

Pilot Consulting

CAMBRIDGE WEST READY FOR NET-ZERO

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Dear Ms. Souwand,

On behalf of the Pilot Consulting Firm, our staff would like to extend our gratitude for presenting us the opportunity to share our expertise on ways to bring forth Net-Zero ready communities within the Greenfields of Western Cambridge.

Attached is Pilot Consulting firm's final deliverable in regard to developing effective Net-Zero ready communities within Western Cambridge. Pilot Consulting founded by members who each specialize in different urban planning areas. Pilot has been able to use their policy analytics, GIS mapping, primary/secondary research, and project management skills to derive solutions for the economic and political barriers of Net-Zero ready communities.

Pilot Consulting proposes the implementation of conceptual models, funding sources, home buyer incentives, public awareness, and Net-Zero education. These are being used as primary solutions to overcome the economic and political barriers of Net-Zero ready communities. Through the assistance and collaboration of key players such as NGOs, home builders, development companies, and Cambridge city officials, Pilot Consulting will be able to bypass these barriers and allow Net-Zero ready communities to flourish. With the collaboration of these key players, Pilot Consulting will directly tackle these barriers via client customer consultation, green development grants, energy step code incentives, and Net-Zero education programs.

We would like to wholeheartedly thank the City of Cambridge for allowing us the opportunity to submit these final deliverables. Should there be any concerns, please feel free to contact our firm via telephone 519-620-8764 or by email at contact@pilotconsulting.com

Regards,

Pilot Consulting Firm:
Michael Grenier, Kamil Rutowicz, Raymond Vuong, Ariana DePiero

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Introduction

This is the final deliverable in response to the Request for Proposal from the City of Cambridge. Within the deliverable, based on extensive research and outside consultation, we have determined that the City of Cambridge has the potential to build Net-Zero ready communities with these recommendations. The objective of the proposed recommendations was to generate a model that can be used towards the development of Net-Zero homes and to drive this new concept into the market. In addition, this project hopes to raise awareness of energy efficiency and educate the public on Net-Zero. Throughout our research, in order to reach these goals, we recognized specific barriers that we identified to be the most crucial ones and generated ideas to target those barriers. This made it evident that there was a need for a type of conceptual model, require a source of funding, give home buyer incentives, raise public awareness, and education as solutions to overcome political and economic barriers. This project aims to use specific approaches such as marketing strategies, rebate programs, and educational and promotional techniques derived from case studies and secondary research with the assistance and collaboration with key partners such as NGOs, developers, and political scientists.

Project Goal

Through research conducted, Pilot consulting group has developed and achieved goals set forth in regard to the attempt to implement Net-Zero housing into the Tri-city market over the past eight months. The first goal that was established was to stimulate the growth of the Net-Zero housing market in the Cambridge area. The concept itself is not very well known or acknowledged in the current housing market which is the reason why Pilot focused on raising awareness and bringing attention to the idea of having projects that can be run entirely on renewable energy.

The next goal that was determined was to educate the public on the value Net-Zero homes bring to not only the environment but the consumer as well. Through research conducted, it was clear that the people are under educated on the subject which poses a problem when trying to implement an innovative concept. Pilot understood the knowledge gap in the community and identified that as something that must be addressed in order continue to expand into the larger market. The idea of Net-Zero needs to be presented as something that not only provides environmental benefits but also personal economic benefits in the form of household savings. We aim to promote Net-Zero housing through the development of a campaign or a committee. This committee will participate in events that allows to public to get involved with Net-Zero, while also forming a group of people who all share the common goal of sustainable living and a cleaner and greener environment.

Awareness can also be raised through the implementation of an education plan that will target buyers, developers, and realtors to provide them with the necessary information to push the product into the larger market. Through the inclusion of Net-Zero education at the college/university level, the goal is to provide a certification that acknowledges that

these individuals understand and know how to properly use this technology when leaving post-secondary education.

