






Town of Newmarket
Community Energy Plan

Rebased July 31, 2019

Newmarket

Foreword on Rebased CEP

This Community Energy Plan was approved unanimously by the Council of the Town of Newmarket in 2016. The energy use baseline year was 2013. The Town's energy use was rebased to 2017 in July 2019. This version of the CEP has been updated to reflect this rebasing. There are no changes in the recommended strategies. The rebased CEP should be viewed as an administrative update to an approved plan. The rebasing of the CEP was funded by the Town of Newmarket.

Funding/Financial Support

The preparation of the Community Energy Plan in 2016 was carried out with assistance from the Ministry of Energy and administered through the Municipal Energy Plan Program. Notwithstanding this support, the views expressed are the professional views of the authors, and the Ministry of Energy accepts no responsibility for them.

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Message from the Stakeholder Advisory Group

Around the world, municipalities are taking the lead on climate change. Newmarket is no exception. In fact, Newmarket has a strong reputation for environmental stewardship including early adoption of a pesticides ban, an anti-idling bylaw, and an eco-homes development. This Community Energy Plan is another step forward in Environmental Leadership on behalf of the residents of Newmarket.

This Community Energy Plan is one of the first in Ontario and sets clear targets for greenhouse gas (GHG) emission reductions and clear actions for achieving those results. The stakeholders listed below worked and debated for well over a year before adopting a very ambitious plan for an efficient, secure and reliable energy future that is environmentally progressive and economically viable.

This Community Energy Plan will take Newmarket from a future of expensive and inefficient energy consumption to a future that is sustainable and responsible. But to do this, we need the residents and businesses of Newmarket to embrace this Plan and to participate in its success. As you read this document, imagine yourself as an owner of the Plan and begin to make choices that will reduce your carbon footprint and make Newmarket a leader in wise energy use.

Working together, we can ensure that Newmarket's energy future is *Well Beyond the Ordinary*.

Community Energy Plan Stakeholder Advisory Group

The Community Energy Plan was made possible by the dedication and commitment of the following Stakeholder Advisory Group members:

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Acknowledgments
Working closely with the Stakeholder Advisory Group, the following individuals and organizations contributed their valued knowledge and expertise to develop the Community Energy Plan:

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List of Acronyms

Acronym	Meaning
BAU	Business-As-Usual
CDM	Conservation and Demand Management
CEP	Community Energy Plan
CHEERIO	Collaboration on Home Energy Efficiency Retrofits in Ontario
CHP	Combined Heat and Power
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DC	District Cooling
DE	District Energy
DH	District Heating
EPD	Energy Planning District
EPL	Energy Performance Label
FIT	Feed-In Tariff
FTE	Full-time equivalent
GFA	Gross Floor Area
GHG	Greenhouse gas
GJ	Gigajoule
IAG	Implementation Advisory Group
IESO	Independent Electricity System Operator
IRR	Internal rate of return
IRRP	Integrated Regional Resource Plan
LIC	Local Improvement Charge
LTEP	Long-Term Energy Plan
MEP	Municipal Energy Plan
mmBTU	One million British Thermal Units
MOE	Ministry of Energy
mt	Metric tons
MURB	Multi-unit Residential Buildings
MW	Megawatt
MWCT	Manufacturing, wholesale trade, construction, transportation/warehousing
NDE	Newmarket District Energy
NEER	Newmarket Energy Efficiency Retrofit
PV	Photovoltaic
QUEST	Quality Urban Energy Systems of Tomorrow
ROP 2010	York Region Official Plan 2010
SAG	Stakeholder Advisory Group

Executive Summary

Purpose of the Community Energy Plan

A Community Energy Plan (CEP) provides the Newmarket community with a roadmap to move towards a sustainable energy system. The CEP provides Newmarket with a vision for sustainable energy that allows the community to manage energy resources and use while contributing to economic development. It also provides a platform to demonstrate leadership in energy management at the community level, and positions Newmarket to respond to changes in legislation relating to climate change, cap and trade, as well as capitalize on funding opportunities for progressive energy planning in the future.

As an important planning tool and "living document," the Community Energy Plan will help Newmarket by:

- Ensuring a reliable, clean and secure local energy system;
- Supporting local economic development;
- Fostering behaviour change and a culture of conservation; and
- Identifying ways to increase the energy efficiency of buildings in Newmarket.

Energy planning can help Newmarket consider the environmental and economic benefits of how energy is consumed and generated in the community, in addition to considering how this impacts the overall quality of life of its residents.

What is a Community Energy Plan?

The Ministry of Energy (MOE) launched the Municipal Energy Plan (MEP) program in 2013 in order to support local energy planning efforts in Ontario. The MEP program supports municipalities' efforts to better understand their community-wide energy use and GHG emissions, identifying opportunities for energy efficiency and clean energy initiatives, and ultimately developing a plan to meet their goals.

The Town of Newmarket is one of the first municipalities to receive Ministry of Energy funding to develop a Community Energy Plan.

This Plan was developed with assistance from the MOE and administered through the MEP program. It is called a Community Energy Plan as the Plan identifies a holistic approach to energy planning across the whole Newmarket community. The CEP will help Newmarket as a community by identifying local priorities and determining how energy should be generated, delivered and used now and into the future. The success of the CEP will require action from multiple stakeholders and is not intended to be undertaken by the Town alone.

How was this Plan Developed?

A Stakeholder Advisory Group (SAG) oversaw the development of the Community Energy Plan from January 2015 to March 2016. The SAG is comprised of key stakeholders representing various sectors and offering different perspectives. SAG members provided guidance, shared technical advice and knowledge, and actively participated through each key phase of the Plan's development. Throughout the planning horizon, a variety of other stakeholders were engaged as well, including Newmarket Town Council, Town staff, the business community, and the community at large.

The Plan fulfills policy direction from both the York Region Official Plan and the Newmarket Urban Centres Secondary Plan, and aligns with the Town of Newmarket Official Plan, Secondary Plan and Strategic Plan.

CEP Vision

The vision of the Newmarket Community Energy Plan is:

To create a sustainable community whose energy future is efficient, secure, reliable, and environmentally responsible. Our approach to managing energy will demonstrate leadership and be *well beyond the ordinary*.

CEP Goals

The vision is supported by six goals. In the statements below, "we" is used to indicate that the goals are to be shared across the Newmarket community, and provide guidance and direction for the Town of Newmarket, local businesses and industry, and the Town's residents.

1. **Energy Generation & Distribution**
   We will strive to have a resilient, stable, clean and secure local energy system.
2. **Economic Development**
   As a result of using energy in a more sustainable way, we will create jobs and attract investment and businesses.
3. **Behaviour Change & Education**
   We will help reduce energy use and GHG emissions by raising awareness through programs and education, thereby building a connection between energy choices and actions and the things people care about.
4. **Energy Efficiency of Buildings**
   We will continue to demonstrate leadership in increasing efficiency of existing buildings and will continuously improve building performance through best management practices.
5. **Land Use & Growth Planning**
   We will continue to build a healthy, complete community with mixed-use development, local jobs and well-connected mobility and transportation options for our residents.

6. **Transportation Efficiency**
   We will have an efficient and clean transportation system, including multi-modal and active transportation options.

CEP Targets

Through the implementation of this plan, the Town of Newmarket will:

1. **Reduce per capita primary energy use by 50% from 2017 baseline by 2041.**
2. **Reduce per capita GHG emissions by 50% from 2017 baseline by 2041.**

By reducing per capita primary energy use by 50% to approximately 70 GJ/capita in 2041, Newmarket will be near current systematic global best practice. This will be mainly achieved through residential and non-residential (commercial and industrial) building retrofits, and significant transportation efficiencies.

From an emissions standpoint, a per capita reduction of at least 50% below the 2017 baseline would be consistent with recommended global targets, which call for an 80% reduction in global emissions relative to 1990 levels in order to keep average temperature rise below 1.5 degrees Celsius. Reaching this target would help provincial and federal efforts to substantially reduce the rate of increase of GHG concentrations in the atmosphere.

Newmarket's 2017 Baseline

In order to understand Newmarket's energy consumption and GHG emissions, a baseline was established using energy consumption data, including electricity, natural gas, propane, diesel and transportation fuels. The year 2017 was selected as the revised baseline year as it is the most recent complete dataset available. Electricity data was provided by the local distribution company Newmarket-Tay Power Distribution Ltd. and Enbridge provided natural gas data. Detailed information about the built environment was also collected, including building age, type and location, gross floor area, etc. Transportation energy use was estimated using the 2016 Transportation of Tomorrow Survey.

Overall, the 2017 Baseline indicates that Newmarket performs relatively well in the local context of Ontario and Canada averages. Energy consumption per household is higher in Newmarket, but intensity in the residential sector is comparable to Canadian averages. The greenhouse gas (GHG) emissions per capita of 5 metric tons CO_2e is well below the Ontario and Canada's overall averages.

However, when comparing Newmarket to global best practice, there is room for improvement. Consumption per household is more than twice the Danish average, consumption per floor area in Newmarket homes is 2 times higher than German A-rated homes, and 2.5 times higher in the non-residential sector. Further, GHG emissions per capita are approximately 100% higher than those of Copenhagen, which has world-class building efficiency standards, a robust district energy system, and a widespread multi-modal transportation system.

Keeping this in mind, it is important for Newmarket to take a proactive approach in community energy planning. Not taking action now not only has the potential to harm the community's environment and quality of life, it represents a lost economic development and business opportunity moving forward.

Newmarket CEP Action Plan

A number of recommended strategies were defined in order to meet the CEP's vision and goals, while helping Newmarket reach its identified transformative targets. These strategies reinforce Newmarket's commitment to be a sustainable community that demonstrates leadership and innovation in how it manages its energy use.

The Newmarket CEP strategies are:

Strategy 1: Efficiency Programs

Strategy 1 includes the following: Residential Efficiency Programs, Commercial and Institutional Efficiency Programs, Industrial Efficiency Programs, and Transportation Efficiency Programs.

This strategy focuses on improving Newmarket's energy performance by raising the efficiency of the energy end use in Newmarket's existing and future homes and commercial and institutional buildings, as well as improving the overall efficiency of transportation.

Strategy 2: District Energy

Strategy 2 incorporates district energy in selected areas and locally sited heat and power generation. The fuels for these could be natural gas or various renewable biofuels.

Strategy 3: Solar Photovoltaic

Strategy 3 incorporates solar photovoltaic, of which there is fairly significant potential in Newmarket.

1 Introduction

1.1 Purpose of the Community Energy Plan - Why develop a CEP for Newmarket?

A Community Energy Plan provides the Newmarket community with a roadmap to move towards a sustainable energy system. The CEP provides Newmarket with a vision for sustainable energy that allows the community to manage energy resources and use while contributing to economic development. It also provides a platform to demonstrate leadership in energy management at the community level, and positions Newmarket to respond to changes in legislation relating to climate change, cap and trade, as well as capitalize on funding opportunities for progressive energy planning in the future.

As a community that is growing, the Town of Newmarket has an opportunity to identify energy strategies that take population and employment growth into consideration. The Town of Newmarket is growing and expects its population to increase from 94,100 in 2017 to around 118,000 by 2041.[1] Due to the fact that Newmarket has reached its urban boundary, the majority of this population growth will be accommodated by intensification as new development and redevelopment will become increasingly vertical.

Taking this expected growth into account, it is critical that the Newmarket community – including the Town of Newmarket, local business and industry, and the Town's residents – look for ways to manage its energy use and environmental carbon footprint, while providing a reliable local energy supply and economic development opportunities.

Not taking action now not only has the potential to harm the community's environment and quality of life, it represents a lost economic development and business opportunity.

Energy planning can help Newmarket consider the environmental and economic benefits of how energy is consumed and generated in the community, in addition to considering how this impacts the overall quality of life of its residents.

This Community Energy Plan provides a roadmap to move towards a sustainable energy system and offers the Town of Newmarket three main groups of benefits:

1. **Economic Competitiveness**
    - Energy costs will be lower than comparable communities as a result of overall efficiency in end use, supply and distribution.

[1] York Region, 2041 Preferred Growth Scenario – 2041 Population and Employment Forecasts (2015).

- Employment will be added through implementing the recommendations of the CEP as well as from a larger part of the overall energy value being retained in the community.
- Investment will be attracted to a community with a comprehensive long-term commitment to a cost-effective, efficient and clean approach to energy use.

2. **Security**
    - Energy supply security will be enhanced by reducing the overall pressure of energy supply and increasing local sources.
    - Energy supply will be more stable and resilient.
    - Flexibility will be increased through an integrated approach to incorporating efficiency and clean and renewable supply.
3. **Environment**
    - Greenhouse gas emissions and the Town's impact on the global climate will be reduced through efficiency in both use and supply well above today's levels.

As an important planning tool and "living document," the CEP will help Newmarket by:

- Ensuring a reliable, clean and secure local energy system;
- Supporting local economic development;
- Fostering behaviour change and a culture of conservation; and
- Identifying ways to increase the energy efficiency of buildings in Newmarket.

1.2 Community Energy Planning in Context

The Ministry of Energy (MOE) launched the Municipal Energy Plan (MEP) program in 2013 in order to support local energy planning efforts in Ontario. [2] The MEP program supports municipalities' efforts to better understand their community-wide energy use and GHG emissions, identifying opportunities for energy efficiency and clean energy initiatives, and ultimately developing a plan to meet their goals.

The Town of Newmarket is one of the first municipalities to receive Ministry of Energy funding to develop a Community Energy Plan (CEP).

This Plan was carried out with assistance from the MOE and administered through the MEP program. It is called a Community Energy Plan as the plan identifies a holistic approach to energy planning across the whole Newmarket community. The CEP will help Newmarket as a community by identifying local priorities and determining how energy should be generated, delivered and used now and into the future. The success of the CEP will require action from multiple stakeholders and is not intended to be undertaken by the Town alone.

[2] Ontario Ministry of Energy, https://www.ontario.ca/page/municipal-energy-plan-program#section-0

The CEP will help the Town of Newmarket:

1. Assess the community's energy use and greenhouse gas (GHG) emissions;
2. Identify opportunities to conserve, improve energy efficiency and reduce GHG emissions;
3. Consider the impacts of future growth and options for local clean energy generation; and
4. Support local economic development.

1.2.1 A Renewed Focus on Energy Planning

In recent years, energy planning and conservation and demand management (CDM) in Ontario have taken on a much more significant and central role in the province's energy picture. This has occurred at the provincial, regional and municipal levels as the importance to ensure clean, low-carbon, efficient and sustainable energy systems have been highlighted.

In addition to launching the Municipal Energy Plan program, the Ministry of Energy has identified conservation as a key part of Ontario's efforts to reduce GHG emissions in both its Long-Term Energy Plan (LTEP) and Conservation First Framework. In the LTEP, the MOE established that conservation will be the first resource considered and will be put before building new generation and transmission facilities wherever cost effective. In addition, the Ontario Government has brought Ontario Regulation 397/11 into force, requiring public agencies such as municipalities, universities, schools and hospitals to report their energy use and GHG emissions to the MOE and to publish the reports on their websites on an annual basis, as well as developing 5-year CDM plans.[3]

At the same time, the Independent Electricity System Operator (IESO) and the Ontario Power Authority (now part of the IESO) have been carrying out regional energy planning activities since their inception in 1998 and 2005 respectively. In April 2015, the York Region Integrated Regional Resource Plan (IRRP) was released. The IRRP ensures a reliable supply of electricity to York Region and considers conservation, generation, transmission, distribution and innovative resources, and is the link between provincial and local planning.

In November 2015, the Ministry of the Environment and Climate Change (MOECC) released their updated *Climate Change Strategy*, in which they set a new interim target of reducing GHG emissions by 37% below 1990 levels by 2030 and retained the long-term target of reducing emissions by 80% below 1990 levels by 2050. In the *Climate Change Strategy*, the MOECC noted that collaboration between municipalities, businesses, industry and residents across the province will be key to helping Ontario reach its targets. Support from municipalities through Municipal Energy Plans, CDM Plans, and other initiatives will be needed.

Energy planning at the municipal or community-wide level is therefore a natural continuation of these initiatives that have underscored the importance of conservation, demand management

[3] Government of Ontario, O. Reg. 397/11: Energy Conservation and Demand Management Plans, filed under Green Energy Act 2009.

and efficiency. Taking a holistic, integrated systems approach in energy planning has seen some cities around the world (most notably Copenhagen and other cities in Scandinavia and Germany) become energy efficient, secure, sustainable, clean and cost-competitive. The MEP program therefore offers Ontario municipalities an important mechanism for municipal and community level action that can achieve some of these outcomes.

1.2.2 Alignment of the CEP with other Planning Documents

The Community Energy Plan fulfills policy direction from both the York Region Official Plan and the Newmarket Urban Centres Secondary Plan.

The York Region Official Plan (ROP 2010 Office Consolidation 2019) encourages local municipalities to undertake municipal-wide Community Energy Plans.[4] ROP 2010, Section 5.2.13 states that the Region will "encourage local municipalities to undertake municipal-wide Community Energy Plans … these plans will detail the municipality's energy use requirements and establish a plan to reduce energy demand and consider the use of alternative and renewable energy generation options and district energy systems, and will ensure that communities are designed to optimize passive solar gains."[5] In addition, ROP 2010, Section 4.1.14 indicates that the Region will "work with local municipalities to leverage Community Energy Plans as a tool to promote economic development."[6] Other municipalities in York Region that have completed or are in the process of developing a CEP include Vaughan, Markham and East Gwillimbury. The potential for aligning energy planning initiatives with other York Region municipalities will be considered as the implementation of Newmarket's CEP moves forward.

York Region has also recognized that complete, compact, vibrant and well-designed Regional Centres that serve as a focal point for employment, housing, community facilities and transit connections are important for a sustainable future. It is therefore a Regional Official Plan policy that local municipalities shall develop Community Energy Plans for each Regional Centre.[7]

The Newmarket Urban Centres Secondary Plan requires the Town to develop a Community Energy Plan that will include the Urban Centres.[8] This will help ensure that sufficient servicing and infrastructure is provided in a manner that keeps pace with growth and that the use of resources is minimized to the greatest extent possible.

