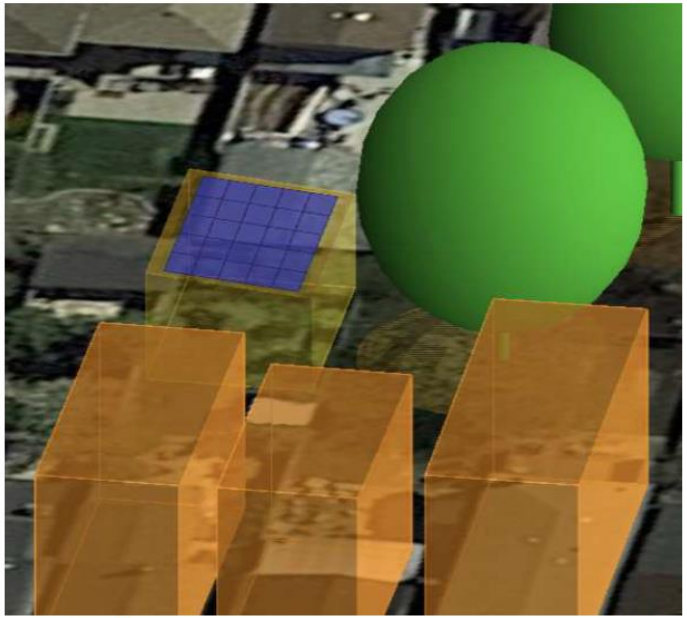


Figure 3 - Model A (Site Specific)

+/-6500 kWh/yr

SOLAR **STUDY:**

Figure 1 - Model B (Generalized)

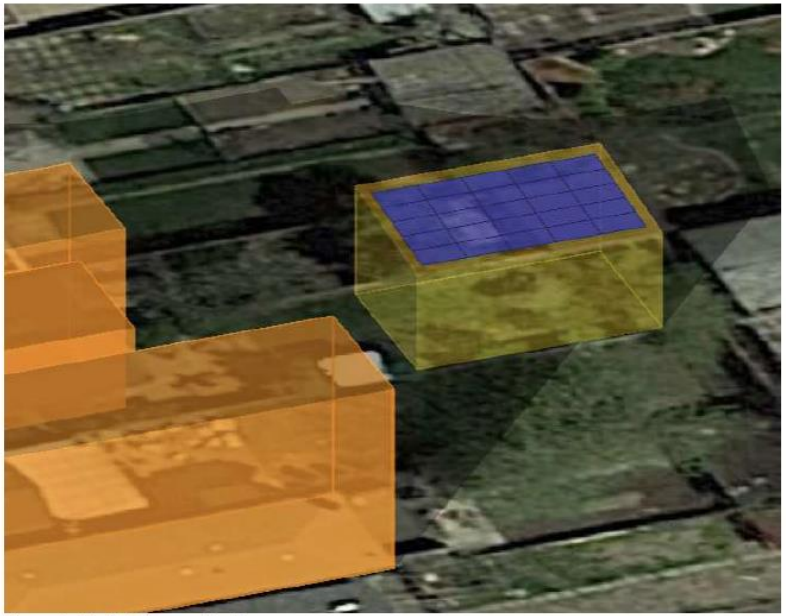


Figure 4 - Model B (Generalized)