Another goal for the project was to change the marketing strategy that is in place for Net-Zero homes with the goal of making them the future of development and create demand for them. There is currently a lack of marketing, with very little to no interest being generated, which will be addressed through improved marketing campaign based on social media, acknowledgment in local publications, and other facets of marketing. With the lack of marketing in the current landscape, there is a lack of interest in not only developers but also realtors, and by creating buzz around the term *Net-Zero* people will become interested and intrigued by this innovative technology. The overall goal for Pilot is to integrate Net-Zero into the Kitchener Waterloo area as it is an emerging market.

Research Process

The methods of research we conducted revolved around using case studies and secondary research such as peer-reviewed journals and books. This led our research by connecting real life examples of Net-Zero, concepts of energy usage and storage, identified political constraints, and Net-Zero in general. Our group conducted a public survey to obtain general knowledge and opinions that was used to direct our study and identify certain barriers and developed approaches to overcome those barriers. Our group was able to interview a political science professor at Wilfrid Laurier University who has expertise in Canadian environmental policy. This interview helped identify some policy barriers and generated implementation ideas. We attempted to contact other interviewees such as developers and NGOs to gain more insight on the development process and any barriers the developers may have encountered if they had experience working with Net-Zero. Our NGO outreach aimed to identify potential partnerships and influencers to develop and private-public collaboration to promote Net-Zero and integrate it into the market. Unfortunately, there were no developers or NGOs that were interested in contacting us which resulted in our research depending on case studies and journals.

Approach 1: Cambridge Green Home Integration Program

Case Study: ZEMCH Network and Conference - Japan

The ZEMCH network is group aiming to help facilitate economically, socially and environmentally sustainable homes around the world. In collaboration with CanmetENERGY, the Zero-energy mass custom home mission to Japan event was founded; showcasing the marketing, design and production techniques for several reputable home companies in Japan. A report by the International Journal of Mass Customisation outlined the findings of consumer behaviour within the Net-Zero market in Japan, analyzing the buyer tendencies in relation to risk association (IJMC 2011).

Overview of Findings

When purchasing new complex products such as Net-Zero homes, the traditional home buyer is entering a completely new market. When entering the new market, the buyer is subjected to a certain amount of perceived risk associated with the new purchase.

Webster and Wind (1972) proposed the theory of humans and organizational buying behaviour which was used to quantify the behaviours when buying a new home, stating the major types of perceived risk by home buyers are performance, financial, psychosocial and temporal. With these types of perceived risk being variable amongst consumers, they can make one of four decisions at the margin:

1. Simply avoid the purchase (i.e not purchase a net zero home)
2. Remain in the same market (i.e purchasing a non-Net-Zero home)
3. Attempt to further knowledge and then decide
4. Conduct business with a reputable industry professional

To combat the perpetual risk associated with entering a new market, the strategy of multi-source supply - where multiple vendors are involved in supplying the products can be used to divide the risk. In the Japanese market, the adoption of a “Cherette Design” model consolidated the construction, design and decision-making steps in the Net-Zero purchasing process. The components of the model focused on the consumers goals and knowledge of their green projects. (IJMC 2011)

The key marketing strategies adopted in the Japanese market was the success in having an effective communication platform that was comprehensive for the buyers, deferring any uncertainty during the home purchasing process. The buyer uncertainty and lack of motivation to enter the new market were targeted through strategic advertisement, education and value assurance during the home purchasing process.

Outcomes of The Program

The response to the ZEMCH conference and network has accelerated growth within the green home market in Japan and globally. Table 1 outlines the motivation factors for buyers in the Japanese Net-Zero market, which quantifies the influence of customer satisfaction on purchasing decisions. Within the top motivation factors, company reliability, product quality and experience with the sales representative were the primary drivers the purchasing process. The success of the marketing strategies derived from ZEMCH have led to substantial growth in the Japanese Net-Zero market. Present day, Japan has a national infrastructure policy enforcing Net-Zero for all newly constructed public buildings by 2020 (IEA 2017). Additionally, Japan has recently completed their first residential Net-Zero community project – “SMA x ECO TOWN Harumidai” built by the Daiwa House Group. The development consisted of 65 Net-Zero homes, with an average land size of 1900sq/ft and market price of \$570,000CAD. (DHG 2019). Our has used this development to scale-up a project to the same magnitude of Cambridge West, with positive results.