In addition, the Town of Newmarket Official Plan, Secondary Plan and Strategic Plan each contain sustainability provisions that are to be encouraged and/or required for new development in Newmarket. The CEP is aligned with these higher order Plans by integrating objectives, goals and the overall Town vision of being "well beyond the ordinary," as well as providing additional targets that should be achieved as the Town (including the urban centres) continues to grow.

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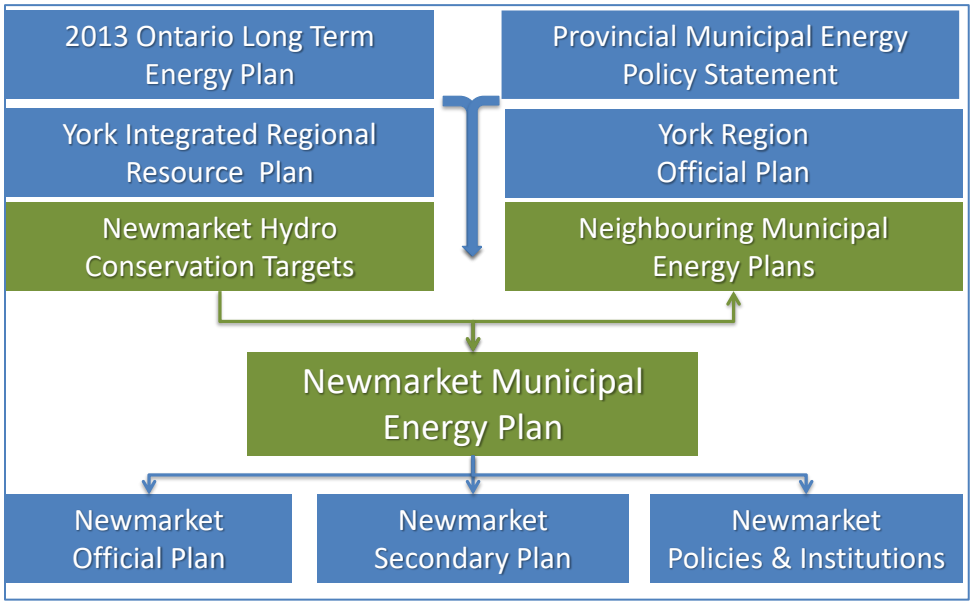
[4] York Region Official Plan, Sustainable Cities, Sustainable Communities (Section 5.2).
[5] York Region Official Plan, Sustainable Cities, Sustainable Communities (Section 5.2.13).
[6] York Region Official Plan, Supporting the York Region Economic Strategy (Section 4.1.14).
[7] York Region Official Plan, Regional Centres (Section 5.4.24).
[8] Newmarket Urban Centres Secondary Plan, Policy 13.3.4 – Energy and Underground Utilities.

The relationship of the CEP to energy planning activities in Ontario and land use and strategic planning at the regional and local level is illustrated in Figure 1.

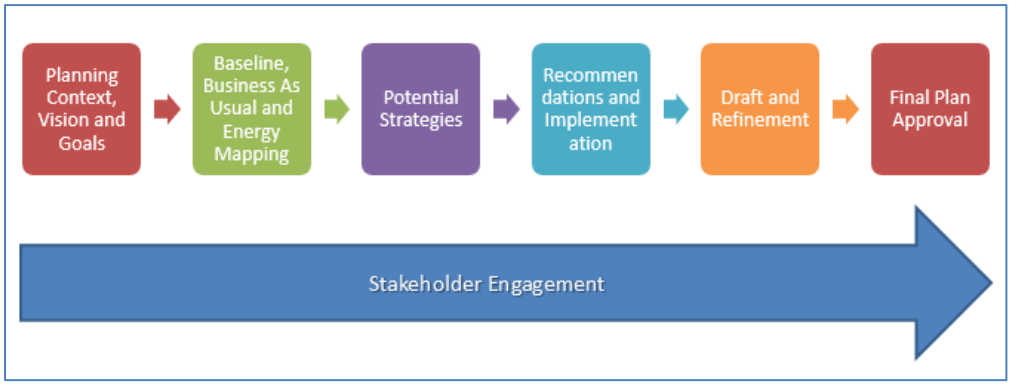
Figure 1: Relationship of the CEP to strategic planning at the regional and local level.



1.3 How was this Plan Developed?

A Stakeholder Advisory Group (SAG) oversaw the development of the Community Energy Plan from January 2015 to March 2016. The SAG is comprised of key stakeholders representing various sectors and offering different perspectives. SAG members provided guidance, shared technical advice and knowledge, and actively participated through each of the key phases of the Plan's development. Throughout the planning horizon, a variety of other stakeholders were engaged as well, including Newmarket Town Council, Town staff, the business community, and the community at large.

Figure 2: Newmarket Community Energy Plan Development Process



2 CEP Vision, Goals & Targets

A wide range of future energy price risks and carbon regulation mean that energy costs in Newmarket will continue to grow unless robust goals and policies are implemented. The CEP provides a strategic direction that will move the community towards a cost-effective, environmentally responsible and sustainable energy system, while ensuring a reliable local energy supply. This CEP will be a catalyst for new economic development, behaviour change and sustainable and efficient growth in Newmarket.

From the outset, the Stakeholder Advisory Group recognized the importance of this Plan and the important role that energy plays in everyday lives. The Newmarket CEP is a transformative plan with significant goals and targets, but also with credible starting points and steps for incremental improvement. Incorporating the ongoing energy planning efforts by York Region and the IESO is important, as is implementing a business-minded and cooperative approach.

2.1 CEP Vision

The vision of the Newmarket Community Energy Plan is:

To create a sustainable community whose energy future is efficient, secure, reliable, and environmentally responsible. Our approach to managing energy will demonstrate leadership and be *well beyond the ordinary*.

The vision statement highlights that the Newmarket CEP is a transformative and ambitious Plan. Linking to the Town's overall vision – *Well Beyond the Ordinary* – was important in order to highlight the importance of demonstrating leadership and being a community that is healthy, thriving and dynamic.

2.2 CEP Goals

The strategies and actions outlined in Section 6 address these goals and align with the CEP vision statement. In the below statements, "we" is used to indicate that the goals are to be shared across the Newmarket community, and provide guidance and direction for the Town of Newmarket, local businesses and industry, and the Town's residents.

CEP Goals

1. **Energy Generation & Distribution**
   We will strive to have a resilient, stable, clean and secure local energy system.
2. **Economic Development**
   As a result of using energy in a more sustainable way, we will create jobs and attract investment and businesses.
3. **Behaviour Change & Education**
   We will help reduce energy use and GHG emissions by raising awareness through programs and education, and building a connection between energy choices and actions and the things people care about.
4. **Energy Efficiency of Buildings**
   We will continue to demonstrate leadership in increasing efficiency of existing buildings and will continuously improve building performance through best management practices.
5. **Land Use & Growth Planning**
   We will continue to build a healthy, complete community with mixed-use development, local jobs and well-connected mobility and transportation options for our residents.
6. **Transportation Efficiency**
   We will have an efficient and clean transportation system, including multi-modal and active transportation options.

2.3 CEP Targets

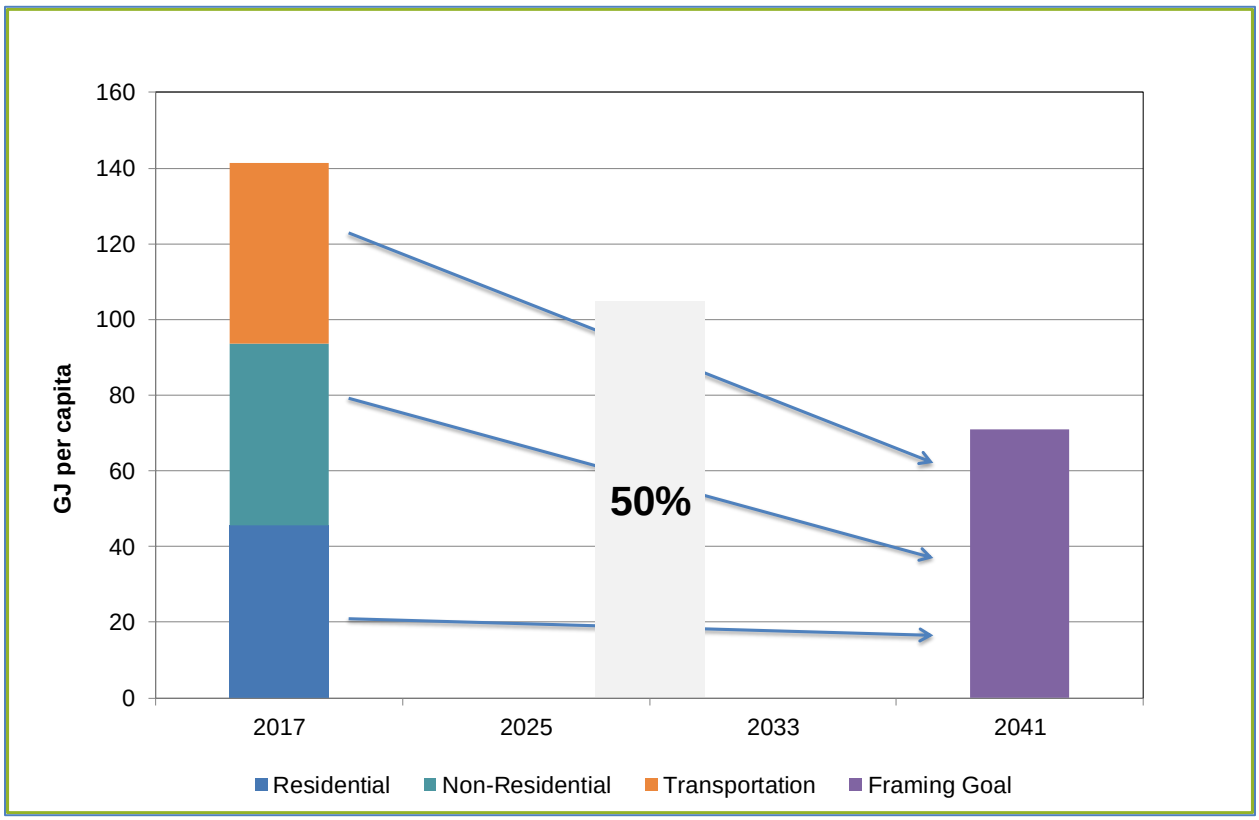
The Newmarket CEP has transformative targets that will ensure the Newmarket community is at or near current (2017) global best practice by 2041.

Through the implementation of this plan, the Town of Newmarket will:

1. **Reduce per capita primary energy use by 50% from 2017 baseline by 2041.**
2. **Reduce per capita GHG emissions by 50% from 2017 baseline by 2041.**

By reducing per capita primary energy use by 50% to approximately 70 GJ/capita in 2041 (as seen in Figure 3), Newmarket will be near current global best practice. This will be mainly achieved through residential and non-residential (commercial and industrial) building retrofits and transportation efficiency measures.

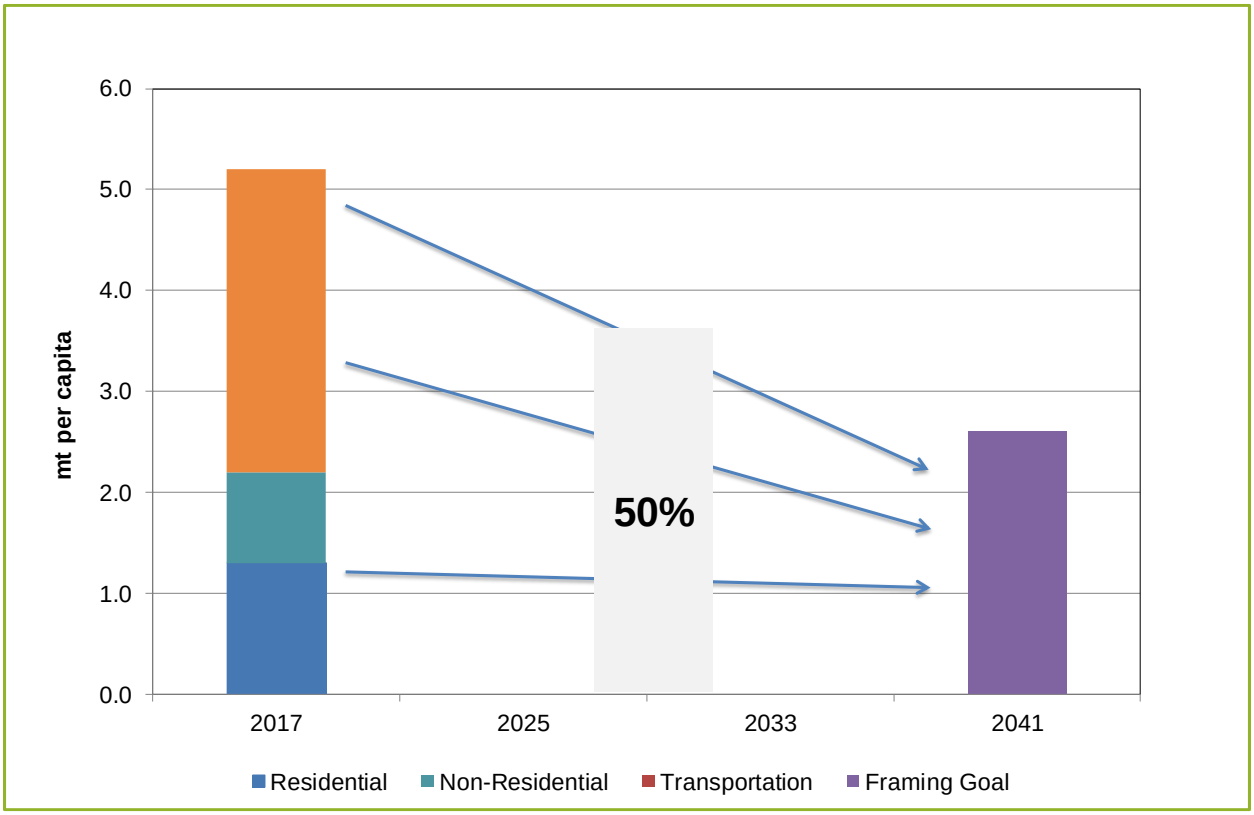
Figure 3: Per Capita Energy Use Reduction Target (2017-2041)



From an emissions standpoint, a per capita reduction of 50% below the 2017 baseline (Figure 4 below) would be consistent with recommended global targets, which call for an 80% reduction in global emissions relative to 1990 levels in order to keep average temperature rise below 1.5 degrees Celsius. At around 2.7 metric tons CO_2 equivalent (CO_2e)[9] per capita, Newmarket would be in line with Copenhagen's current level of greenhouse gas emissions. Reaching this target would help provincial and federal efforts to substantially reduce the rate of increase of GHG concentrations in the atmosphere.

[9] CO2 equivalent (CO2e) is a metric measure that is used for easy comparison of emissions from various GHGs based on their global warming potential (GWP). By using this measure, we are able to tally the total emissions from different sources, including electricity, natural gas, gasoline, diesel and propane.

Figure 4: Per Capita GHG Emissions Reduction Target (2017-2041)



2.4 CEP Principles

The Stakeholder Advisory Group developed several sound principles to guide the overall decision-making process and development of the CEP vision, goals and targets. In reaching the above targets, one of the Plan's guiding principles is that all energy-related investments by the community will achieve attractive long-term returns.[10] In the SAG's view, the reliability of the local energy system is non-negotiable in determining specific actions – energy supply and security is of utmost importance in energy planning, especially in growing communities. In general, a transformative, best-in-class approach was applied at all stages throughout the development of this Plan, along with a sound and responsible economic approach.

[10] For example, the return on 20-year provincial bonds, or a minimum of 5% risk-adjusted 20-year Infernal Rate of Return (IRR).

3 Newmarket's Community Energy Profile in 2017

3.1 Overview of Newmarket

Currently home to 94,100 residents, the Town of Newmarket's population (approximate 2017 population) growth rate has surpassed those of Ontario and Canada in recent years, and the Town's population is projected to continue to grow steadily in the years to come. From 2006 to 2011, Newmarket saw its population increase by 7.6%, compared to the national average growth of 5.9% and the provincial growth rate of 5.7%. Newmarket experienced significant growth in the early 2000s as well – the Town's population increased by 12.9% from 2001 to 2006, compared to Ontario's increase of 6.6%.[11] The Town will continue to grow and is expected to have close to 118,000 in by 2041.

A strategic area within Newmarket has been designated by the Province of Ontario as an Urban Growth Centre in the *Places to Grow* initiative[12], which intends to promote higher density development, a lower rate of vacant land utilization and build out in urban areas, and increased public transit use in the Greater Golden Horseshoe area. The designation of 24 Urban Growth Centres is a major component of *Places to Grow* – these centres are defined as mixed-use, high-density, public transit focused developments, and are expected to become focal points for growth within the Greater Golden Horseshoe.

Newmarket's economic future is bright with a local economy that is flourishing and diverse. Of the approximately 47,500 jobs in Newmarket, 34% are in the institutional sector, which includes health care and social assistance, public administration, and educational services. The retail and personal services sector is also robust with more than 13,000 jobs (around 33% of the total), the MWCT sector (manufacturing, wholesale trade, construction, transportation/warehousing) includes around 8,500 jobs (21%), and business services includes 4,700 jobs (12%).[13]

Looking towards the future, the growth of the Town will occur in five strategic sectors[14]:

1. **Business Services** – Building on Newmarket's strong finance and professional sector.
2. **Health Sciences** – Anchored by the Southlake Regional Health Centre.
3. **Information and Communications Technology** – Building on the Town's ultra high-speed internet project.
4. **Manufacturing** – Reinforcing the more than 5,000 manufacturing jobs in Newmarket.
5. **Retail** – Growing the entrepreneurial and creative sectors centred on Newmarket's historic downtown Main Street.