+/-9200 kWh/yr

RECOMMENDATIONS

IMPLEMENT **THE PRESCRIPTIVE CHART:**

Garden Suite Energy Step Scenarios (based on OBC SB-12)					**But not TEDI (SHD) require
		STEP 1	STEP 2	STEP 3	STEP 4
Component	Thermal Values	OBC Min. (base case, Zone 1, 3.1.1.2.A)	TGS Tier 1 (Energy Star, 20% above code)	TGS Tier 3 (CBHA NZr, up to 80% above code)	TGS Tier 4, (Passive House Standard) from Russell
Ceiling w/out Attic Space	Min. Nominal R	31	44	65	85
	Clearfield	**26.35**	**37.4**	**55.25**	**72.25**
Walls above grade	Min. Nominal R	22	30	47	58
	Clearfield	**18.7**	**25.5**	**39.95**	**49.3**
Basement Walls	Min. Nominal R	20	28	47	58
	Clearfield	**17**	**23.8**	**39.95**	**49.3**
Below grade slab (>600 mm below grade)	Min. Nominal R	—	15	30	30
	Clearfield	-	12.75	25.5	25.5
Heated slab or slab (≤600 mm below grade)	Min. Nominal R	10	15	30	30
Edge of below grade slab (≤600 mm below grade)	Min. Nominal R	10	15	35	30
Windows - Fixed	Max. U	0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.12 Btu/(h•ft²•F)	0.12 Btu/(h•ft²•F)
Windows - Operable		0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)
SHGC		0.35	0.35	0.35	0.4
Doors		0.28 Btu/(h•ft²•F)	0.21 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)	0.14 Btu/(h•ft²•F)
Space Heating Equipment	Min. AFUE	96% gas furnace	Hybrid system: 95% AFUE ENERGY STAR gas furnace, w/ ASHP (HPSF 8.2) Operation: Furnace <-5C ASHP >-5C	Mini-split ASHP, 7.1 HPSF, SEER 14	Mini-split ASHP, 7.1 HPSF, SEER 14
Heating Airflow	cfm	550.00	400.00	included in COPs	
Fan Power	W/cfm	0.30	0.30	included in COPs	
Space Cooling Equipment		EER 11 Window Shaker	SEER 14? 2 stage compressor (not AS crappy)	Mini-split ASHP, 7.1 HPSF, SEER 14	Mini-split ASHP, 7.1 HPSF, SEER 14
HRV Efficiency	Min. SRE	75%	75%***	89%*	93%
HRV Outdoor Air	cfm	low speed = 50 High speed = 100	low speed = 50 High speed = 100	low speed = 50 High speed = 100	low speed = 50 High speed = 100
HRV fan power	W/cfm	1.10	1.10	0.60	0.60

STEP 3 AS MINIMUM REQUIREMENT:

STEP 4 AS A VOLUNTARY BUT INCENTIVIZED TARGET:

INCENTIVE IDEAS:

Provide a development charge refund?

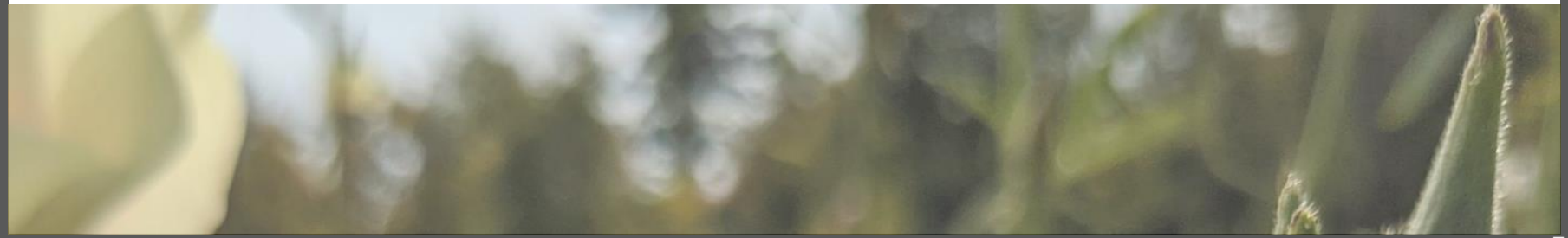
?

Legislative Assembly of Ontario

Assemblée législative de l'Ontario

Bill 108

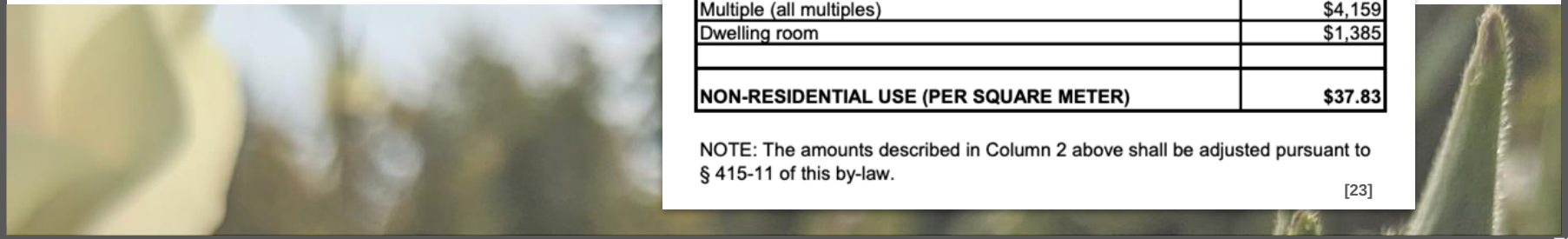
[22]



INCENTIVE IDEAS:

Provide a development charge refund?