A Framework for Cambridge West – Cambridge Green Home Integration Program

The barrier this plan will overcome is the buyer uncertainty within the Net-Zero market in the Cambridge West community. The Cambridge Green Home Integration Program (CGHIP) will draw from the consumer relationship principles of the Net-Zero market in

Japan, and through a consolidated framework provide a comprehensive experience for the home buyer. Figure 1 is a conceptual model of the framework for the CGHIP, highlighting the relationships between the stakeholders involved. The key components of the program are outlined below:

1. Proposed mandate to prioritize the integration of building companies that have experience with Net-Zero and LEED residential developments
2. Integration of green project managers to facilitate the financing, operation and maintenance of Net-Zero home components i.e.: photovoltaic solar installation
3. Providing direct to client consultation on the specifications of the Net-Zero home prior to purchase and during the entire ownership period to allow for a transparent relationship between the home-owners and the green project managers
4. Creating a goal-oriented plan for homebuyers in which they gradually invest into their Net-Zero home components i.e. purchasing solar panels, triple pane windows.

This plan follows the same buyer stimulation techniques as the ZEMCH study used in which there is transparency between the home suppliers and the home buyers, allowing for some risk associated with the complex purchase being alleviated by the enhanced customer knowledge. The challenge that this type of program faces within the North American market is the cultural difference the people in Japan and the people in Cambridge. Product quality and buyer experience are of the utmost importance in the Japanese market, as opposed to the North American buyer market which tends to prioritize cost saving. The expectation for the CGHIP is to plant the seed of comprehensive and transparent buyer experience, being a levy for the Net-Zero market to flourish in the Cambridge area.

Approach 2: Funding and Cost Reduction

The barrier that we have identified is the cost of production, as many projects may require a green loan which contributes to the high cost. Based off our research, we concluded that the additional cost of a Net-Zero home can cost approximately \$25,000.00 more with some variation (Satnik, 2019). Our approaches are designed to minimize project costs, increase affordability, and receive financial support which includes applying for federal funding, identifying existing rebate programs and implementing an ecological fiscal reform.

Federal Funding

The financial support received from the federal government is a flexible asset that can be invested to multiple stages of research and development of Net-Zero homes by offering cash incentives or rebates, reduce cost of building, or investing into technological developments. We have identified two potential grants from the Government of Canada to support our project which are the Energy Innovation Program and the Energy Efficiency Research, Development, and Demonstration.

Energy Innovation Program: Clean Energy Technology Innovation

This program is directed toward incentivizing the research and development of clean technology. In addition to developing new knowledge to support clean growth, increase environmental performance, and reductions in greenhouse gas emissions. As of 2018, this program had a planned spending of over \$25 million of non-repayable funds to promote sustainable economic growth by transitioning towards a low-carbon economy.

Recipients that qualify for this funding includes a wide range of sectors but more importantly, research associations, Canadian academic institutions, and regional and municipal governments and their department and agencies (Natural Resources Canada, 2017). The funding eligibility requirements is to designate research into six priority areas:

1. Renewable, smart grid and energy storage systems;
2. Reducing diesel use;
3. Methane emission reduction;
4. Reducing greenhouse gas emissions in the building sector;
5. Carbon capture use and storage; and
6. Improving industrial efficiency.

Our project is specifically invested in research and development of a renewable, smart grid and storage system and reducing greenhouse gas emissions in the building sector, but further development can lead to addressing carbon capture, use and storage and improving industrial efficiency.