[11] Statistics Canada, 2011 Census of Canada.
[12] Government of Ontario, Ministry of Municipal Affairs and Housing – Growth Plan for the Greater Golden Horseshoe, 2006 and 2017.
[13] York Region 2013 Surveyed Employment.
[14] Town of Newmarket, http://www.newmarket.ca/Business/ecodev/growwithus

3.2 Profile of Homes and Buildings

Single detached dwellings comprise a large percentage (75%) of residential buildings in Newmarket. Semi-detached homes and row/townhouses make up a combined 17% of residential buildings, while multi-unit residential buildings (MURBs) make up around 8%. As noted by Statistics Canada, single detached homes have the highest average household energy use in Ontario at 136 GJ/household, compared to 94 GJ/household for multi-unit buildings and 33 GJ/household for apartments.[15]

Table 1: Newmarket Residential Buildings Profile

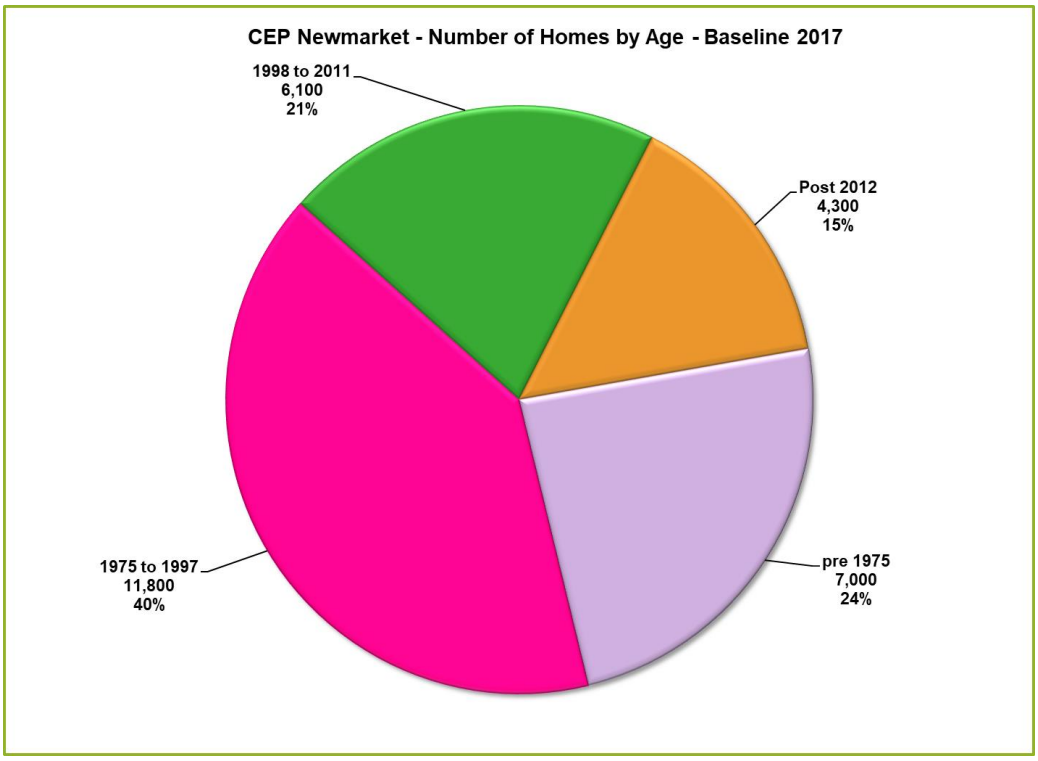
Residential Building Type	# of Units	% of Total
Single Detached	21,900	75%
Semi-Detached	2,400	8%
Row/Townhouse	2,700	9%
MURB	2,200	8%
Total	**29,200**	**100%**

Overall, the average age of houses in Newmarket is around 32 years old (built in 1986), with many homes being built before 1975 (24%). Around 60% of the residential buildings in Newmarket were built from 1975 to 2011, as the Town experienced significant population growth during that time.

The 2012 Ontario Building Code is much more stringent than previous codes and is one of the most energy efficient building codes in North America. Homes built since 2012 are 20% of the total.

[15] Statistics Canada, http://www.statcan.gc.ca/pub/11-526-s/2013002/t007-eng.htm

Figure 5: Residential Building Age Profile



In the non-residential sector, retail buildings make up 34%, followed by mixed-use buildings, industry and office buildings.

Table 2: Newmarket Non-Residential Buildings Profile

Non-Residential Building Type	# of Units	% of Total
Office	80	11%
Retail	240	34%
School	55	8%
Industry	110	16%
Mixed	180	26%
Medical/Hospital	3	1%
Other	30	4%
Total	**698**	**100%**

3.3 Establishing Newmarket's 2017 Revised Baseline

In order to understand Newmarket's energy consumption and GHG emissions, a baseline was established using energy consumption data, including electricity, natural gas, propane, diesel and transportation fuels. The year 2017 was selected as the revised baseline year as it is the most recent complete dataset available at the time of the CEP rebasing. Electricity data was provided by the local distribution company Newmarket-Tay Power Distribution Ltd. (Newmarket Hydro) and Enbridge provided natural gas data. Detailed information about the

built environment was also collected, including building age, type and location, gross floor area, etc.

Consumption of transportation fuels for Newmarket was estimated using a combination of the *2016 Transportation Tomorrow* resident activity surveys[16] conducted by the Data Management Group, current vehicle registration data, along with inputs from Metrolinx and York Region. Reasonable adjustments for actual journey lengths and survey undercounts were agreed with the Town Transportation Department. Daily and Annual average passenger and vehicle kilometers travelled within the boundary of Newmarket were estimated. These were then combined with the distribution of vehicles based on vehicle registration data and average fuel consumption by vehicle type. The results in an estimate of annual volume of fuel consumed for gasoline, diesel and electricity. The total retail fuel sales from the Kent Group were also available and served as a "sanity check" on the estimation process.

Emissions coefficients for each transportation fuel type and for natural gas were based on data from Environment Canada's annual *National Inventory Report*.[17] Transportation fuel costs were sourced from Statistics Canada.

Emissions coefficients for electricity were based on the *2017 Practice Guidelines for Electricity Emissions Factors* from The Atmospheric Fund[18]. The site to source energy factor for electricity was based on the team's estimate using average generating mix data from IESO.

3.3.1 Energy Demand Mapping

Energy mapping has proven to be an effective way of explaining and presenting how energy is used and GHG emissions are dispersed in a given community. The maps help identify specific planning districts or neighbourhoods that are logical candidates for conservation and retrofit opportunities as well as areas where there are opportunities for distributed energy solutions.

In order to link metered consumption data from the baseline to the geographical location of specific buildings, it was necessary to build a model of energy consumption for each building type that could be linked to the municipal parcel fabric. The project team gathered Geographical Information System (GIS) parcel fabric files and property assessment roll files from the municipality. The assessment data was linked to the property rolls based on the roll numbers. Each building was then assigned a building type based on structure type and age. The project team then created 12 Energy Planning Districts based on land use characteristics of different areas of Newmarket. The result was a set of building inventories, with existing floor space for specific building types assigned to Energy Planning Districts.

Once building data was matched to geography, energy data from the baseline was matched to the residential and non-residential building inventories based on archetypes of building energy

[16] Transportation Tomorrow Survey, http://www.transportationtomorrow.on.ca/.
[17] Environment and Climate Change Canada, Canada's Greenhouse Gas Emissions, https://www.ec.gc.ca/ges-ghg/.
[18] A Clearer View on Ontario's emissions July 2017 https://taf.ca/

performance developed using EnergyPlus v9.1 energy modelling software. The result was a set of archetypes of buildings with modelled energy intensity values (GJ/m^2) for electricity, natural gas, and various end uses including heating, cooling, domestic hot water, and appliances/lighting.

The resulting energy intensity values for all building types were combined with the building characteristics in each Energy Planning District. The result was a unique value for energy consumption in each Energy Planning District based on the m^2 floor space for all building types in that area. These values were then matched to the actual metered consumption data to create an energy use database for Newmarket.

3.3.2 Newmarket's Energy Planning Districts

Twelve Energy Planning Districts (EPDs) were created and aligned with Town planning. The EPDs can be differentiated not only on the defined boundaries but also by their main building types and uses. Figure 6 illustrates the twelve EPDs and this map serves as the basis for all energy maps that were created as part of this Plan.

Figure 6: Newmarket Energy Planning Districts

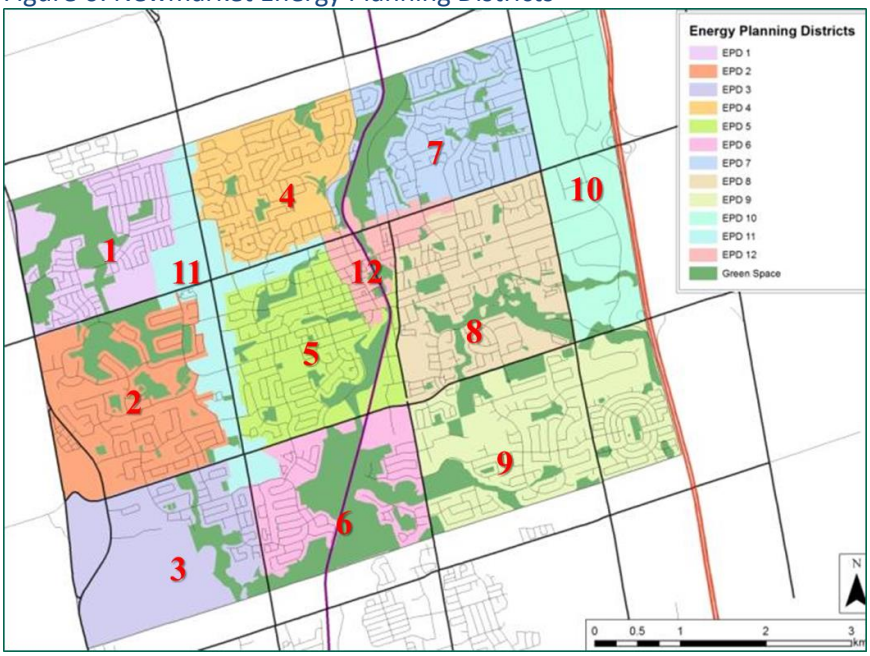


Table 3 summarizes the gross floor area (residential and non-residential) as well as the main building types in each EPD. As *Table 3* shows, EPDs 1 through 9 are mainly residential areas and together account for XX% of the residential gross floor area in Newmarket. In the northeastern part of Newmarket, EPD 10 represents the industrial corridor north of Mulock Drive and between Leslie Street and Highway 404. EPD 11 is mostly commercial and includes large

portions of the redeveloping Davis Drive and Yonge Street corridors[19], while EPD 12 is the historic Downtown area and includes the Main Street businesses and the Southlake Regional Health Centre.

Table 3: Energy Planning Districts

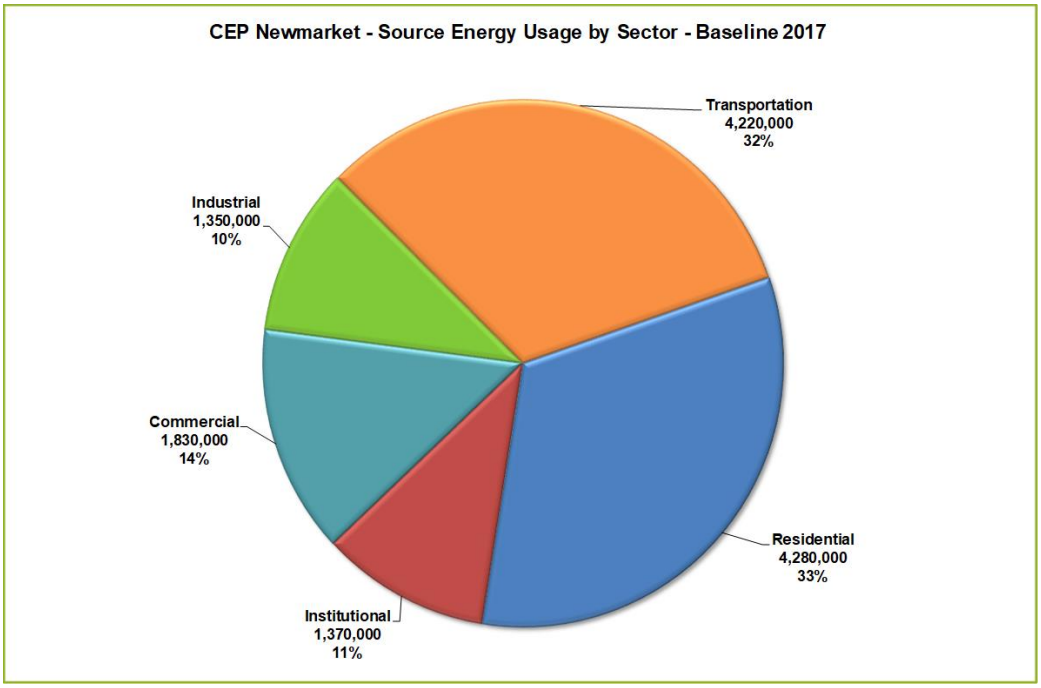
EPD	Total GFA (m^2)	Residential GFA (m^2)	Non-Residential GFA (m^2)	Main Building Types
1	583,500	569,400	14,100	Residential, Schools
2	738,300	696,900	41,400	Residential, Schools
3	305,400	276,600	28800	Residential, Schools
4	495,400	470,000	25,400	Residential, Schools
5	460,100	377,900	82,200	Residential, Schools, Offices
6	478,300	386,500	91,800	Residential, Schools, Offices, Industry
7	491,400	438,500	52,900	Residential. Schools, Retail
8	675,400	520,000	155,400	Residential, Schools, Offices, Retail
9	1,014,800	919,800	95,000	Residential, Offices, School
10	708,700	400	708,300	Industry, Mixed, Retail
11	476,100	76,300	399,800	Residential, Retail, Offices, Mixed
12	269,300	67,100	202,200	Health, Mixed, Residential, Retail, Offices
Total	**6,696,700**	**4,799,400**	**1,897,300**	**Residential 72%** **Non-Residential 28%**

3.4 Newmarket's Energy Use Profile

In 2017, 13.0 million GJ of energy was used in Newmarket. As seen in Figure 7, the majority of community energy (68%) was consumed in residential and non-residential buildings, including homes, businesses, offices, schools, government buildings and shopping areas. Approximately 32 % of total energy use was for the fuel used by all journeys within the Town boundaries.

[19] Newmarket's Urban Centres Secondary Plan is centered on the "Newmarket Centre" Provincial Urban Growth Centre, located around the intersection of Yonge Street and Davis Drive. Being one of only four Urban Growth Centres in York Region, this area is planned to accommodate a significant amount of future growth.

Figure 7: Energy Use by Sector (GJ) (2017)

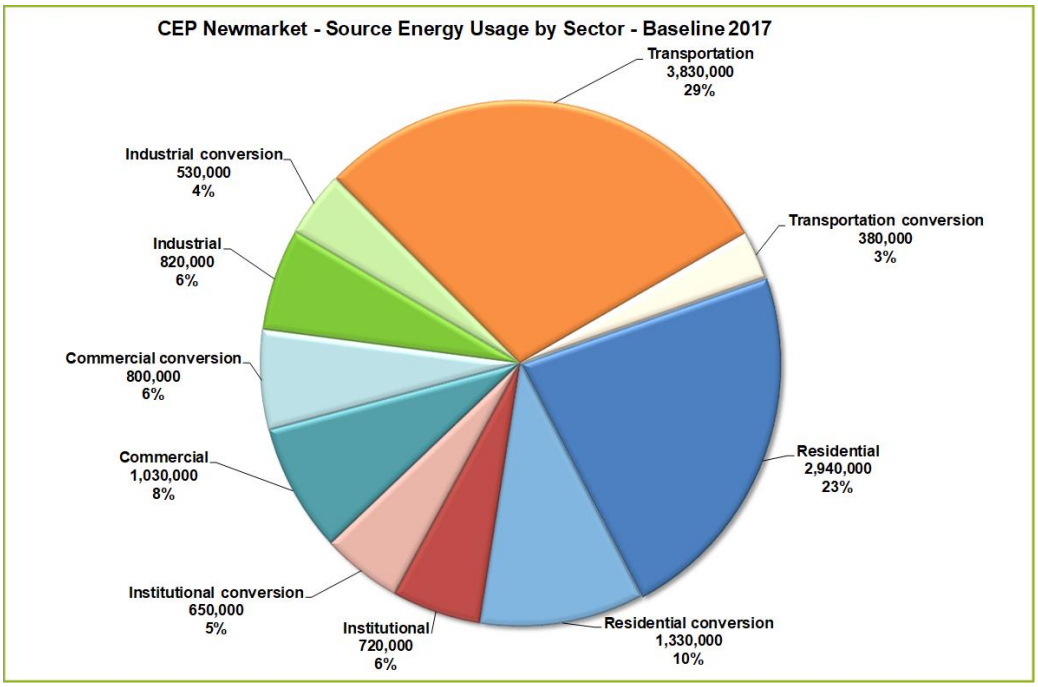


However, like many other jurisdictions in Canada and around the world, nearly 30% of the total energy of 13.0 million GJ is used before it even reaches the Newmarket community due to conversion losses. Energy conversion is the process of changing one form of energy to another. Energy is needed and used to generate, transmit and distribute electricity that is converted from sources such as wind, solar and hydro resources. Through each of those processes there is a loss of some of the energy as the power is converted from their primary energy sources, sent from the power plant to Newmarket Hydro, and then to Newmarket homes and businesses.

Figure 8 below shows conversion losses by sector in Newmarket. Conversion losses in the non-residential sector – where half of the energy ultimately is lost – and residential sector are noticeably high. These conversion losses are significant and the strategies that are included in Section 6 of this plan include ways to reduce conversion losses, by maximizing the amount of energy produced locally in Newmarket.