?



CITY OF TORONTO
SCHEDULE C TO CH.415, ART I
DEVELOPMENT CHARGES
EFFECTIVE NOVEMBER 1, 2020

TORONTO GREEN STANDARD PROGRAM - TIER 2, 3 AND 4 CAP

Column 1	Column 2
Residential (PER DWELLING UNIT OR DWELLING ROOM)	
Single detached and semi-detached	$5,128
Apartment - two bedroom and larger	$3,272
Apartment - one bedroom and bachelor	$2,232
Multiple (all multiples)	$4,159
Dwelling room	$1,385
NON-RESIDENTIAL USE (PER SQUARE METER)	**$37.83**

NOTE: The amounts described in Column 2 above shall be adjusted pursuant to § 415-11 of this by-law.

[23]

INCENTIVE IDEAS:

Replicate Durham Region's incentive program?

INCENTIVE IDEAS:

Create a NearZero research project?

INCENTIVE IDEAS:

Waive permit fees?

Permit fees shall be calculated based on the formula given below unless otherwise specified in this schedule:

Minimum fee of $198.59 (2020) shall be charged for all work.

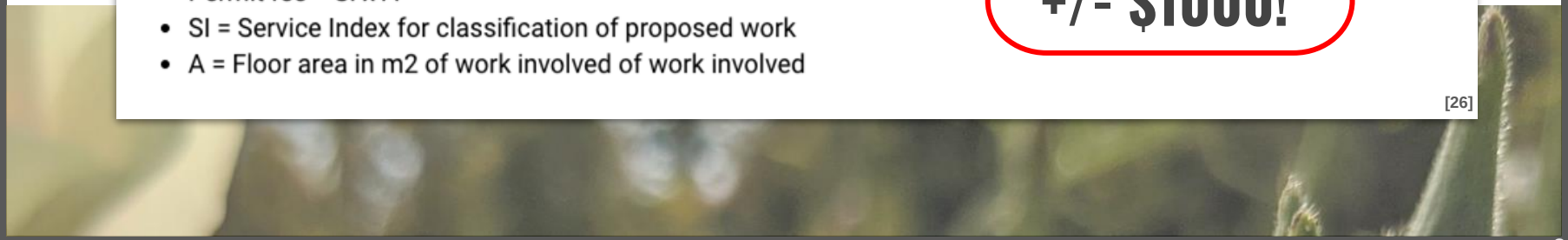
An hourly fee $85.79 (2020) shall be charged for examination and inspection activities.

Fee Calculation Formula:

- Permit fee = SI x A
- SI = Service Index for classification of proposed work
- A = Floor area in m2 of work involved of work involved

+/- $1000!

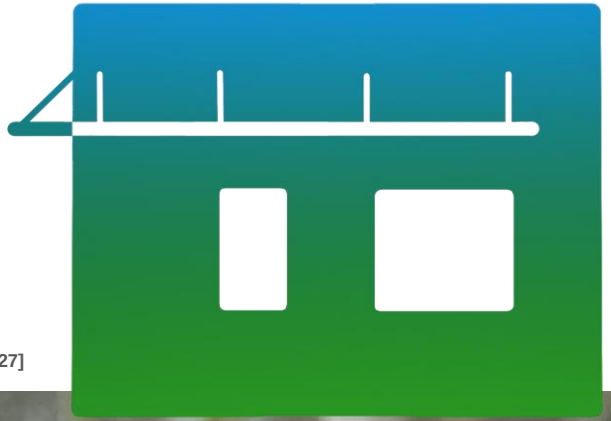
[26]