Energy Efficient Buildings Research, Development and Demonstration

This program is planning on investing \$182 million to increase energy efficiency and address climate change through improving home design, renovation, and construction. Specifically, \$48.4 million is dedicated to support the implementation of new building codes and the development of Net-Zero energy-ready buildings. The funding provided is expected to be in the range from \$50,000 to \$5 million per project and is conditionally repayable for demonstration projects but non-repayable for research and development. This program is eligible to Canadian organizations to aid in accelerating the development of technologies, provide cost-effective solutions, validate locally with real-world demonstrations, and build confidence for adoption of updated building codes (Natural Resources Canada, 2019).

Rebate Programs

Rebate programs help to decrease cost of goods or development but can also act as incentives for consumers. Our interview with both a real-estate agent and a political analyst revealed that consumers tend to opt for convenience especially if cost is involved. Green energy technology is more expensive than conventional technology and the

rebates help consumers justify paying a premium over convenience. Existing rebate programs that were identified were the Canadian Mortgage and Housing Company and the Independent Electricity System Operator (IESO): Save on Energy rebates.

Canadian Mortgage and Housing Company

The Canadian Mortgage and Housing Company (CMHC) is a Crown Corporation of Canada in attempt to make housing affordable in Canada through assistance from the government, non-profits, lenders, developers, and social entrepreneurs (Table 2). The CMHC Green Home offers a refund on the cost of mortgage loan insurance for homes that are purchased, built or renovated for energy efficiency with a refund of up to 25% depending on the standards met (Canadian Mortgage and Housing Company, 2018).

Independent Electricity System Operator: Save on Energy

The Save on Energy program provides a rebate from their Heating and Cooling program. This program provides a rebate to homeowners that install an eligible heating and cooling system which is a baseline of energy efficiency. Therefore, Net-Zero homes will be built to a high standard of energy efficiency and should qualify for the rebate of up to \$850 (Save on Energy, n.d.).

Ecological Fiscal Reform

An ecological fiscal reform is a strategy that redirects government's taxation and to create an integrated set of incentives to support the shift to sustainable development (VanNijnatten, 2016). Our proposed idea was to implement an environmental tax within the City of Cambridge where any form of industrial development or homes built according to the baseline building code would be affected by this tax and generate a 'sustainable development fund'. This funding can be used in policy tools such as tax exemptions, tax rebates, but also be invested into Net-Zero development and technological advancements.

Despite many industries and homebuyers that may not approve of this tax, it drives incentive to build above the building code and pushes developers to consider energy efficiency. This tax will either ignite the movement of sustainable development or provide funds to promote and build sustainably.

Approach 3: Incentives

Additional barriers that we identified are that the municipal building code have base standards with minimal energy efficiency requirements and there are no provided incentives to develop above the baseline. Another barrier that we identified through research concluded that consumers prefer cheap and convenience which would require some form of incentives to convert consumers from conventional fuel to electric. This transition should lead other municipalities to reach the provincial goal of becoming carbon

neutral by 2030 (Figure 2). The approaches we took to these barriers was a quality-based measure, developing a property tax rebate scale, and the local government zoning.

Quality – Based Measure

The quality-based measure we investigated was the Energy Step Code. This was inspired through a case study from British Columbia. The BC Energy Step Code was developed to make incremental steps in energy efficiency to reach Net-Zero by 2032. This was a voluntary provincial standard that provides a series of measurable energy-efficiency requirements and allow builders and developers to freely reach those targets (Glave, 2017).