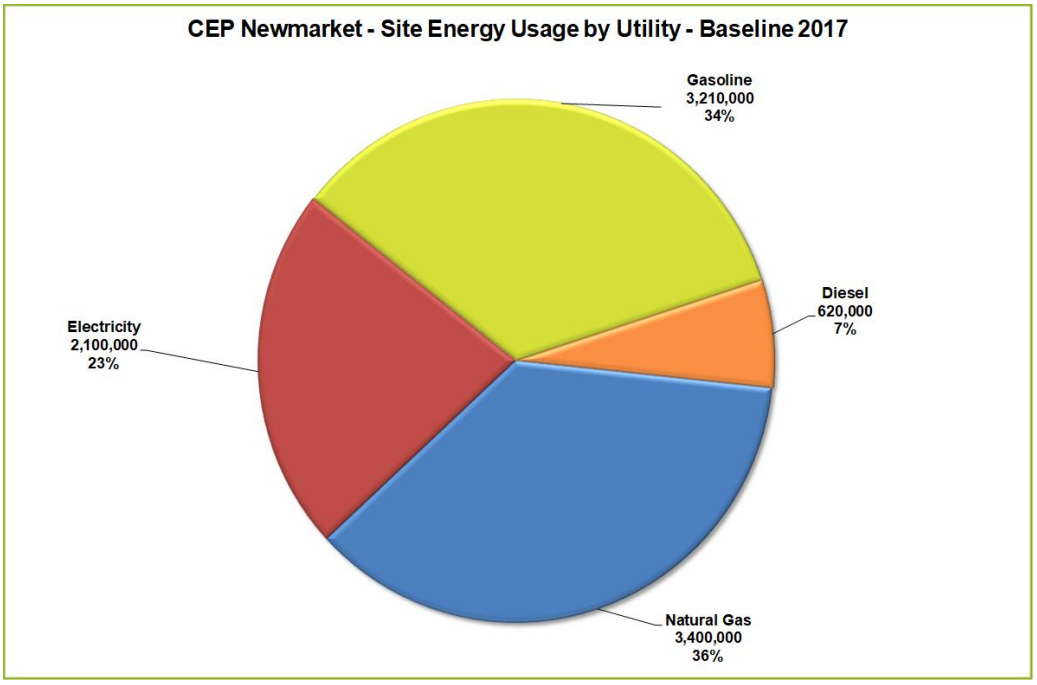
By reducing conversion losses, more money can be kept in the Town's local economy and more opportunities can be generated for local savings and the creation of energy-related jobs. By reducing total energy demand in Newmarket, resources are conserved and GHG emissions are much lower than would be expected under high demand scenarios.

Figure 8: Energy Use by Sector with Conversion Losses (GJ) (2017)



Taking these conversion losses into account, total energy end use by utility in 2017 amounted to 9.3 million GJ, which translates to approximately 99 GJ per resident. Figure 9 illustrates that transportation fuels (41%) and natural gas (36%) accounted for a large majority of energy consumption, followed by electricity.

Figure 9: Energy Use by Source (GJ) (2017)



A major portion of electricity in Newmarket (more than 60%) is consumed in the non-residential sector, especially the industrial sector in EPD 10. Office space, retail, food retail, and schools also consume electricity at a high level. Electricity is mainly used in the residential sector for air conditioning, lighting and appliances. In Newmarket, there are around 900 older single detached homes and 300 homes in multi-unit buildings that are still running on electrical heating.

The non-residential sector accounts for 38% of natural gas consumption in Newmarket, mainly to heat offices and retail spaces, as well as for process use in the industrial sector.

Approximately 62% of natural gas is consumed in homes, primarily for space and water heating and cooking. As expected, older homes are less energy efficient and therefore consume more energy on both a per-unit and per-floor area (m^2) basis. For example, *Table 4* illustrates that single detached homes built from 1975 to 1997 use 47% more natural gas on a per-m^2 basis than homes built after 2012. Single detached homes built prior to 1975 are even more inefficient at 0.65 GJ/m^2, 103% higher than newer homes.

Table 4: Single Detached Homes – Natural Gas Consumption Intensity

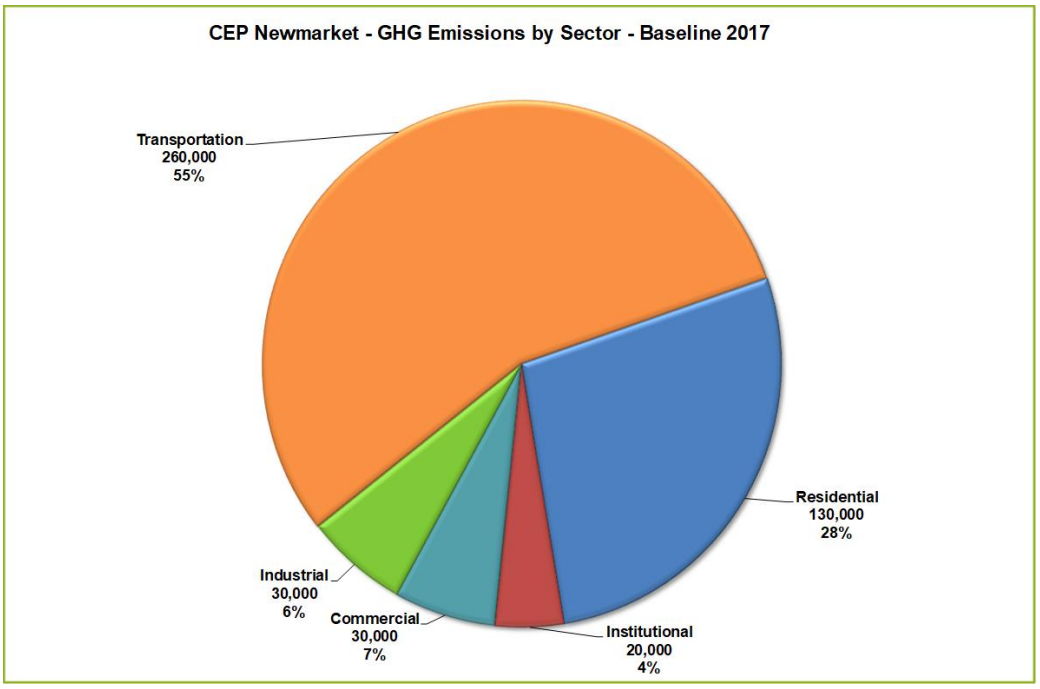
Residential Building Type	# of Units	Gross Floor Area (m^2)	Natural Gas Consumption (GJ)	Natural Gas intensity (GJ/m^2)
Single Detached - 2012-current	3,300	549,000	176,000	0.32
Single Detached - 1998-2011	4,000	679,000	253,000	0.37
Single Detached - 1975-1997	9,900	1,697,000	799,000	0.47
Single Detached - Pre-1975	4,700	800,000	523,000	0.65

3.5 Newmarket's GHG Emissions Profile

The CEP analysis indicates that Newmarket's total energy related GHG emissions in 2013 amounted to more than 470,000 metric tons, or approximately 5.0 metric tons (mt) of CO_2e on a per capita basis in 2017. This is far lower than both the Ontario average of 9.0 mt of CO_2e per capita, and Canada's average of 16.7 mt of CO_2e per capita. However, there is still room for improvement when cities such as Copenhagen only emit 2.2 mt of CO_2e per capita and the CEP strives to meet or exceed current global best practice by 2041 to achieve a 50% reduction per capita in GHG emissions.

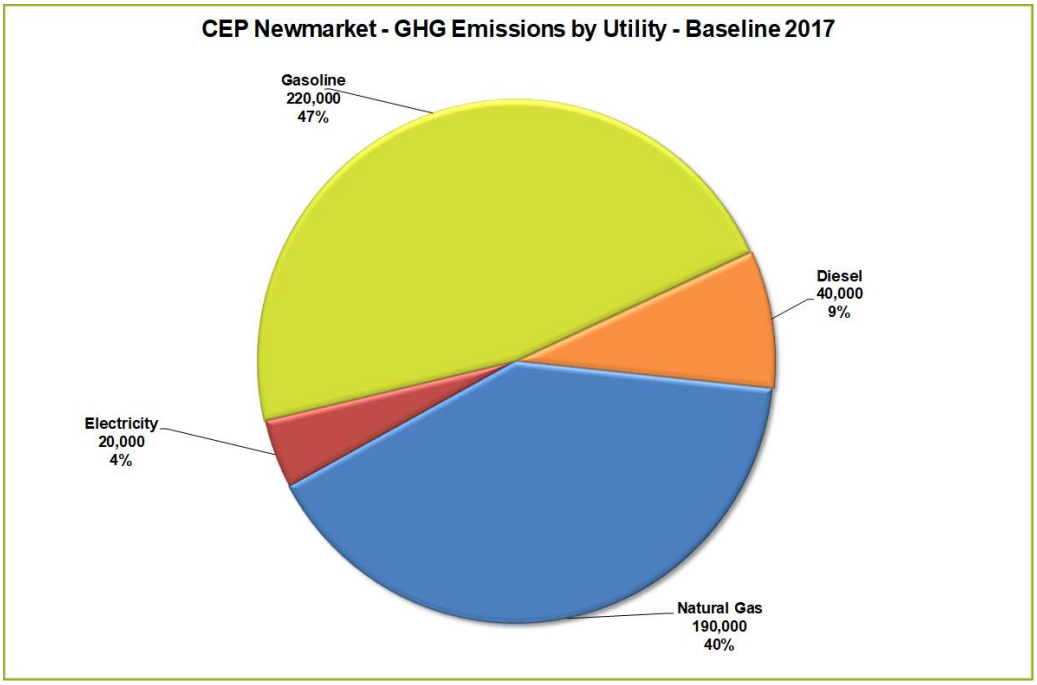
The transportation sector accounts for more than half (55%) of the total GHG emissions in Newmarket. At 28% and 17%, the residential and non-residential sectors combine to make up a little under half of the Town's emissions.

Figure 10: Greenhouse Gas Emissions by Sector (mt) (2017)



In looking at emissions by energy source, gasoline and diesel accounts for 56% of total emissions, while natural gas accounts for 40%. Electricity accounts for the remaining 4%.

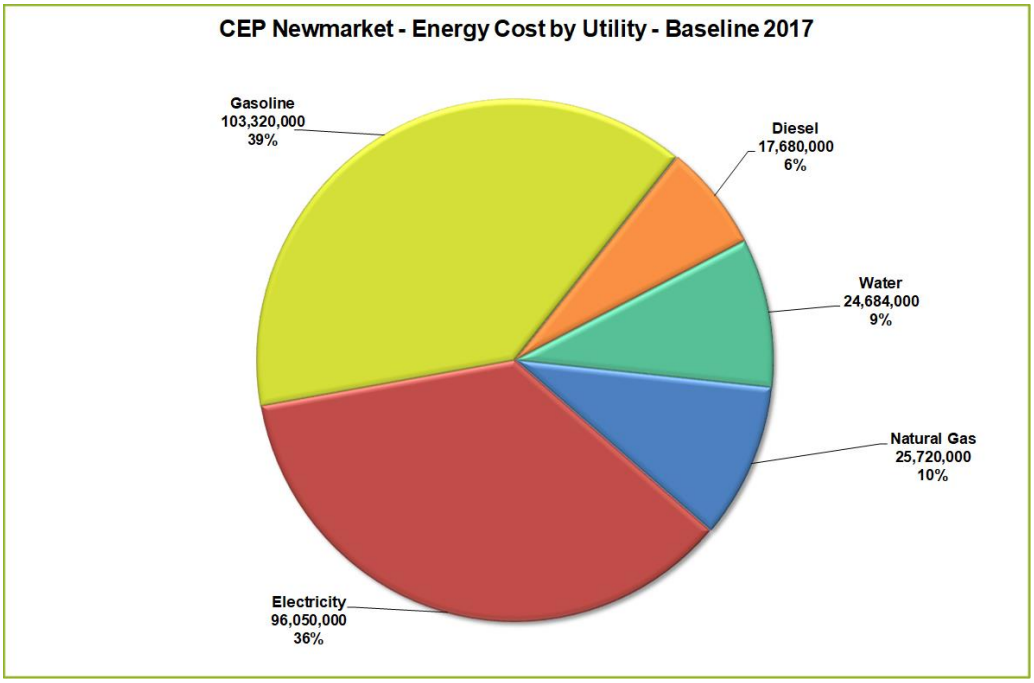
Figure 11: Greenhouse Gas Emissions by Source (mt) (2017)



3.6 Newmarket's Energy Costs

The Newmarket community – businesses, industry, and residents – collectively spent $267 million to meet its energy and water needs in 2017. Of this total, 36% was spent on electricity, 39% on gasoline, 10% on natural gas and 6% on diesel. Water and wastewater are a significant cost at $25M (9%).

Figure 12: Baseline Energy Costs by Source ($) (2017)

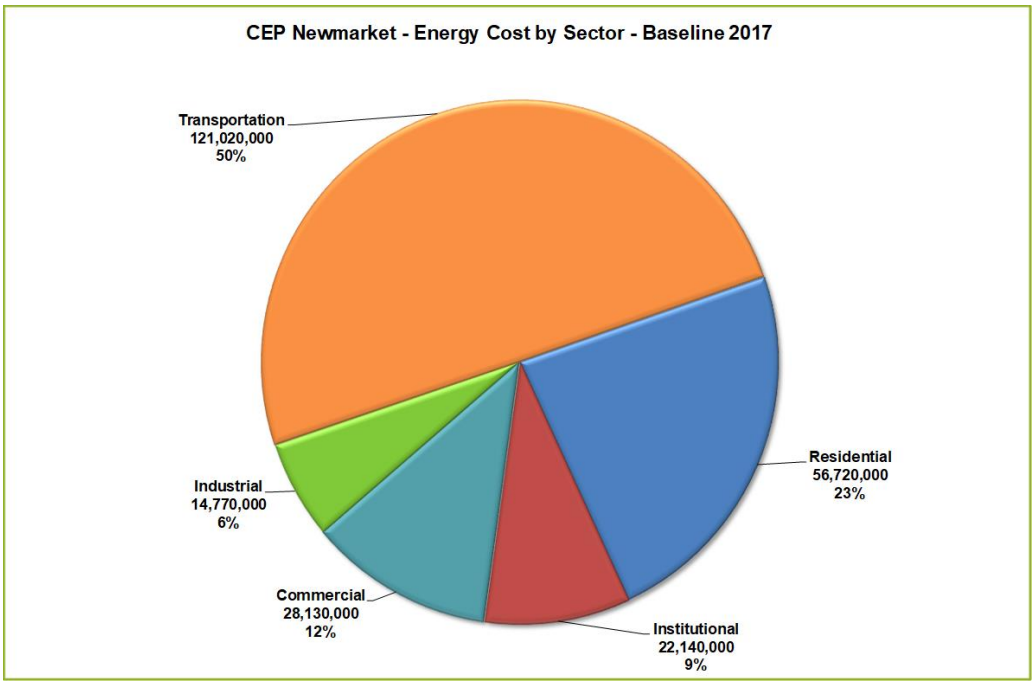


Electricity costs are now relatively higher due to several factors, including transmission system upgrades as well as the province's decision to shut down all coal-fired generation, partly replacing this with renewable power through the Green Energy Act's Feed-In Tariff (FIT) and microFIT programs. However, with reduced FIT prices, the ability to dispatch wind generation, and the decision to defer new nuclear plant construction, the Ministry of Energy expects that ratepayer savings will be realized in the coming years.[20] In addition, based on the first 16 Large Renewable Procurement contracts offered by the IESO in March 2016, the price ranges for the contracts were lower than existing FIT prices as of January 1, 2016. The LRP, FIT and microFIT programs have been suspended from 2016. [21] At the same time, the relative costs of natural gas consumption have been low in recent years due to historically low natural gas prices. In 2017, the CEP's revised baseline year, wholesale natural gas prices largely hovered in the $2.50 CAD/mmBTU range, one of the lowest in the world.

[20] Ministry of Energy, Long-Term Energy Plan.
[21] Independent Electricity System Operator, http://www.ieso.ca/Pages/Participate/Generation-Procurement/Large-Renewable-Procurement/default.aspx

In reviewing the energy costs by sector in Figure 13 below, non-residential end use accounts for approximately 27% of the energy costs in Newmarket. This makes sense given that electricity costs make up 36 % of total costs and a major portion of electricity in Newmarket is consumed in the non-residential sector. The residential sector accounts for 23% of overall costs, and transportation is at 50%.

Figure 13: Baseline Energy Costs by Sector ($) (2017)



3.7 Baseline Performance Indicators

In reviewing the 2017 baseline performance, it is evident that Newmarket performs relatively well in the local context of Ontario and Canada averages. Energy consumption per household excluding transportation is higher in Newmarket, but intensity in the residential sector is somewhat lower than Canadian averages. The GHG emissions per capita of 5.0 metric tons CO_2e is well below both the Ontario and Canadian average as indicated in *Table 5*.

However, when comparing Newmarket to global best practice, there is room for improvement. Consumption per household is 60% than the Danish average, consumption per floor area in Newmarket homes is 2 times higher than German A-rated homes[22], and 1.9 times higher in the non-residential sector. As mentioned before, GHG emissions per capita are approximately 140% higher than those of Copenhagen, which has world-class building efficiency standards and a robust district energy system.

[22] A-rated homes are low-energy homes that have received an A rating using the Building Energy Rating (BER) methodology. The BER is a rating of the overall energy efficiency of a building (residential or commercial).

This is compounded by the fact that future energy price risks (e.g., rising residential electricity bills, the potential for natural gas prices to return to higher, historical values), combined with the potential of an additional $10 to $20 million in local energy costs due to potential Federal carbon taxes[23], together pose significant energy price risks for Newmarket and other municipalities in Ontario. While there are significant risks, there are also significant opportunities and major long-term efficiency potential in Newmarket.