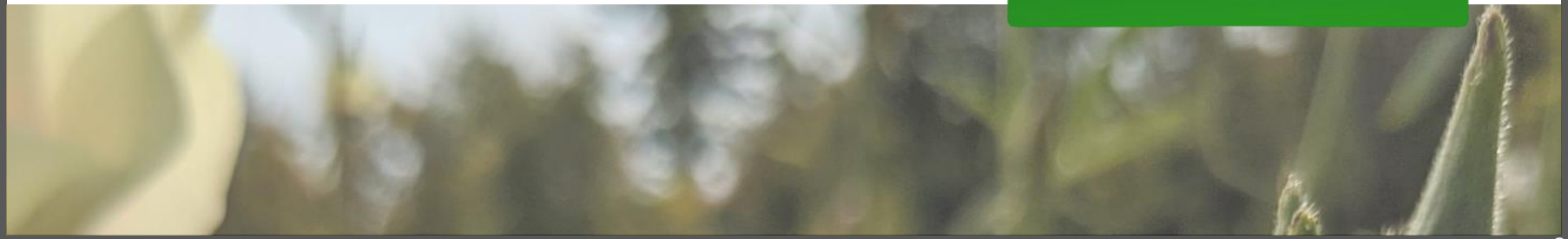


SAY NO TO FOSSIL FUEL AS AN ENERGY SOURCE:

"Fuel switching to clean, renewable electricity provides the largest overall emission reductions, with annual savings of 70-75% compared to natural gas."

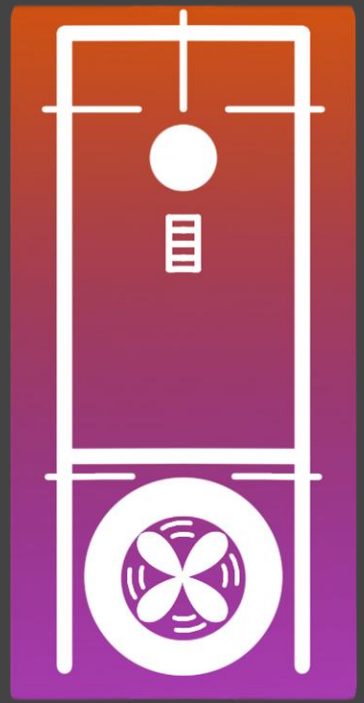
Builders for Climate Change Action, 2019, p. 3 [27]



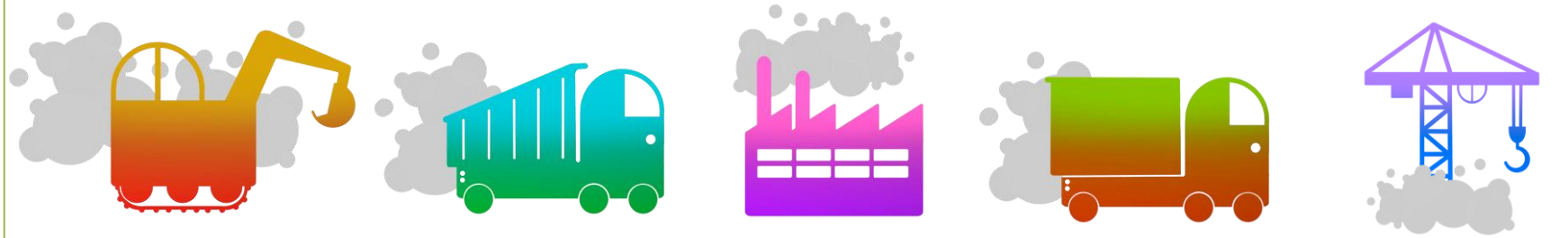


MANDATORY BLOWER DOOR **TEST:**

Require all Garden Suites perform a blower door test before drywall installation.