LEEDs and Net-Zero Rebate

By taking the concept of the Energy Step Code and implementing it into a smaller scale for the City of Cambridge and applying a form of property tax rebate towards reaching the higher energy-efficiency codes, it will provide incentive to developers to reach this code. The code and rebates could follow LEED certification and energy usage intensity as a model to determine its' efficiency. Net-Zero cannot be compared to LEED since it has no usage intensity as it is self-sufficient, however by combining the two into the framework where higher energy-efficiency and Net-Zero homes provide greater returns, it will motivate the consumer market to invest in these homes as energy prices are on the rise (Satnik, 2019). The percentages were developed through identifying the average annual property tax from the City of Kitchener website and generated through reasonable means. However, these rates are not static and to be determined thoroughly based on budget and available funds (Table 3). The smaller incremental increase between the lower LEED standards help drive incentive for homeowners to opt for the higher standard of LEED or even Net-Zero as the increments increase.

Local Government Zoning

The City of Cambridge may have the option to zone the proposed site designated towards green buildings or Net-Zero home specifically. Based on public surveys, many consumers do not know of Net-Zero or would not opt to inconvenience themselves because it is believed to be too complicated and not worth the extra costs. The government zoning will result in forcing Net-Zero homes into the market which will show consumers the simplicity yet efficient the home is with further promotion through education and promotion. Incentivising builders to build on the zoned lands can be done through providing a density bonus (Laut & Davis, 1988). This may affect the market but as population continues to grow and expand out to suburban areas, early development will be more affordable before demand drives up the market as seen in other regions.

Approach 4: Public Awareness and Education

The final approach we have chosen to look at is the reinforcement of public education and awareness. Something we have identified as an issue over the past several months is that many people are unaware of what the term Net-Zero actually means, as well as

how it can be implemented into the Cambridge area. With this goal there are a few barriers involved, such as buyer uncertainty that comes with purchasing complex products like Net-Zero homes. Many potential buyers are unaware of the benefits that these houses have to offer and in turn show very little interest when it comes to purchasing these homes. With all the new technology involved, we aim to educate consumers on the innovative systems and inform them that it is not as complex as it is made out to be once understood.

The second barrier we came across for this particular approach was the fact that the education involved and presented must accommodate the vastly different target market groups. This means that the educational material must be able to resonate with all groups of people from all walks of life, from blue-collar to white-collar. Although the target audience may be very different, the educational material must be containing the same information, it is in the presentation of such material that will be different. Some of the areas that we look to touch on include the science behind the technology that is found within the house, the environmental benefits that the homes come with, and the economic advantages that can be gained through the purchase of a Net-Zero home. It is also important to touch on the construction and development that will take place in order to erect one of these homes. It is crucial that all these aspects are covered in literature to properly inform the potential clients of the development that they will be investing in and to convince them that their purchase will be worthwhile.

Kitchener-Waterloo Sustainability Committee

In order to implement our strategies, we have come up with the idea of either creating or partnering with a pre-existing sustainability committee. Through continued research, we decided that a partnership with a pre-existing committee would be the most beneficial for this project. Creating a new one would require an extensive amount of city funding and advertising in order to create interest in potential members. The Kitchener-Waterloo area has several environmental committees that we see as ideal candidates to join forces for this project. These committees include, Reep Green Solutions which is an environmental charity that helps people strive to live a more sustainable lifestyle. They focus mainly on water conservation, climate change and helping homes become more energy efficient. This would be a perfect fit because their goals align well with the benefits of this project (Reep, 2014).

Another committee that has the potential for a successful partnership would be Sustainable Waterloo Region, a group that is less focused on helping homes become more energy efficient but rather looking at green technology, which has a clear link with the idea of Net-Zero homes. Sustainable Waterloo Region works with the EVOLV1 Building, located in Waterloo, which is an entirely sustainably run building that includes live walls, rain irrigation systems, solar panels and much more. If we were to partner with Reep Green Solutions our goals and values match perfectly with theirs and it could be a symbiotic relationship. Their goal of helping people lead a greener lifestyle is exactly what Net-Zero homes are all about and through a partnership both organizations could thrive.