Table 5: Baseline Performance Indicators

Performance Metric	Newmarket Baseline	Canada Average	Ontario Average	Comparable Best Practice
Energy Consumption/household	101 GJ	92.5 GJ[24]	101 GJ[25]	64 GJ[26]
Energy Consumption/m^2 (Residential)	0.61 GJ	0.69 GJ[27]	0.75GJ	0.29[28]
Energy Consumption/m^2 (Non-Residential)	1.35 GJ	1.14 GJ[29]	1.10 GJ	0.72
GHG emissions/capita	5.0 metric tons CO_2e	16.7 metric tons CO_2e30	9.0 metric tons CO_2e	2.2 metric tons CO_2e[31]

4 Energy Maps

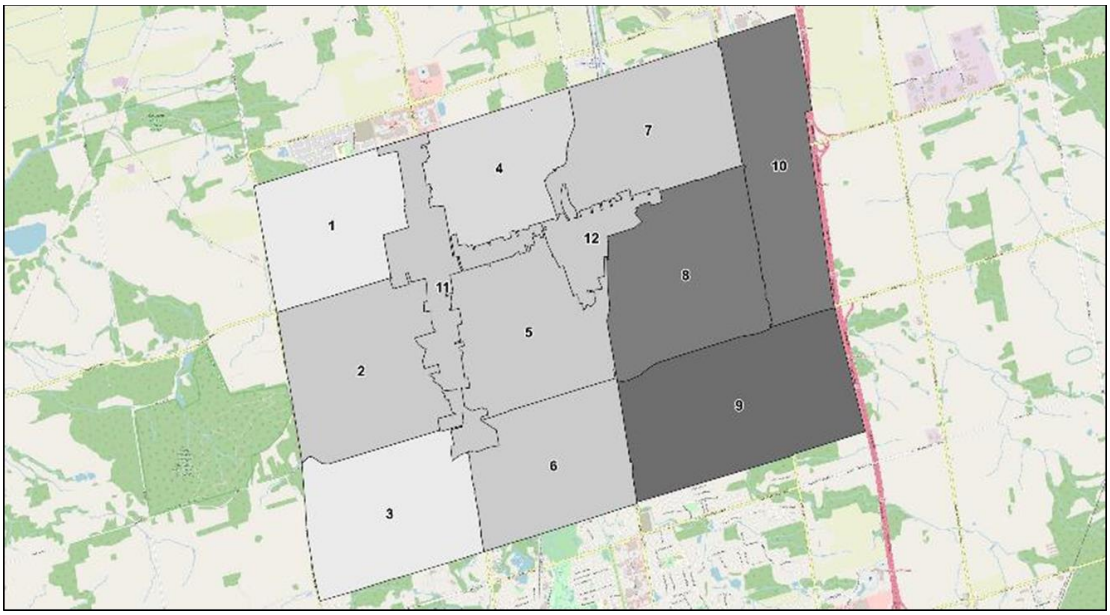
The energy maps in this section serve to enhance and complement the information provided in Section 3. The maps will help Town staff, utility providers, Newmarket residents and other key stakeholders better understand where the community is using the most energy overall, where electricity and natural gas use are high, and where there is significant demand for heating and cooling. These maps are also useful tools to begin to identify specific EPDs as candidates for conservation and retrofit opportunities and distributed energy solutions. However, it should be noted that further detailed analysis for suitability for retrofit programs and detailed feasibility studies for district energy systems will be required prior to implementation.

[23] Ontario Cap and Trade program was cancelled in 2018, with the possibility there may be Federally imposed carbon taxes.
[24] Statistics Canada, Household energy use, by fuel type and by province, 2015 – average energy use, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510006001
[25] ibid.
[26] Odysee-Mure, Key indicators, http://www.indicators.odyssee-mure.eu/online-indicators.html
[27] Based on market median home size of 135 m2 (1,450 square feet).
[28] Odysee-Mure
[29] Natural Resources Canada, Survey of Commercial and Institutional Energy Use: Buildings 2014
[30] United Nations Framework Convention on Climate Change, National Inventory Submissions 2018.
[31] Copenhagen City 2017 reported emissions.

4.1 Baseline Energy Use Maps

Energy Map 1 illustrates total energy consumption in Newmarket in 2017.

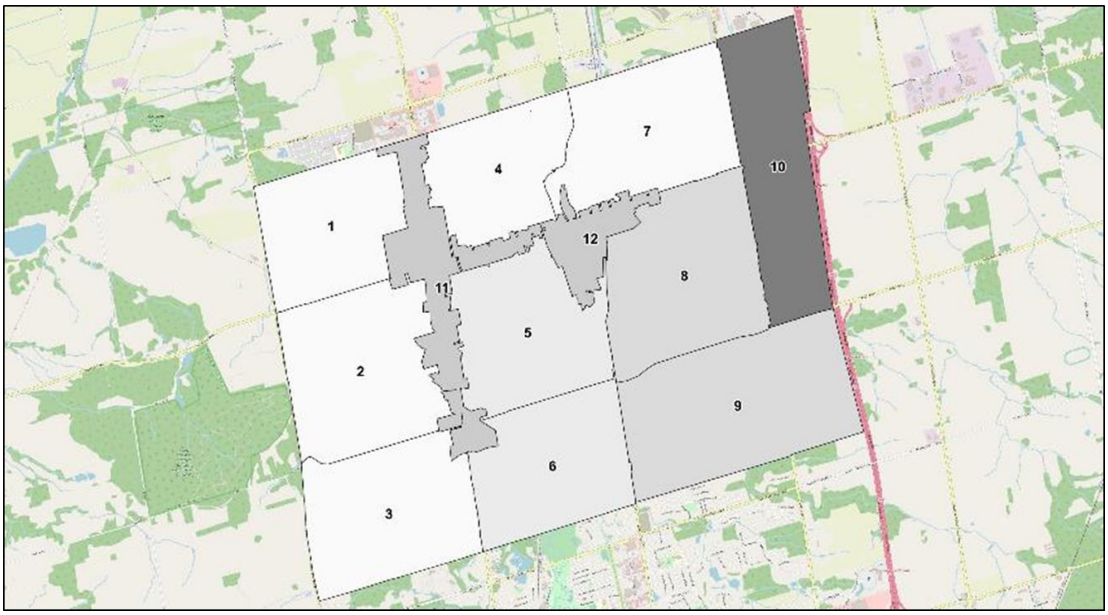
Energy Map 1: Total Energy Use (GJ) (2017)



The highest energy consumption occurs in the mixed use EPD 9 and EPD8, followed by EPD 10 (industrial corridor))

Energy Map 2 illustrates total non-residential energy use in Newmarket in 2017.

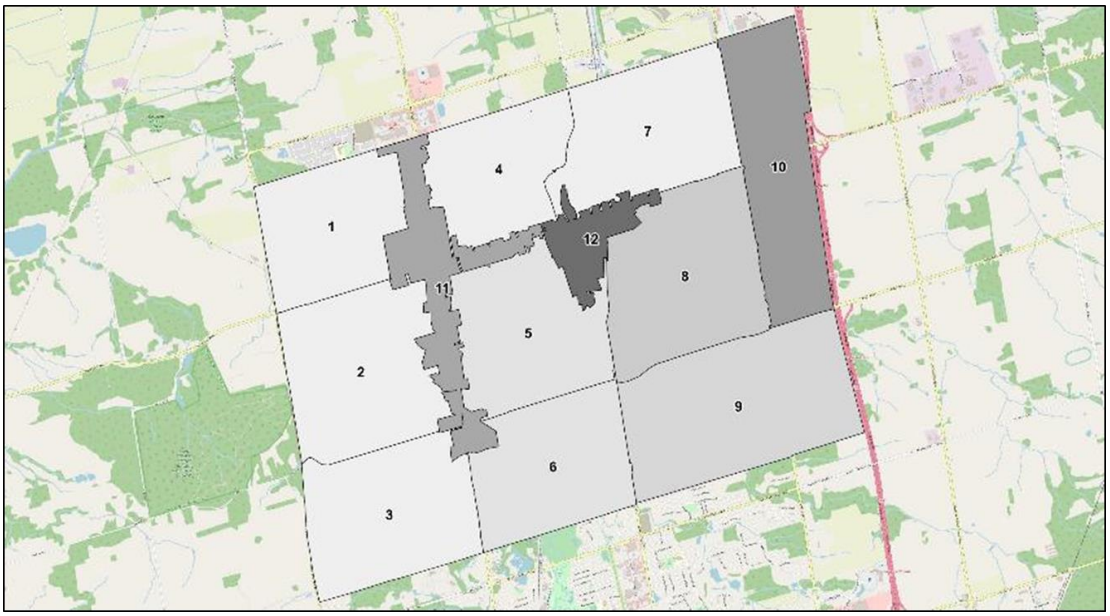
Energy Map 2: Non-Residential Energy Use (GJ) (2017)



Non-residential energy use is highest in EPDs 10, 11 and 12, which combine for 56% of total non-residential energy use in Newmarket. These areas are also considered to be economic development priorities in Newmarket, as the business services, health sciences, manufacturing and retail sectors in these areas continue to expand.

In addition to examining total energy consumption, it is vital to consider energy intensity when targeting specific neighbourhoods or areas for retrofit or efficiency programs. Such programs not only need to consider total consumption, but density, gross floor area and the amount of market penetration of existing programs also need to be considered. *Energy Map 3* shows energy intensity in Newmarket, where intensity is total energy consumed (GJ) divided by land area (km^2).

Energy Map 3: Energy Intensity (GJ/km^2) (2017)

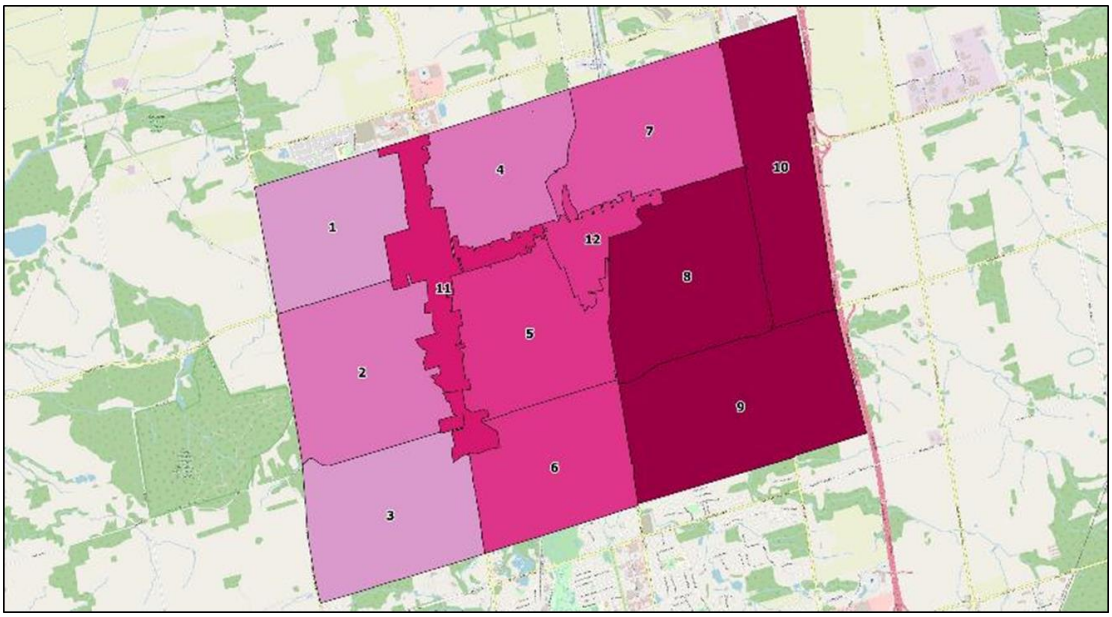


This map shows that energy intensity is highest in EPDs 10, 11 and 12, due to the nature of the main building types located in those districts. Of the more residential areas, EPDs 8 and 9 have the highest energy intensity.

4.2 Baseline Electricity Consumption Maps

Energy Map 4 illustrates total electricity consumption for both the residential and non-residential sectors in 2017.

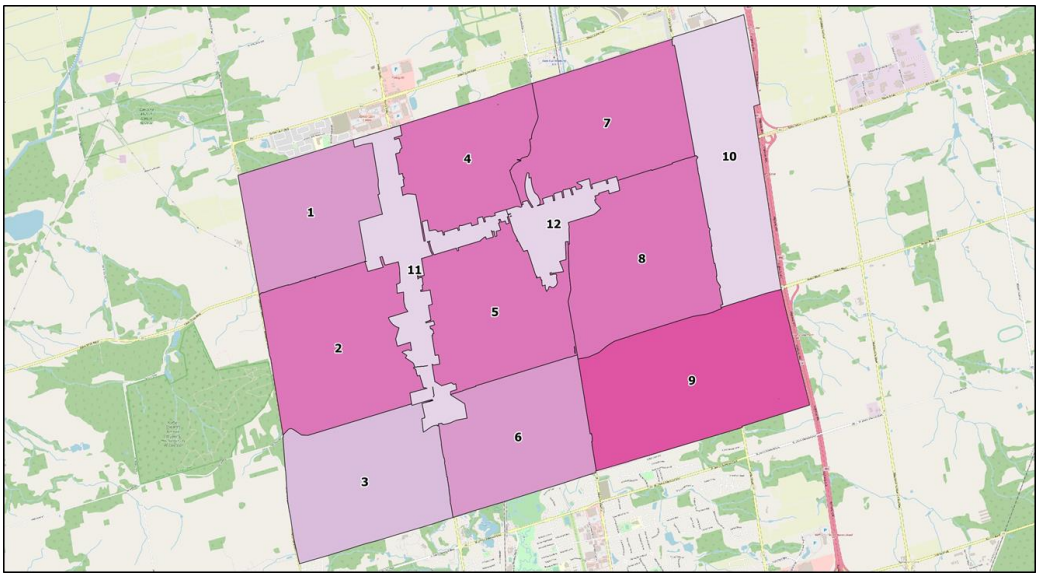
Energy Map 4: Total Electricity Consumption (GJ) (2017)



Although EPD 12 clearly doesn't consume electricity to the same level as EPD 8,9,10 and 11 (due to the relatively small size of the EPD), it's interesting to point out that EPD 12's non-residential electricity intensity (taken by dividing non-residential electricity consumption by non-residential gross floor area) is significantly higher than other EPDs. This is due to the Regional Health Centre being located in EPD 12. Hospitals are open 24 hours a day, 365 days per year and include numerous energy intensive activities such as refrigeration, medical and lab equipment use, computer use, etc. EPDs with higher electricity intensity – such as EPD 12 with the unique potential offered by the Health Centre – may serve as future locations to study and evaluate the prospective impacts of distributed generation.

Energy Map 5 illustrates total electricity consumption in the residential sector.

Energy Map 5: Residential Electricity Consumption (GJ) (2017)

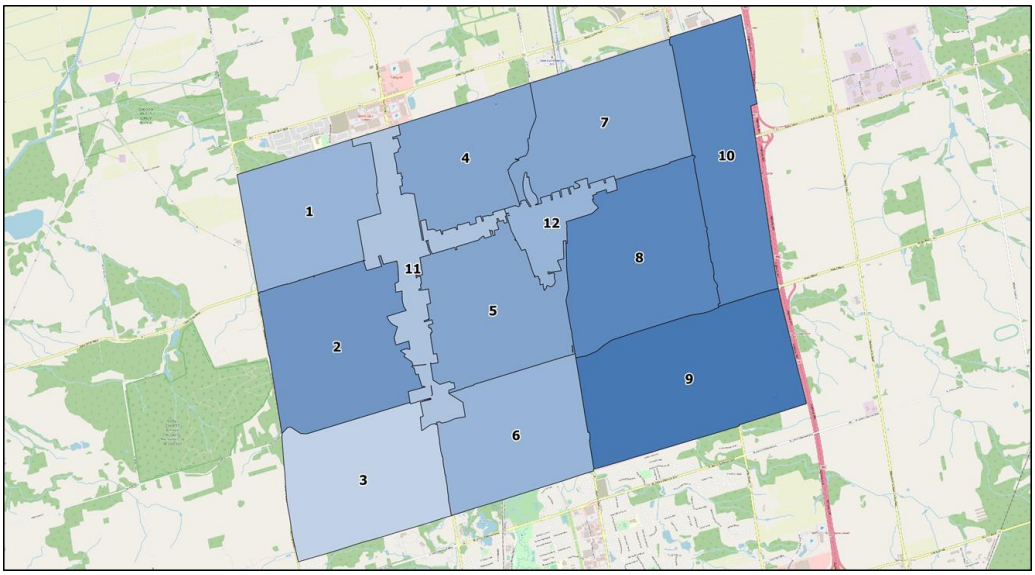


In the residential sector, EPD 9 stand out the area with the highest electricity consumption. Firstly, this is due to the simple fact that this EPD has the highest residential gross floor area in Newmarket. has a high percentage of larger older homes.

4.3 Baseline Natural Gas Consumption Maps

Energy Map 6 shows total natural gas consumption in Newmarket in 2017.

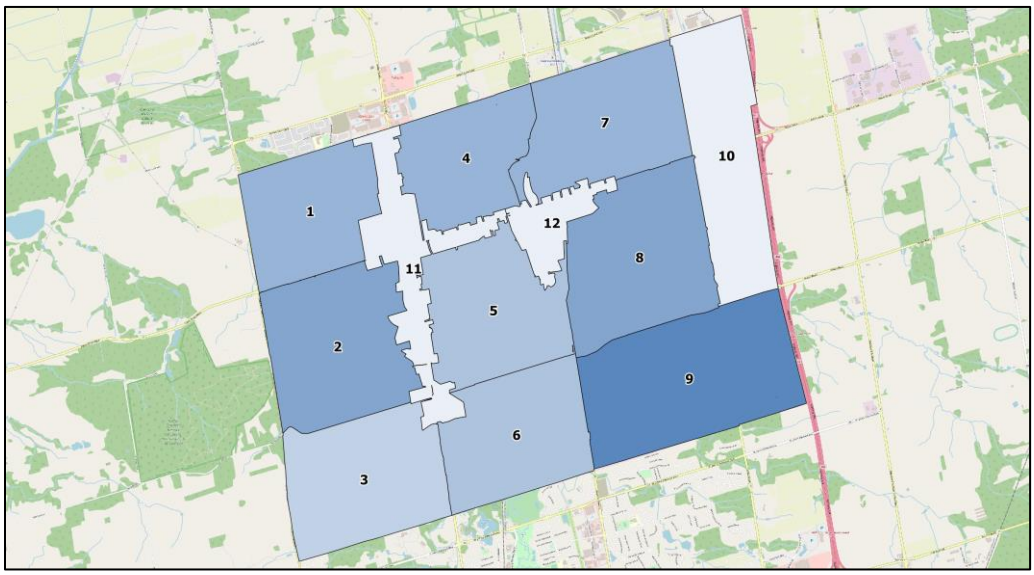
Energy Map 6: Natural Gas Consumption (GJ) (2017)



Total natural gas consumption is highest in EPD 10 (mainly industry) and EPDs 8 and 9 (mainly residential).