AIM FOR **TRUE NET ZERO:**

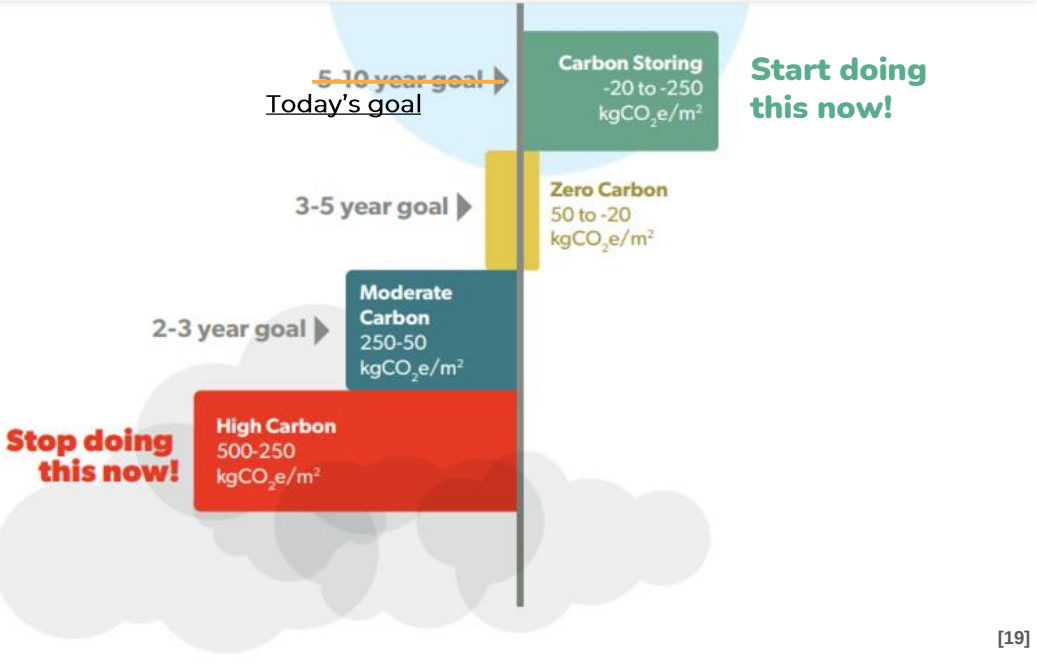


Extraction Transportation Manufacture Transportation Construction

AIM FOR **TRUE NET ZERO:**

MATERIALS MATTER!
Plant based materials are carbon sequestering and less environmentally impactful in the short and long term.

...AND **START NOW!**



[19]

LET'S MAKE THE TRANSITION!

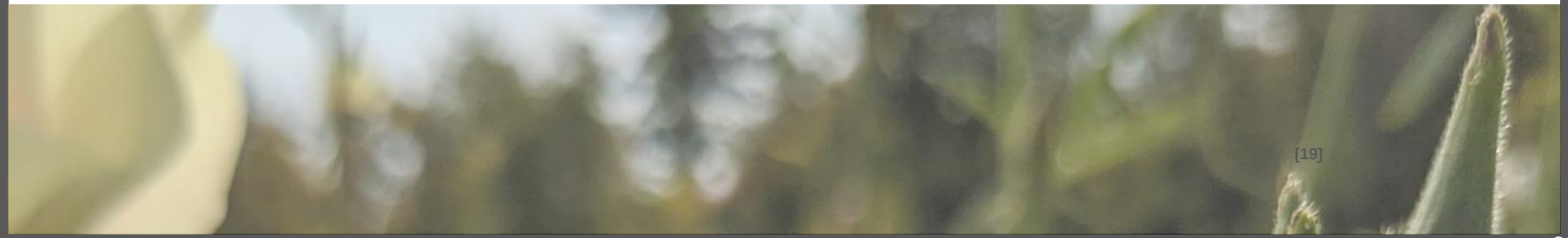
[15]

'We have to weigh the cost of inaction versus the cost to change.'


DISCUSSION

OUR **QUESTION** FOR YOU:

- What tools does the city have (e.g. OP, ZBL) to encourage, enforce, or incentive better-than-code buildings?



OUR SOURCES:

[1] MapTO: Detached and semi-detached residential zones
[2] City of Toronto: Toronto's 2018 GHG Emissions Inventory
[3] City of Toronto: Modelling Toronto's Low Carbon Future
[4] City of Toronto: Transform TO
[5] City of Toronto: Zero Emissions Building Framework
[6] City of Toronto: Toronto Green Standard v3
[7] TAF: Transform TO
[8] City of Toronto: Toronto Official Plan
[9] Urban Toronto: Sustainable Design, understanding the TGS
[10] CTV News: Toronto Storm
[11] Toronto Life: Hell or High Water
[12] City News: Rewind July 2013 Storm
[13] CBC News: Toronto Island Flood
[14] City of Toronto: Expanding Housing Options in Neighbourhoods
[15] Ecohome: Choosing the right house wrap
[16] DeMarkHome: Gas Furnace Types
[17] K Carriere: Backyard: Way Forward
[18] EPA: GHG emissions calculator
[19] Endeavour & GreenUp: Low Rise Buildings as a Climate Change Solution
[20] ??
[21] Tom Toles: GoComics
[22] LAO: Bill 108
[23] City of Toronto: TGS Program
[24] Durham region: The clean energy economy
[25] Metro Vancouver: green building initiative
[26] Calgary: waive permit fees
[27] Builders for Climate Action: switch fuel