If the City of Cambridge were to join their team, we could introduce them to the concept of Net-Zero development and they could provide the infrastructure to educate a large audience. Partnering with either of these committees would help us raise more awareness and education around Net-Zero development and technology. By joining one of the programs it will help create a platform that will be able to further the development and technology of Net-Zero homes. The members from Cambridge West Community would be there to offer suggestions to allow for a smooth transition and introduction of Net-Zero housing more feasible.

Kitchener - Waterloo Home and Garden Show

A suggestion we may offer to the committees is applying for a position in the Kitchener-Waterloo Home and Garden show. A booth could be presented that would have small models of the houses, an introduction to the new technology, present the savings and benefits of owning a Net-Zero home and finally to answer any questions or concerns surrounding the idea of Net-Zero development. Every year this event attracts thousands of perspective customers who attend the show over a three-day period. This event is presented every year in the middle of March, with the next Home and Garden show occurring March 26th – 28th, 2020, with applications already being accepted. Booth prices are based on the amount of square footage you would like to use for your display, coming in at \$12.75 per square foot which is extremely affordable for the amount of exposure Net-Zero housing will receive from this event. Every year this event receives \$100,000 worth of advertising through broadcasting on local news programs, papers, radio and social media (HGTV, 2019). This is something that the Net-Zero community is struggling with at the moment.

Lottery Dream Home

Another idea that we propose is having a Net-Zero developer donate or build a house for one of the many lottery homes giveaways such as HGTV Dream Home of the Princess Margaret home lottery. Annually, these events receive thousands of dollars in funding and advertising. The amount of media attention that these homes receive is unparalleled, from television interviews with the developers, zone wide advertisement, constant local news attention, and online access through the development process. Over 35,000 people tour these homes during the giveaway period and the homes are highly sought after because of the exposure they receive (Lottery, n.d.). The combination of the media coverage, the many people that tour the homes, and the hundreds of thousands of tickets that are purchased yearly, it will make Net-Zero homes a household name.

In 2013 HGTV started introducing smart homes into their home give-away program, today smart homes are some of the most developed houses in North America (Past HGTV Smart Homes, n.d.). If they hadn't received the exposure from the home give away programs, they wouldn't be where they are today. If we can get a developer to donate or build a home for the Home Give Away and lottery it would create a ton of advertising and buzz around the idea of Net-Zero houses. Net-Zero may even become the next smart home and be spread all across North America due to the exposure received from this.

Creating Education Programs

The final suggestion we will present would be the introduction of an education program in local universities and colleges. The committee could partner with universities around Canada to help create a course that would educate builders on the idea of Net-Zero development. The curriculum would include programs that informed students on how to create a Net-Zero home and how the technology behind it can be used to their advantage. It would also touch on the background on what Net-Zero has to offer and the benefits associated with it, allowing students to leave school with the skills necessary to participate in the development of Net-Zero homes. This would allow prospective future builders to be familiar with the process of building these homes and allow for them to be qualified right out of school. This could be presented as a sustainability minor or even such as a Net-Zero option on the student's final degree/diploma. This education could then be extended out to technicians, realtors and even the public which would make all types of students aware of the process of Net-Zero.

Conclusion

The final deliverables for the City of Cambridge Request for Proposals draws out a conceptual framework for the city to implement in addition to identifying potential funding sources to carry out the project. This project also speculated potential incentive programs and policy that can be used to manage the project as well as finding partnerships to educate and promote the concept of Net-Zero in an attempt to bring it into the market. The Pilot Consulting team would like to thank the City of Cambridge for the opportunity to work with them and believe the city is capable of Net-Zero and has a green future ahead of them.