Energy Map 7 illustrates natural gas consumption by residential users.

Energy Map 7: Residential Natural Gas Consumption (GJ) (2017)

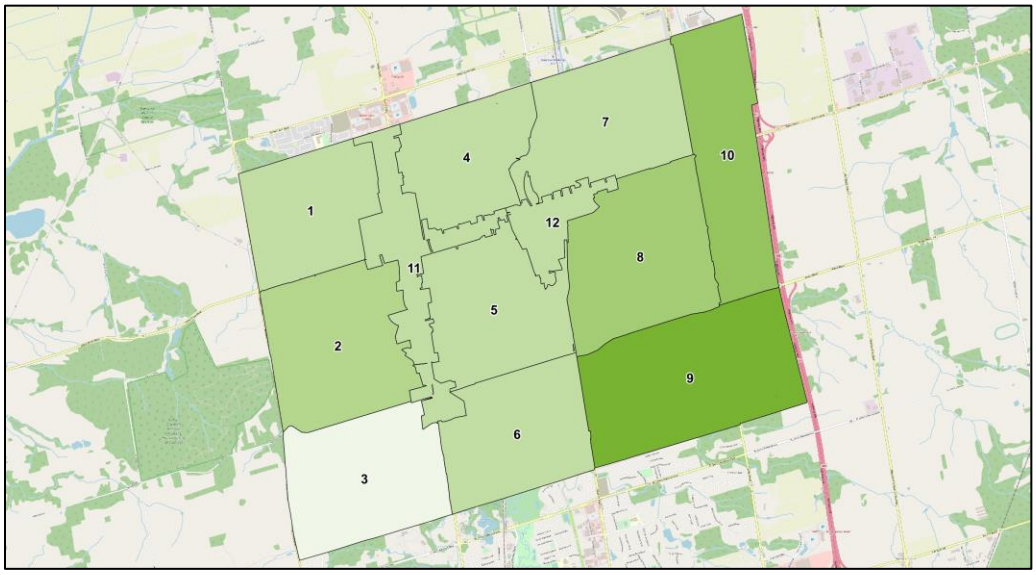


Residential natural gas consumption is highest in EPD 9, followed by EPDs 2, 4, 5. 7 and 8. While EPD 9 has the highest natural gas usage, intensity values are highest in EPD 1 & 4.

4.4 Baseline GHG Emission Map

Total GHG emissions for 2017 are shown in *Energy Map 8*.

Energy Map 8: Total GHG Emissions (metric tons CO_2e) (2017)



Interestingly, EPD 10 (industrial corridor) and EPD 9 (largely residential, with some offices and schools) are the highest emitting EDPs. This indicates a clear need for differentiated efficiency measures and actions in these Energy Planning Districts. In terms of GHG intensity (GHG emissions/m^2), as expected, the largely non-residential EPDs 10 and 12 have higher intensities than the other EPDs.

4.5 Conclusions

Based on the energy maps presented throughout this section, the following conclusions can be made:

1. The highest energy intensity occurs in the largely non-residential EPDs 10, 11 and 12. Of the residential EPDs, EPD 8 and EPD 9 have the highest energy intensity.
2. EPDs with higher electricity intensity are considered prime locations to evaluate the potential impacts of distributed generation. EPD 12 (where Southlake Regional Health Centre is located) looks to be a potential fit, as does EPD 10 and 11.
3. Natural gas consumption in the residential EPDs is highest in EPD 9. However, natural gas intensity is higher than EPD 9 for a few other mainly residential EPDs. This illustrates that when looking at energy consumption, it is also important to consider energy intensity when targeting specific areas or neighbourhoods for retrofit or efficiency programs. Targeting specific EPDs for these initiatives must not only consider total consumption, but density, gross residential floor area, building age and type, as well as the amount of market penetration that has already occurred for retrofit/efficiency initiatives in those neighbourhoods.
4. Total GHG emissions indicate that, on an aggregate basis, residential EPDs 8 and 9 and industrial EPD 10 have the highest GHG emissions. This indicates a need for differentiated efficiency measures and supply actions that target the residential and non-residential (commercial and institutional) sectors in Newmarket.

5 Newmarket's Energy Future

As mentioned before, Newmarket is expected to continue growing and the Town's population is forecasted to be close to 118,000 by 2041. As Newmarket grows, the Town will have to plan for the energy needs of its community in a progressive and forward-looking fashion.

In order to determine what this anticipated growth means for Newmarket's energy consumption and GHG emissions profile, modelled business-as-usual (BAU) forecasting was conducted from 2017 to 2041. BAU forecasting shows what the future will be under the assumption that little to no action is taken to address energy consumption as the Town's population and employment continue to grow at expected rates.

5.1 Establishing a Business-As-Usual Scenario

In the residential sector, it was assumed that existing homes in Newmarket would experience a *de minimus* demolition rate, and, on average, would see no efficiency improvements through to 2041[32]. New homes built from 2018 to 2041 are added in line with expected population growth. New homes are assumed to be fully compliant with the 2012 Ontario Building Code, including post-2012 updates.

The non-residential sector BAU also assumes that existing buildings in 2017 would see no efficiency improvement through to 2041. New non-residential buildings would be added in line with forecasted employment growth, with similar code assumptions.

The BAU therefore assumes that new homes and non-residential buildings will adapt to the provincial building code update and that these new buildings will be significantly more efficient than the current average. However, existing homes and buildings, which will see no efficiency improvements, will still represent 88% of the BAU energy use in the residential and non-residential sectors in 2041.

The BAU assumes that passenger kilometres travelled will increase in line with population, and freight kilometres travelled will increase in line with employment. The modal mix was assumed unchanged. Even in the BAU a modest 1% per year efficiency improvement was assumed for all modes of motorised travel.

While the CEP is being rebased to 2041, the BAU estimates were extended to 2050 to keep the visibility of the relationship between the Town (2041) and Federal (2050) GHG goals.

5.2 Business-As-Usual Forecasts

Figure 14 below shows how overall site energy consumption will increase by 17% from 9.3 million GJ in 2017 to 10.9 million GJ in 2041. Under the BAU scenario, the residential and non-

[32] Based on the assumption that, on average, energy efficiency improvements in some existing homes will be counterbalanced by efficiency deterioration in others.

residential sectors would be expected to increase by 24% and 3%, respectively, while the transportation sector would see an increase of 20%.

Figure 14: BAU Forecast - Energy Consumption by Sector (2017-2041-2050)

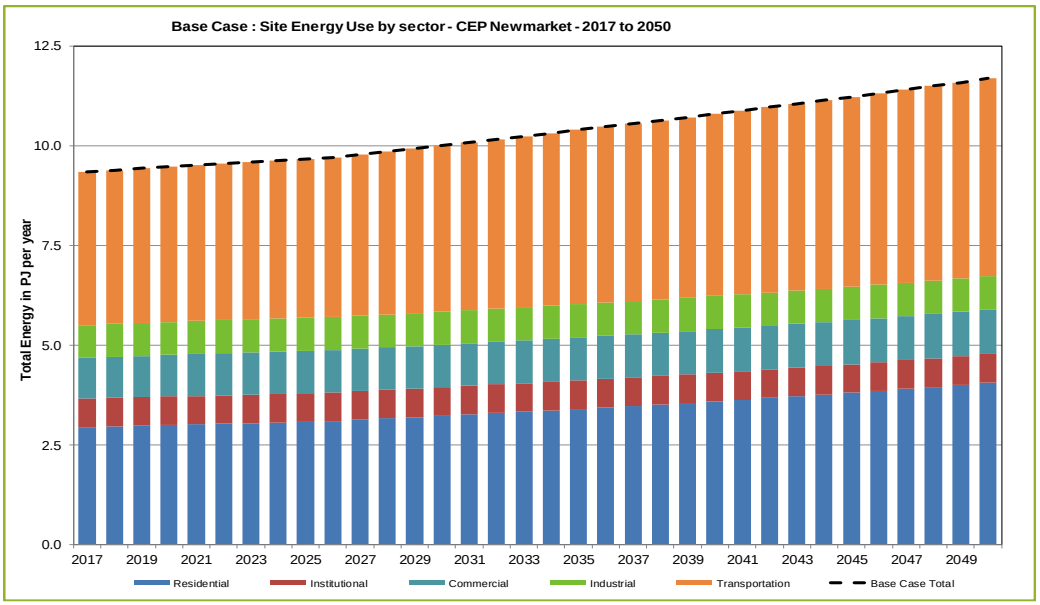
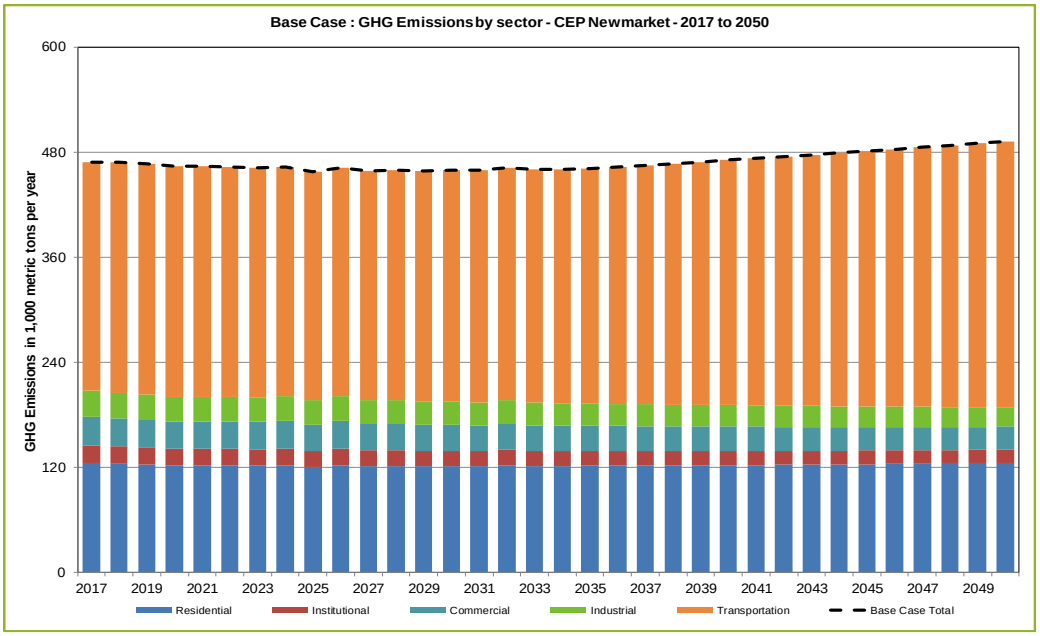


Figure 15 shows how total GHG emissions by sector will grow under the BAU scenario. Total GHG emissions would essentially stay flat, rising from 470,000 metric tons to 473,000 metric tons by 2041. Transportation (60% of total emissions) will remain as the higher emitting sector given the carbon intensive nature of gasoline and diesel, followed by residential at 26%, primarily from the continued use of natural gas for heating.

Figure 15: BAU Forecast - Total GHG Emissions by Sector (2017-2041-2050)

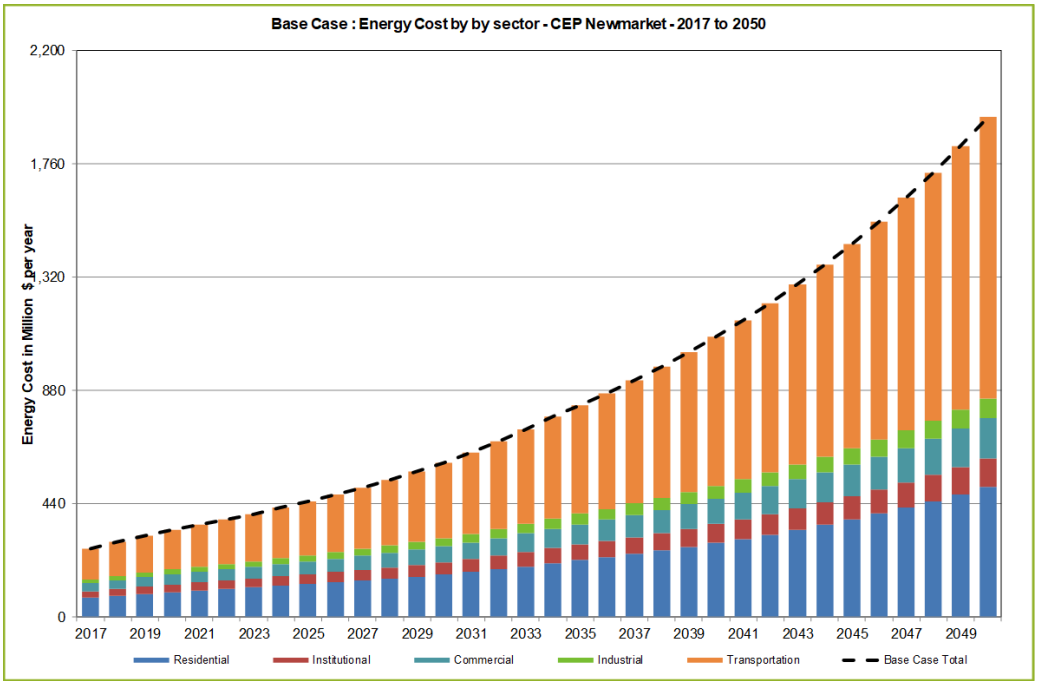


5.3 Economic Impacts and Risks of Business-As-Usual

It is also important to consider the potential economic impacts on the Town's overall energy costs under the BAU scenario. The expected utility price outlooks were assessed for higher and lower combinations of risk factors.

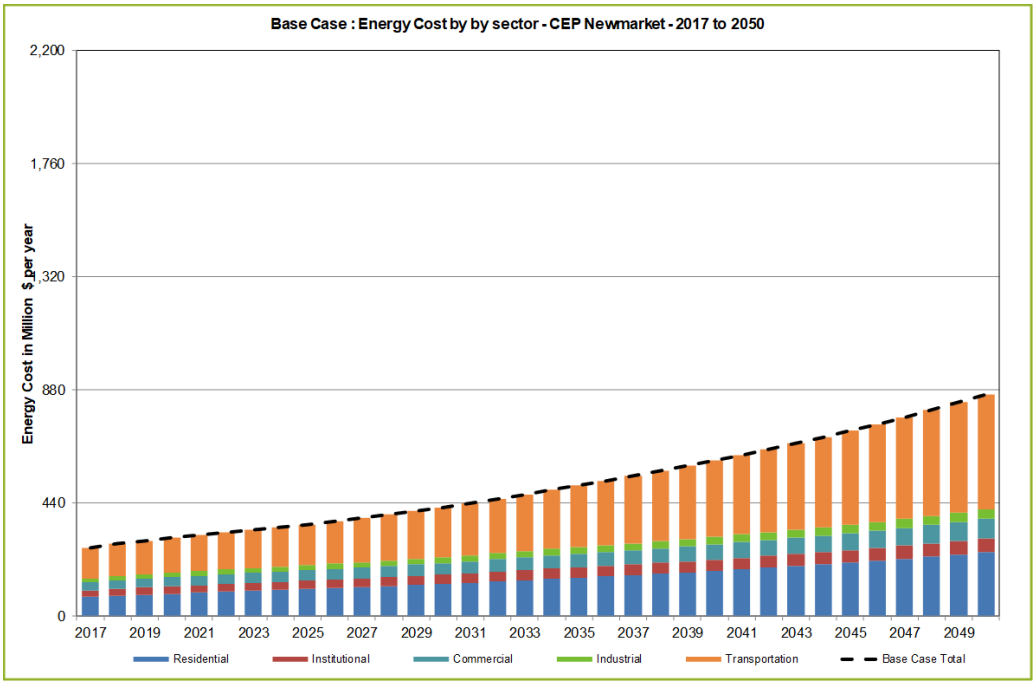
If gas, electricity, water, and transportation fuel prices, along with emissions costs, follow the higher price outlook, Newmarket would see its total utility costs increase from $267 million to $1,152 million in 2041.

Figure 16: BAU Forecast - Cost by Sector (Higher Price Outlook) (2017-2041-2050)



Even under the assumption of lower utility and emissions costs throughout the forecast period to 2041 the Town's total energy spending would increase from $257 million to $627 million. This represents a 100% increase per capita.

Figure 17: BAU Forecast - Cost by Sector (Low Price Assumptions) (2017-2041-2050)



The BAU scenario, coupled with a potentially wide range of price uncertainty and expected growth in both population and employment numbers, suggests that inaction would not only have environmental impacts, but considerable economic impacts as well.

5.4 The Implications of Business-As-Usual

Under the business-as-usual scenario, and without any significant actions moving forward, the Newmarket community would continue to contribute approximately 500,000 metric tons of energy-related GHG emissions into the environment on an annual basis. The BAU scenario will not only harm the environment and lessen the quality of life for the Town, it represents missed economic development and business opportunities.

How much is 500,000 metric tons of CO_2e?

The same amount of CO_2e:

- Produced by 109,000 passenger vehicles driven for one year.
- The average amount of energy used by 100,000 Ontario homes in one year.
- The amount that 13 million 10-year old tress can capture and store in one year.

6 Newmarket CEP Action Plan

This section defines a set of recommended strategies to meet the CEP vision and goals and will help Newmarket reach the identified transformative targets. Moreover, the strategies reinforce Newmarket's commitment to be a sustainable, competitive community that demonstrates leadership and innovation in how it manages its energy use.

6.1 Loading Order

When exploring possible scenarios and strategies for this Community Energy Plan, the loading order below was followed as a general guide. This approach is built off of the smart energy planning technical principles developed by Quality Urban Energy Systems of Tomorrow (QUEST) as part of their work on developing "Smart Energy Communities" in Canada. [33] QUEST is a non-profit organization that conducts research, engagement and advocacy to advance smart energy communities in Canada.