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Appendix

Motivation Factor	Primary Motivator %
Reliability of the large-scale company	22%
Superior product quality and performance	18%
Earthquake resistance	17%
Convinced by the sales persons' explanation	15%
Good post-purchase services	2%
Good Design	4%
Relatively low price	2%
Customization according to needs and demands	2%
Short Construction time	2%

Table 1 - Motivation factors for buyers in the Japanese Net-Zero market (Noguchi and Collins 2008)

Cambridge Green Home Integration Program: “The Process”

- Collaborate with **Green Project Managers** to build Net-Zero investment Portfolio
- Work with **builders** to comprehensively understand Net-Zero home ownership



- Ensure integration of reliable and green-centered development companies
- Facilitate integration of **Green Project Managers** to assist home owners

- Coordinate with **home owners** about Investing towards Net-Zero
- Strategize with **City of Cambridge** about Green-Home Integration methods

- Responsible for hiring **builders** that prioritize green home construction

Figure 1 - Cambridge Green Home Integration Conceptual Model - Courtesy of Pilot consulting

Building Standard	Insurance Premium Refund
R-2000 (national)	25%
Built Green™ (national)	15%
ENERGY STAR® (national)	15%
GreenHouse™ (Ontario)	15%
GreenHome™ (Yukon)	15%
LEED Canada for Homes (national)	15%

Table 2 CMHC insurance premium refund based on building standard. Net-Zero would stand at R-2000 and a 25% refund.

2030 TARGETS

ONTARIO DATA

Building Type's "Energy Use Intensity" (EUI) Goals for 2030 Challenge

Building Type	Revised EUI ekWh/m ² ·yr	Data Source (see Notes)	50% REDUCTION	60% REDUCTION	70% REDUCTION	80% REDUCTION	90% REDUCTION	CARBON NEUTRAL
			ekWh/m ² ·yr Total EUI (Ontario) 2010	ekWh/m ² ·yr Total EUI (Ontario) 2014	ekWh/m ² ·yr Total EUI (Ontario) 2015	ekWh/m ² ·yr Total EUI (Ontario) 2020	ekWh/m ² ·yr Total EUI (Ontario) 2025	ekWh/m ² ·yr Total EUI (Ontario) 2030
Bank/Financial Institution	261	1	130.5	104.3	78.2	52.2	26.1	0.00
Courthouse	400	1	200.0	159.9	119.9	79.9	40.0	0.00
Office - 10,000 ft ²	251	1	125.5	100.3	75.2	50.1	25.1	0.00
Office - 10,001 to 100,000 ft ²	305	1	152.5	121.9	91.5	61.0	30.5	0.00
Office - 100,001 ft ² or Greater	352	1	176.0	140.9	105.7	70.5	35.2	0.00
Retail - Mall	342	1	171.0	136.8	102.6	68.4	34.2	0.00
Retail - Non-Mall, Vehicle Dealerships, Misc.	279	1	138.0	111.4	83.6	55.7	27.9	0.00
Retail Store	235	1	117.5	93.8	70.4	46.9	23.5	0.00
Education(College/University-Campus level)	423	1	211.5	169.4	127.0	84.7	42.3	0.00
Education - General	268	1	134.0	107.3	80.4	53.6	26.8	0.00
Education- K-12 School	265	1	132.5	105.8	79.4	52.9	26.5	0.00
Food Sales Convenience Store ^(w/ or w/out gas station)	779	1	389.5	311.5	233.6	155.7	77.9	0.00
Food Sales- General	727	1	363.5	290.8	218.1	145.4	72.7	0.00
Food Sales- Supermarket/Grocery	688	1	344.0	275.3	206.5	137.6	68.8	0.00
Storage- Refrigerated Warehouse	410	1	205.0	164.1	123.1	82.1	41.0	0.00
Food Service- Fast Food	1721	1	860.5	688.3	516.2	344.2	172.1	0.00
Food Service- General	1131	1	565.5	452.4	339.3	226.2	113.1	0.00
Food Service- Restaurant/Cafeteria	973	1	486.5	389.3	292.0	194.6	97.3	0.00
Health Care - Clinic	290	1	145.0	116.0	87.0	58.0	29.0	0.00
Health Care - Hospital Inpatient	782	1	391.0	312.8	234.6	156.4	78.2	0.00
Health Care - Medical Office	204	1	102.0	81.5	61.1	40.7	20.4	0.00
Health Care - Nursing/Assisted Living	428	1	214.0	171.2	128.4	85.6	42.8	0.00
Health Care - Outpatient	254	1	127.0	101.7	76.3	50.9	25.4	0.00
Lodging - General	289	1	144.5	115.6	86.7	57.8	28.9	0.00
Lodging - Hotel/Motel	312	1	156.0	124.9	93.7	62.5	31.2	0.00
Lodging-Residence Hall/Dormitory	296	1	148.0	118.3	88.7	59.1	29.6	0.00
Public Assembly - Entertainment/Culture	340	1	170.0	136.1	102.1	68.1	34.0	0.00
Public Assembly - General	236	1	118.0	94.6	70.9	47.3	23.6	0.00
Public Assembly - Library	372	1	186.0	149.0	111.8	74.5	37.2	0.00
Public Assembly - Recreation	233	1	116.5	93.1	69.8	46.6	23.3	0.00
Public Assembly - Social/Meeting	186	1	93.0	74.5	55.9	37.3	18.6	0.00
Public Safety - Fire/Police Station	274	1	137.0	109.6	82.2	54.8	27.4	0.00
Public Safety- General	316	1	158.0	126.5	94.9	63.3	31.6	0.00
Religious Worship	172	1	86.0	68.7	51.5	34.4	17.2	0.00
Service (Vehicle Repair/Service, Postal Service)	278	1	139.0	111.1	83.3	55.6	27.8	0.00
Storage-Distribution/Shipping Centre	158	1	79.0	63.4	47.5	31.7	15.8	0.00
Storage - General	94	1	47.0	37.4	28.1	18.7	9.4	0.00
Storage- Non-Refrigerated Warehouse	112	1	56.0	44.6	33.5	22.3	11.2	0.00
Warehouse - Self-Storage	14	1	7.0	5.8	4.3	2.9	1.4	0.00
Residential - Mobile Homes	387	2	193.5	154.8	116.1	77.4	38.7	0.00
Residential - Multi-Family, 2 to 4 Units	220	2	110.0	88.0	66.0	44.0	22.0	0.00
Residential - Multi-Family, 5 or More Units	220	2	110.0	88.0	66.0	44.0	22.0	0.00
Residential - Single-Family Attached	256	2	128.0	102.4	76.8	51.2	25.6	0.00
Residential - Single-Family Detached	267	2	133.5	106.8	80.1	53.4	26.7	0.00
Residential - Mid-Rise/ High Rise	220	2	110.0	88.0	66.0	44.0	22.0	0.00
Data Center		3						
Laboratory		4						
Mixed-Use		5						

The year used to set the reduction target is based on the year when the contract documents were completed and ready for tender.

NOTES:

1. CBECs (Commercial Building Energy Consumption Survey) Average calculated as the arithmetic mean of reported EUIs across all survey buildings of the given type, then modified for the Ontario climate.
2. Canadian Comprehensive Energy Use Database for Ontario 2003
3. Recommend the use of Target Finder to derive data.
4. Recommend the use of Labs21 to derive data.
5. Recommend the use of the Calculator tab to develop single EUI.



Ontario Association of Architects

This data was developed in 2014, by Bob Bach, Energy Profiles Ltd. in consultation with the Ontario Association of Architects' (OAA) Sustainable Built Environment Committee (SBECE)

Figure 2. Ontario's 2030 energy usage intensity goals outline by sector and year with amount of reduction each year.

LEED Certification (Based on Energy Use Intensity)	Rebate in Property Tax (%)
Net-Zero	14
LEED Platinum	10
LEED Gold	6
LEED Silver	4
LEED Certified	2
Build Code	0

Table 3. Table showing property tax rebate based on energy use intensity according to LEED standards and Net-Zero with the highest rebate.