1. **Improve efficiency** – First, reduce the energy input required for a given level of service (e.g., retrofit/efficiency programs).
2. **Optimize energy** – Avoid using high-quality energy in low-quality applications.
3. **Manage heat** – Capture all feasible thermal energy and use it, rather than exhaust it. Consider the potential for Combined Heat & Power, District Energy in higher density neighbourhoods and industrial parks.
4. **Reduce waste** – Use all available resources, such as landfill gas and municipal, agricultural, forestry wastes, and industrial waste heat.
5. **Use renewable energy resources** – Tap into local opportunities for biomass, biogas, solar, wind energy, and opportunities for inter-seasonal storage.
6. **Use energy delivery systems strategically** – Optimize use of energy delivery systems and use them as a resource to ensure reliability and for energy storage to meet varying demands. Optimize community investments and have a flexible energy distribution approach.

This approach also aligns with the *Trias Energetica* concept developed in the 1980s by the Delft University of Technology in the Netherlands, which acts as a guide and industry standard when pursuing energy sustainability in the building sector. The concept makes it clear that reducing energy demand through efficiency measures must come first on the path to sustainability. The model includes four key components: (1) energy efficiency, (2) heat recovery, (3) renewable energy, and (4) energy distribution.

[33] QUEST, Building Smart Energy Communities.

6.2 Summary of Strategies

The Newmarket CEP strategies are:

- Strategy 1: Efficiency Programs
    - Strategy 1A: Residential Efficiency
    - Strategy 1B: Commercial and Institutional Efficiency
    - Strategy 1C: Industrial Efficiency
    - Strategy 1D: Transportation Efficiency
- Strategy 2: District Energy
- Strategy 3: Solar Photovoltaic

Strategy 1 – Solely focuses on improving Newmarket's energy performance by raising the efficiency of the energy end use in Newmarket's existing and future homes and commercial and institutional buildings, as well as improving the overall efficiency of transportation.

Strategy 2 – In addition to the efficiency measures in Strategy 1, also incorporates district energy in selected areas and locally sited heat and power generation. The fuels for these could be natural gas or, over the period of the plan, various renewable biofuels.

Strategy 3 – In addition to the efficiency measures in Strategies 1 and 2, also incorporates solar photovoltaic, of which there is significant potential in Newmarket.

6.3 Strategy 1A: Residential Efficiency

The residential sector is responsible for about 33% of the Town's total source energy use, with a relatively high average energy use compared to global best practice. Most homes are low-density (single or semi-detached houses) or town homes, and the large majority (~90%) of homes were constructed prior to the 2012 Ontario Building Code. In addition to considering existing homes, Strategy 1A also considers efficiency approaches for new construction and developments as Newmarket continues to grow.

Recommended Approach

The below outlines the recommended approach for Residential Efficiency:

- **Existing Residential Buildings** – Over the plan period, existing homes will have deep energy efficiency retrofits[34], yielding efficiency gains between 30% and 50% depending on the age/type of the building. It has been targeted that at least 80% of existing homes will participate in this retrofit program by the year 2041. The program will be structured to allow for the practicalities of starting a new program. This would include ramping up the number of

[34] A deep energy efficiency retrofit is a complete package applied to a home that takes a whole-building approach and includes energy efficiency measures such as high efficiency windows, supplementary insulation, lighting upgrades (e.g., LED), weather-stripping, programmable controls for HVAC (heating, ventilation and air conditioning) and/or appliances, etc.

retrofits completed on an annual basis from a few hundred retrofits per year initially to between 1,000 and 1,500 per year as the program matures.

- **New Residential Development** – New homes will be added in line with expected population growth, and they should be 100% compliant with the 2012 Ontario Building Code and amendments, and anticipated building code updates. The assumption is that Code updates will occur in 2022 and 2032, each with 10% efficiency gain on the previous version. Development will occur to meet building code and new construction will be much more efficient towards 2041.
- **In-Home Equipment** – As consumers become more driven to purchase more efficient household appliances, heating/cooling equipment and entertainment devices, and as more available incentives become available.

Institutional and Policy Implications

- Create a Town of Newmarket entity to deliver high-quality, standardized residential energy efficiency retrofit packages[35]. This could be delivered through a number of legal forms. It could be a wholly owned Town department or corporation or could be a public/private partnership. It could equally be an extension of the non-regulated activities of Newmarket Hydro Holdings Inc. Whatever the final structure, it would partner with local private contractors, material suppliers and non-profit groups. Achieving scale (i.e., the operational efficiencies, advantages and synergies that would arise with increased retrofits) would be possible using the Local Improvement Charge mechanism of the *Ontario Municipal Act* using property tax assessments as the collection mechanism. Other than some initial start-up costs, capital for financing retrofits would be entirely from private investors. For the homeowner, the net effect is at least immediately cost neutral. The entity will generate sustained positive returns to the Town, and the construction partners will have increased local employment and enhanced margins. For more details see Section 6.3.1.
- Ensure transparency of home energy performance whenever a new or existing home is sold or rented through a comprehensive voluntary Energy Performance Labelling program fully supported by the local real estate and construction industry.
- Actively facilitate community wide awareness of efficiency benefits, options, incentives and success stories.

6.3.1 Newmarket Energy Efficiency Retrofit Entity

The overall objective of the Newmarket Energy Efficiency Retrofit (NEER) entity will be to efficiently deliver deep energy efficiency retrofits to up to 80% of existing homes in Newmarket. The retrofit packages and pricing will be standardized, with specific details to be developed as part of the CEP's implementation.

Core package components could include measures such as: window upgrades, weatherization, insulation upgrades, lighting upgrades, HVAC upgrades (furnace, boiler, air conditioning),

[35] Detailed business plans and specific retrofit package details for each recommended strategy will be developed as part of the Plan's implementation.

comfort controls, etc. Core package components will be defined by the type and age of the home. Other options beyond the core package could include reroofing, solar PV/thermal, ground source heat pumps, etc.

Benefits of the proposed standardized approach compared to the current retrofit market include cost effectiveness, higher quality and more consistent retrofits, avoidance of site evaluation costs prior to sale, easier to purchase, easier to achieve volume, etc.

The current efficiency retrofit market is tailored to low volumes of customized retrofit projects. As a result, contractor overheads often exceed 35%. By creating volume and standardized packages, overhead will drop and contractor margins will increase.

The entity will boost local employment opportunities by teaming with local contractors and material suppliers. Local employment opportunities include contractor staff carrying out the retrofits, contract management and administrative positions within the NEER entity, and material suppliers. High local material content could also be achieved if competitively sourced Canadian materials are used, such as windows, insulation, lighting, HVAC, control systems, etc.

NEER will be responsible for training processes and determining how contractors are screened and selected. It will also be responsible for quality control and handling any potential complaints from homeowners.

As noted in Section 6.3, a modest amount of public money will be needed for initial start-up costs, after which the NEER programs will be self-financing through private investors. Local Improvement Charges (LIC) through Infrastructure Ontario's Loan Program are a potential avenue for affordable long-term financing solutions that the Town of Newmarket can use towards local capital improvement projects on public or private properties, including energy efficiency retrofits. Through the LIC mechanism, the Town will transfer increased property tax revenues to NEER, who will develop and deliver the programs, pay the contractors and pay lenders. As the retrofit volume increases, NEER will generate a small profit and may make dividend payments to the Town or further drive down retrofit costs.

6.4 Strategy 1B: Commercial and Institutional Efficiency

Non-residential property is responsible for 35% of the Town's total source energy use, with typical average energy use comparable to Ontario but significantly higher than global best practices. Most of the non-residential energy consumption is concentrated in EPDs 10, 11 and 12.

Recommended Approach

The below outlines the recommended approach for Strategy 1B:

- Over the plan period, at least 60% of existing commercial and institutional built area will have significant energy efficiency retrofits. Along with changes in operating practices, this will yield efficiency gains of between 35% and 50%. This will result in about 50,000 m^2 of retrofit activity per year, a major stimulus to local employment. There are multiple building owner and occupant benefits.
- At a minimum, new commercial and institutional construction will be fully compliant with the 2012 Ontario Building Code (and subsequent updates). Code updates in 2022, and 2031 would each come with an expected 10% efficiency gain. As an average expectation, this recognizes that some buildings will fall short and other will exceed the code and require no local change in policy.
- All municipal, educational and other institutional new construction with significant public funding in the Town will perform to the current systematic global best practice level. Currently, this would mean an energy use about 30 to 40% lower than current code.

Institutional and Policy Implications

The following institutional and policy implications arise from Strategy 1B:

- Create a Town of Newmarket entity to deliver high-quality, standardized non-residential (commercial and institutional) energy efficiency retrofit packages. As outlined in Section 6.3, this could be one of several legal forms. It could be a wholly owned Town department or corporation or could be a public/private partnership. It could equally be an extension of the non-regulated activities of Newmarket Hydro Holdings Inc. Whatever the final structure, it would partner with local private contractors, material suppliers and non-profit groups. Achieving scale would be done by using the Local Improvement Charge mechanism of the Ontario Municipal Act using property tax assessments as the collection mechanism. Other than some minor initial start-up costs, capital for financing retrofits would be entirely from private investors. For the property owner, the net effect would normally be immediately cost positive. There may be the need to adjust tenancy agreements. The entity will generate sustained positive returns to the Town, and the contractor partners will have increased local employment and enhanced margins.
- Use the permitting process for both new construction and significant renovations as an opportunity for clarifying energy performance expectations and extended possibilities beyond code compliance. This could include locally permissible incentives such as increased density or priority permit handling.
- Ensure transparency of commercial energy performance whenever a new or existing building is sold or rented through a comprehensive voluntary Energy Performance Labelling program fully supported by the local commercial real estate and construction industry.

- Town, local schools and other early adopters implement and publicize a voluntary Energy Performance Labelling program as an early example for community outreach.
- Actively facilitate building owner and occupant awareness of efficiency benefits, options, incentives and success stories.
- Promote through any Provincial or Regional programs or networks that may currently exist (e.g., ClimateWise Business Network).

6.5 Strategy 1C: Industrial Efficiency

Most industrial energy use is concentrated in EPD 10 in the northeast corner of the Town of Newmarket.[36] As a general rule, Canadian industry is relatively efficient and operates at levels within 20% of systematic global best practices.[37] However, there is typically a 20% to 30% energy gap between an industry average and the peer group's best performers.

Recommended Approach

The below outlines the recommended approach for Strategy 1C:

- Industries in Newmarket will implement world-class energy management programs and improve energy efficiency by at least 1.5% per year consistent with best-in-class performers such as Toyota, BASF etc.

Institutional and Policy Implications

The following institutional and policy implications arise from Strategy 1C:

- Actively facilitate industrial energy management best practice sharing between local industrial players.
- Promote through any Provincial or Regional programs or networks that may currently exist (e.g., ClimateWise Business Network).

6.6 Strategy 1D: Transportation Efficiency

The vehicles owned by the Town's residents and businesses accounted for approximately 32% of the Town's source energy use in 2017. This is based on the estimated total use by all vehicles within the Town's boundaries. There is little detailed transportation data available to allow the energy use and emissions of all vehicles to be fully assessed, an area for future improvement in general.

Recommended Approach

The below outlines the recommended approach for Strategy 1D:

[36] The exact portion of industrial consumption in the non-residential sector's total energy use (35% of the total) is unknown based on the data available.
[37] In comparison, the gap between Canada and global best practice in homes and building efficiency exceeds 100%.

Increase the overall efficiency and emission impact of transportation through reducing average trip lengths, shifting more journeys to low or zero carbon modalities, and increasing the efficiencies of all vehicles.

Institutional and Policy Implications

Many of the transportation outcomes will be driven by global, national and regional policies, supported and encouraged by local actions at the community level.

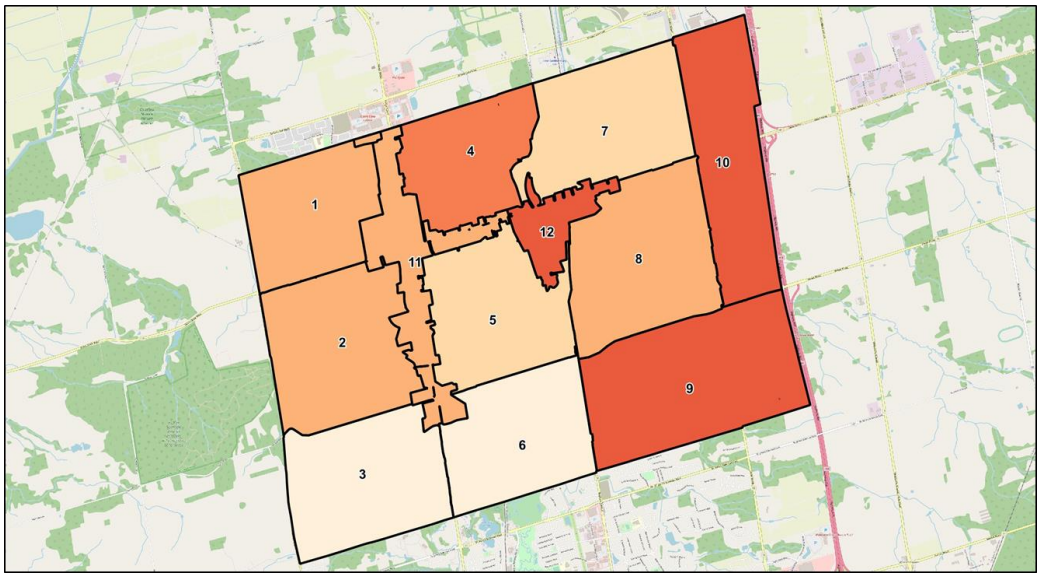
The following institutional and policy implications arise from Strategy 1D:

- The use of electric vehicles will be encouraged by selected actions including installation of charging points, preferred parking and sharing of success stories.
- Increased foot traffic and the use of two-wheelers will be encouraged by holistic street design approaches.
- The use of train and local transit will be encouraged as modes of transportation for Newmarket residents. Transit accommodations will also be included in future development (e.g., roadway provisions, bus stop provisions, etc.)
- Neighbourhood design for mixed use, along with increased local employment, will include transportation specific design elements.
- Active engagement with, and implementation of, various York Region initiatives including Smart Commute and provincial programs such as the Ministry of Transportation Electric Vehicle Chargers Ontario Program.

6.7 Strategy 2: District Energy

A district energy (DE) system is a thermal energy distribution system that provides community scale heating and cooling. A DE system is a proven approach that serves homes, buildings and industry through a network of insulated pipes that provides domestic hot water heating, space heating and air conditioning. It allows the combination of many sources and fuels such as: combined heat and power, solar and biomass, waste heat recovery, boilers, and absorption and electric chillers.

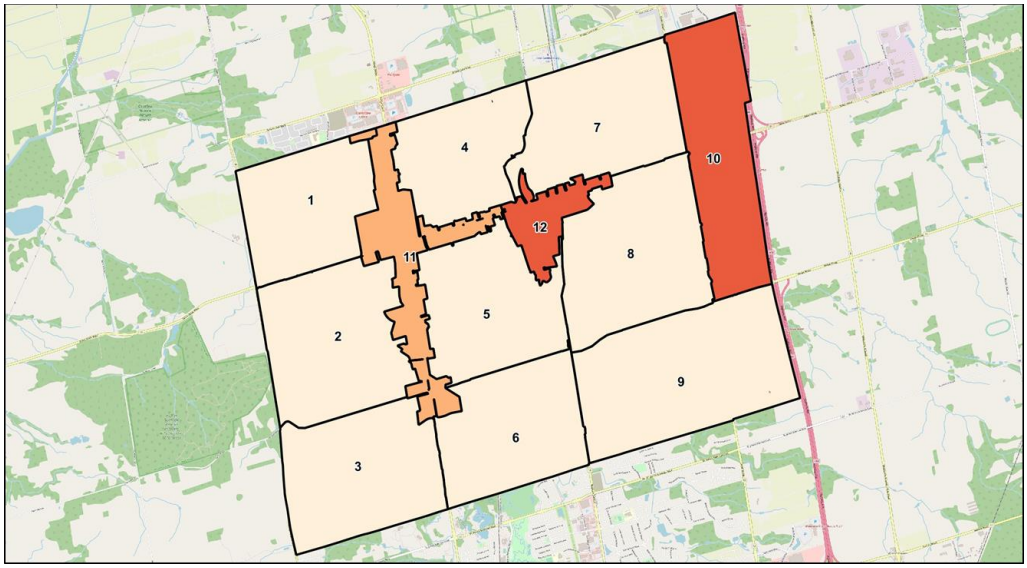
Energy Map 9: Total Heating Intensity (GJ/km^2) (2017)



In order to contemplate a DE system, the potential area where the system would be located must possess a critical mass of heating density. Based on comparable assessments in Canada and Europe, heating densities expected in 2041 Newmarket exist that could possibly support a DE system.

Energy Map 10 shows heating intensity in the non-residential sector, which, along with mid- and high-rise residential, would be typical DE clients.

Energy Map 10: Non-Residential Heating Intensity (GJ/km^2) (2017)



Energy Map 10 illustrates that non-residential heating intensity is highest in EPDs 10, 11 and 12 chiefly due to the commercial, institutional and industrial sectors that exist in these EPDs. These are also areas targeted for significant densification by 2041.

Recommended Approach

The below outlines the recommended approach for Strategy 2:

- Develop a detailed business case for a Newmarket DE entity, including a detailed feasibility study in order to assess the framework in specific areas (e.g., EPDs 10, 11 and 12) for a DE system in Newmarket have the necessary characteristics required for such a system to succeed. This business case will also serve as a basis for how the DE entity should be structured and moved forward.
- Develop a comprehensive District Heating (DH) distribution system primarily serving the heating needs of the non-residential buildings in EPDs 11 and 12, including the Regional Health Centre complex. The DH system would be initially supplied by a mix of natural gas or alternative fuel-fired distributed Combined Heat & Power (CHP), heat-only boilers and the recovery of available waste heat. Biofuel or other low carbon sources could be added over time.
- Selectively add local area District Cooling (DC) services based on the individually negotiated needs of consumers. The DC systems would be supplied by a mix of electric and absorption chillers.
- Develop a comprehensive multi-utility services structure in EPD 10 tailored to the energy and other utility needs of new and existing industrial and heavy commercial consumers. At a minimum, the service package would include district heating, district cooling, waste heat recovery, dedicated or shared CHP sub-projects, in addition to the normal natural gas and electricity services.[38]

Institutional and Policy Implications

The following institutional and policy implications arise from Strategy 2:

- Establish a Newmarket District Energy entity to deliver DE services and manage the heating and cooling supply portfolio including CHP units. This could be an entity wholly owned by the Town or a public/private partnership. It could also be an extension of the non-regulated activities of Newmarket Hydro. The entity will generate sustained positive returns to the Town and possible private partners, along with sustained benefits to the users.
- Use the permitting process for both new construction and significant renovations in EPDs 11 and 12 as an opportunity for clarifying DE capabilities and benefits and setting DE connection expectations.

[38] The potential for this services structure to connect with the DE system in EPDs 11 and 12 – thereby gaining the benefits of industrial and non-industrial use patterns to be combined for maximum coincidence efficiency – would be decided in the final detailed business plan.

- Include competitive energy service offerings as an integral part of the Town's Economic Development discussions with existing and future investors in EPD 10.

6.8 Strategy 3: Solar Photovoltaic

Through supportive provincial policies like the Green Energy Act, Ontario has seen solar photovoltaic and other renewable technologies experience rapid growth in installed capacity in the last few years. Though these policies have been suspended in 2016, the continuing technological advances combined with falling panel and installation costs supports that there is significant potential for solar PV in Newmarket.

A preliminary estimate of the rooftop area on the Town's existing industrial, commercial and institutional buildings shows that there exists potential for well over 50 MW of solar PV[39] that could be installed in Newmarket over the plan period. This could potentially supply 8% to 10% of the Town's total power by 2041.

Solar PV generation could be particularly useful as carbon-free power source that tends to coincide with system peaks during high cooling demand peaks in the summer.

Recommended Approach

The below outlines the recommended approach for Strategy 3:

- Add sufficient distributed PV capacity in addition to CHP associated with the District Energy system to offset and potentially eliminate summer and winter power peaks by 2031, after taking into account the impact of successful residential and non-residential efficiency programs. This will minimize both the risks of summer peak failures and the impact of Time-of-use electricity prices. Combined, the CHP and PV distributed generation within the Town will "repatriate" significant energy value added.

Institutional and Policy Implications

The following institutional and policy implications arise from Strategy 3:

- Designation of potential suitable large-scale solar PV locations, such as car parks, commercial rooftops, etc.
- Large-scale solar PV investment planning by Newmarket-Tay Power in collaboration with private users to implement large scale PV at a rate consistent with the CEP goals.

6.9 Selected Benefits

The strategies described throughout Section 6 have several benefits that have the potential to support the Town, home and building owners, the local utilities and Newmarket's businesses and labour force.

[39] Based on estimates of 5 to 20 MW on residential rooftops, 7 to 10 MW on non-residential buildings and 10 to 20 MW surface/ground-mounted solar PV (mostly car parks). At 2018 levels, up to 1MW roof mounted is a $2.5M investment and about $2.0M surface/ground mounted when sourced in volume - Source NREL

6.9.1 Home and Building Retrofits

There are a number of potential beneficiaries in Newmarket and much local value added stemming from the proposed high-quality, standardized residential and commercial and institutional energy efficiency retrofit packages outlined in Section 6.3 and 0.

The goals outlined in this Plan – in particular, the economic development, behaviour change and energy efficiency goals – would be supported to a great extent, and local employment would be boosted.

The Town of Newmarket would benefit from enhanced property values (and therefore, taxes)[40] and would retain dividends from the energy efficiency entity that would be created in order to deliver the retrofit packages. Building owners would see reduced energy costs and/or enhanced rents as a result. Building property values would be enhanced, and the tenants would have improved comfort. Real estate agents in Newmarket could see faster sales and enhanced commissions.

Given that the Town efficiency entity would likely be popular with selected local contractors and material suppliers, these local employers could see increased margins as a result of the predictable high project volume (i.e., ramping up the number of residential retrofits completed on an annual basis from a few hundred retrofits per year initially to between 1,000 and 1,500 per year and beyond as the program matures and about 50,000 m^2 of retrofit activity in the non-residential sector per year up to 2041).

As the CEP is implemented over time, it can be expected that the local utilities will more readily meet their statutory efficiency targets. It is also not uncommon to see reductions in investment needs in local utility infrastructure as the growth in overall energy demand slows.

6.9.2 Energy Performance Labelling

Energy Performance Labelling (EPL) is a low-cost performance validation tool that can help Newmarket achieve its home and building energy efficiency goals. EPLs should be available on all property (both residential and non-residential) when sold or rented and should be issued as part of any retrofits occurring as a result of Strategies 1 and 2.

Energy Performance Labelling:

- Ensures transparency of home/commercial energy performance whenever a new or existing home/building is sold or rented;
- Acts as incentive to invest in upgrades of inefficient homes and buildings before putting them on the market;
- Clearly indicates that the associated building is subject to reduced energy bills;

[40] This is based on the assumption that there is a sale/resale premium for homes/buildings that have been retrofitted and due to improved performance, there will be a possibility for the Town to revalue these homes/buildings for property tax purposes.

- Increases home and building values; and
- Acts as a real estate marketing tool.

In order to show leadership, the Town of Newmarket should display their Energy Performance Labels in all public municipal buildings, and these efforts should be publicized in order to maximize community outreach.

The format of the EPL in Newmarket should be an adaptation of the Natural Resources Canada (NRCan) EnerGuide rating system and the program should be fully supported by the local commercial real estate and construction industry. Further, the EPL program should align with the province's future provision of mandating home energy efficiency disclosure as outlined in the Green Energy Act in 2009, if and when that program is launched.

6.9.3 District Energy

A DE system offers numerous potential economic and environmental benefits, as well as improved energy security due to improved fuel flexibility.

Newmarket residents would see reduced price volatility due to stable and competitive heating and cooling prices. The Town of Newmarket would benefit largely from the associated economic development effects of a DE system. Quality jobs in construction and operation would be created and energy dollars would re-circulate in the local economy. From a financial standpoint, DE systems have the potential to demonstrate positive operating results in 2 to 5 years, with a long run positive net present value in the tens of millions.[41]

District Energy systems create scale for fuels and technologies that are not feasible on single buildings and facilitate CHP. Industrial and heavy commercial customers in Newmarket would therefore have the potential for optimized on-site CHP and tailored energy services, as well as reduced space and utility staffing requirements. DE also facilitates biofuels and waste heat to further reduce Newmarket's carbon footprint.

Combined, these benefits would increase Newmarket's economic competitiveness and likely lead to a significant increase in investment and employment.

6.9.4 Solar Photovoltaic

Solar enjoyed high public support in Ontario during the critical initial growth phase and is easily integrated into both rural and urban communities. It can also be developed in strategic locations to help meet local needs.[42]

As a clean, carbon-free power source, solar PV has numerous potential benefits to Newmarket. First and foremost, it aligns with supportive Federal policy and will help in achieving GHG

[41] Based on comparable DE business plans elsewhere, the Internal Rate of Return (IRR) could be approximately 7% to 9% under the lower price outlook, while under a higher price outlook the IRR could be 14% to 17%. These ranges are affected by overhead assumptions.
[42] Canadian Solar Industries Association (CanSIA), Revising Ontario's Long-Term Energy Plan.

reduction targets at the community, regional, provincial and national levels. Second, as mentioned previously, solar PV's main system attribute is its peak-shaving capabilities.[43] The sun shines brightest during high cooling demand peaks in the summer[44], and this could help reduce summer peak demand in Newmarket.

[43] Peak-shaving refers to the reduction of power consumption during periods of peak demand, when the Time-of-Use rates are the highest.
[44] In other words, the peak times of energy consumption are highly correlated with energy production from solar.

7 Implementation Framework & Next Steps

This section provides guidance on how to transition the Community Energy Plan from planning to implementation. Emphasis is placed on immediate actions and next steps that can be taken in order to ensure that the CEP goals and objectives are met. Other factors, such as public outreach, the facilitation of an Implementation Advisory group, and the hiring of a Town Energy Manager are also discussed.

7.1 Immediate Actions

In order to fulfill the Residential Efficiency strategy, a Town of Newmarket energy efficiency entity would be created in order to deliver energy retrofit packages standardized by property type and age. Realistically, the residential and non-residential energy efficiency entities would likely be under the same corporate structure. However, residential efficiency would be prioritized in 2017 as a first step.

The entity would team with local contractors and material suppliers to minimize cost and maximize quality, as well as giving a boost to local employment opportunities.

Scale would be achieved through standardized pricing and the use of the Local Improvement Charge mechanism of the Ontario Municipal Act using property tax assessments as the collection mechanism. Other than some minor initial start-up costs, the retrofit entity would be financed from the private capital market at near municipal rates under municipal guarantee.

For **Strategy 1A: Residential Efficiency**, immediate next steps would be:

- Develop a detailed Newmarket Energy Efficiency Retrofit (NEER) business case[45] for the residential retrofit entity as the first step towards implementation.
- Identify and initially target/prioritize owner-occupied homes with a high probability of gaining immediate and significant benefits from deep energy efficiency retrofits – likely in an area where older, single detached homes are predominant. This would test the market acceptance and business model of the residential retrofit program.

For **Strategy 1B: Commercial and Institutional Efficiency**, immediate next steps would be:

- Develop a detailed business case[46] for the NEER commercial and institutional retrofit entity as the first step towards implementation.
- Identify and prioritize market segments with a high probability of gaining immediate and significant benefits from deep energy efficiency retrofits – likely high quality, older, owner-occupied premises. This would test the market acceptance and business model

[45] Rebasing Note (July 2019): Development of the Residential NEER Business Case started in early 2019 and is scheduled for approval in late 2019 with possible implementation start in 2020

[46] Rebasing Note (July 2019): Development of the Non-Residential NEER Business Case is expected to start shortly after the approval of the Residential Business Case.

of the residential retrofit program. This program would almost certainly focus in EPDs 10,11 and 12 in the initial stage.

For **Strategy 2: District Energy**, immediate next steps would be:

- Develop a detailed Newmarket District Energy (NDE) business case[47] for the district energy entity as the necessary first step to gain directional approval from Town Council and to initiate implementation and long-term financing. The NDE business plan would serve the dual purpose of being a detailed confirmation of feasibility as well as the basis for the NDE to be structured and move forward.
- In EPDs 11 and 12, identify and target a few anchor developments with a high probability of gaining immediate and significant benefits from restructured heating services and/or CHP. Use this as a platform for ongoing market development to adjacent consumers. By their nature, healthcare campuses, academic campuses, shopping malls and large civic buildings tend to be natural candidates to be district energy anchors as well as focused integrated efficiency plans.
- In EPD 10, identify existing or new individual consumers actively pursuing CHP opportunities under the Ontario program and/or identify consumers who could clearly gain significant benefits from integrated heating and cooling services. Use these as the basis to develop tailored multi-utility services to adjacent consumers.

For the **Energy Performace Labelling Program**, immediate next steps would be:

- The CEP recommends an extensive voluntary Energy Performance Labelling program that aligns with the current direction of the province to mandate energy performance labelling in the near future. The goal is to make the actual energy performance of a property transparent to a prospective buyer or renter and forms part of the decision-making criteria.
- It is recommended that, in addition to residential buildings, public municipal buildings and similar community institutions post EPLs to familiarize the general public with the concept and create transparency around the energy performance of community-owned property.
- It is recommended that the EPL program be coordinated by the Town and supported by various community organizations and businesses. Immediately following approval of the CEP, it is recommended that a detailed Newmarket Energy Performance Labelling Program will be designed for approval by the Council before the end of 2016[48].

For the **Facilitation of a CEP Implementation Advisory Group**, immediate next steps would be:

- Through the process of developing the CEP, the Stakeholder Advisory Group has acquired a significant amount of knowledge regarding integrated community energy plans. The SAG provides a forum for strategic discussion and deliberation of the

[47] Rebasing Note (July 2019) Start of the development DE Business Case is pending
[48] Rebasing Note (July 2019) The EPL program is not yet finalized. The NEER Plans will include EPL provisions.

solutions proposed and the members are ultimately the long-term champions for the CEP.

- There is benefit in transitioning the SAG to an Implementation Advisory Group (IAG)[49] over the course of 2016-2017 to shape the business case and foster greater community support. It is envisioned that quarterly IAG meetings would be required so IAG members can provide oversight and monitor progress regarding implementation of the CEP.

7.2 Mobilizing the Community

The CEP includes a number of complex recommendations relating to residential, non-residential and infrastructure changes. There is a need to build community understanding of the benefits of an integrated community energy system, the mechanisms by which programs can be delivered and the impacts to the residents' quality of life. It is recommended that a public outreach and education campaign be developed that would increase the overall energy literacy of residents in Newmarket in support of furthering the CEP actions, including uptake in the residential efficiency program.

7.3 Resources and Funding

To ensure continued implementation of the CEP actions, ongoing resources and funding will be required. The Town of Newmarket will have to proactively leverage existing initiatives and resources through both internal and external channels. Where possible, budget allocations for specific projects should be integrated with the lead department plans.

Multiple government, utility and association resources to support energy efficiency and climate change mitigation initiatives continue to be available at provincial and national levels. The scope, eligibility, scale and timing pf these incentives changes over time. Incentive programs will be pursued in the relevant context of the CEP implementation plans and timing.

As one of a relatively small number of communities in Ontario that have a comprehensive Community Energy Plan, this Plan positions Newmarket in a positive fashion to take advantage of some of these resources and funding opportunities.

The Town will continue its role in providing oversight for the implementation of the CEP, including the assignment of a Town Energy Manager, who will ensure the various policy, planning and implementation support elements are synchronized for the Plan to move forward. The Town Energy Manager will act as a catalyst for continuous implementation of the plan over many years. The manager will ensure there is regular monitoring and reporting of progress and proactively coordinate with elected leaders, stakeholders and community partners. A key responsibility of the Town Energy Manager will be to work with the public and private sectors to identify funding resources for full implementation of the CEP. This is a critical staff role that

[49] Rebasing Note (July 2019): The SAG has been reconfigured to guide the development of the R-NEER Business Case and its subsequent implementation. This is expected to be a continuing process.

should be at least 0.5 full time equivalent (FTE) assignment and is separate from the general management of the District Energy and NEER strategies.

The CEP Stakeholder Advisory Group has agreed to continue their collaboration – transitioning to an Implementation Advisory Group – as the plan is implemented and should meet on a regular basis (4 to 6 times per year).

Immediate budget should address development of the NEER and DE feasibility studies, business plans, land-use and other planning items, plus the cost of community outreach and education. The necessary general management costs of these two initiatives will be fully budgeted within the respective Business Plans and will not be a burden on the Town.

The labelling program will also need a seed budget to team with the real-estate community.

7.3.1 Timelines and Budgetary Considerations

Table 6 below[50] outlines the timelines and cost estimates for a list of activities that are important next steps to spur momentum in early implementation of the plan.

Table 6: Timelines and Budgetary considerations for recommended immediate actions

Recommended Activity	Description / Timelines	Cost Estimate	Funding Source
Newmarket Energy Efficiency Retrofit Business Plan	It is recommended that a NEER Business Plan (investment-grade business plan) should be developed for approval by Council **before the end of 2017**.	$100,000	Recoverable cost assuming NEER goes ahead
District Energy Business Plan	It is recommended that a DE Business Plan (investment-grade business plan) should be developed for approval by Council **before the end of 2017**.	$85,000	Recoverable cost assuming NDE goes ahead
Energy Performance Labelling Program	It is recommended that a detailed Newmarket EPL Program should be designed for approval by Council **before the end of 2017**.	$50,000	Potentially recoverable from NEER
Town Energy Manager	The Town should consider appointing or retaining an Energy Manager **before the end of 2016** with the mandate to implement the MEP**.**	$75,000/year FTE[51]	Identification of funding is part of role, shared costs to be explored with utility providers
CEP Education and Outreach campaign	It is recommended that a public outreach and education campaign be developed **before the end of 2016**	$25,000	Recoverable cost assuming NEER goes ahead

[50] Rebasing Note (July 2019) – Table 6 was part of the original CEP as approved by the Town of Newmarket Council. It has been included for archival reasons.
[51] Recurring cost.

Recommended Activity	Description / Timelines	Cost Estimate	Funding Source
	that would increase the overall energy literacy of residents in Newmarket in support of furthering the MEP actions, including uptake in the residential efficiency program.		
Facilitation of the CEP Implementation Advisory Group	The CEP SAG would be transitioned to an Implementation Advisory Group over the course of **2016-2017** to shape the business plans and foster greater community support. Moving forward, there would be quarterly IAG meetings so that implementation progress can be reviewed.	$15,000	

7.4 Ongoing Tracking and Monitoring

In order to ensure that the Newmarket CEP goals and objectives are met, and that progress is being achieved, ongoing tracking, measuring and reporting will be imperative. Regular reporting will move the Plan forward and by identifying activities and initiatives that are contributing to the Plan's progress and recognizing partners and key stakeholders, the community will be further mobilized.

Each year, GHG emissions for the Newmarket community will change as the CEP is implemented and as the population grows. GHG data will be collected and catalogued by the Town Energy Manager every five years through ICLEI Canada's PCP Milestone Tool. The tool provides a framework to quantify, monitor and manage GHG emission data generated at the local level based on the methodology of the PCP program. By analyzing annual data and providing updates on GHG emissions for the year, the Town will better understand the effectiveness of new initiatives and will be able to identify areas that have improved and areas that require more attention. This will provide important information to the implementation committee for the purposes of work planning and prioritizing efforts.

7.5 Plan Renewal

In addition to ongoing monitoring and reporting, the CEP must be flexible in order to adapt to the Newmarket community as it changes in the years to come. The actions and underlying assumptions of the CEP should be frequently assessed to ensure that any major developments are integrated.

The CEP must be a "living document" that will be updated as new information becomes available. As discussed earlier in this Plan, the energy landscape in Ontario is in a period of rapid and important change. As utilities formalize their conservation targets and programming and the York Region Integrated Regional Resource Plan is further refined, there may be further alignments that will need to be integrated into the CEP.

Therefore, subsequent renewal of the CEP should occur in five-year intervals[52] but may require more frequent revisions to recognize provincial and federal legislative changes, technological innovations, and any major infrastructure developments.

52 Rebasing Note (July 2019) – The rebased version of the CEP is an administrative update to the 2013 CEP and is not an in-depth strategy review.