Community Energy Strategy

Community-driven energy solutions for Oakville

Oakville's
Energy Task Force

Oakville Energy Vision

Founded on community collaboration and innovation, Oakville's sustainable energy future is clean, affordable and resilient.

Thank you to funding partners:

Sheridan FCM Federation of Canadian Municipalities / Fédération canadienne des municipalités Ontario OAKVILLE

Letter from the Oakville Energy Task Force Co-Chairs

On behalf of the Oakville Energy Task Force, we are pleased to present Oakville's first Community Energy Strategy. At its core this strategy establishes a common vision to transform Oakville's energy systems by 2041, improving Oakville's energy efficiency, reducing greenhouse gas emissions and saving energy costs.

We would like to thank everyone from the community and our project partners at the Town of Oakville and Sheridan College for all their efforts over the last two years to create this strategy. It is through the engagement of residents, businesses, industries, subject matter experts, community groups and more that the Community Energy Strategy came to fruition.

We are motivated to take collective action on the climate emergency, understanding the imperative to take part in fulfilling Canada's Paris Agreement commitment of keeping global temperature rise below 2 degrees Celsius this century.

We have established this strategy based on global best practices that are achievable in the context of Oakville's existing energy systems and infrastructure. This strategy recommends community-driven solutions that pool our expertise and resources, knowing we make the biggest impact when we work together.

Since the strategy was produced by the community, its success will also come from community implementation. A low carbon, more livable Oakville doesn't come from just a plan but through the required actions, as they are recommended in the following pages. As you read through this living document, ask yourself how you can get involved in Oakville's low carbon energy transformation.

We invite you to review the Community Energy Strategy and look forward to working with you on its successful implementation.

Sincerely,

Michelle McCollum
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Introduction

Energy is integral to our quality of life. It moves us where we need to be, heats and cools us, powers our jobs, keeps us connected, and so much more.

Energy is also changing. Emerging technology, escalating energy costs and the climate emergency have created a need to redefine how we get, use and distribute energy. Communities around the world are responding to this opportunity and mobilizing at a local level to shape a low carbon and resilient energy future.

In 2019, Oakville Town Council unanimously voted to declare a climate emergency recognizing the important role communities play in fulfilling Canada's Paris Climate Agreement commitment[1]. Canadian communities represent 60 per cent of national energy use and 50 per cent of national greenhouse gas (GHG) emissions[2].

Now Oakville joins hundreds of communities across Canada, representing approximately 60 per cent of the country's population, to undergo a community energy planning process[3].

Oakville's Community Energy Strategy is a result of a two-year cross sector collaboration that draws strength from the expertise and demonstrated leadership of the Town of Oakville, Sheridan College and the Oakville Energy Task Force (Task Force), with additional funding from the Federation of Canadian Municipalities and the Government of Ontario.

[1]Source: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[2, 3] QUEST: https://questcanada.org/wp-content/uploads/2018/08/2015_National-Report-on-Policies-Supporting-Community-Energy-Plan-Implementation_Full_Report.pdf

Community energy planning helps all of us - residents, businesses, organizations and institutions - work together to reduce energy costs and GHG emissions while strengthening the local economy and building an affordable and resilient energy future. Its proven benefits to a community include:

- reducing energy costs,
- keeping energy dollars local,
- using energy more efficiently,
- decreasing GHG emissions,
- creating more opportunities to attract businesses and jobs,
- increasing the security and reliability of the energy supply,
- enhancing resiliency to climate change,
- improving public health and
- increasing community engagement and energy literacy.

Community energy planning considers all local electricity, natural gas, gasoline and diesel flows that impact activities within the municipal boundary, from supply through distribution to end-use. While the scope of the strategy is energy and its related emissions and economic impacts, the Task Force appreciates that there are many other significant subject areas that impact and address climate change. One of many possible examples is how naturalization, urban forests and green infrastructure play an important role in sequestering carbon, shading buildings, building connections to nature and creating more attractive streets to encourage active transportation.

We all have an important role to play. Task Force member organizations offer information and ideas on what you can do at home, at work and in your community to take action on climate change.

Planning for Action

Oakville's community energy planning process was designed to promote scalable, transformative and swift implementation, resulting in of a set of three documents:

1. Community Energy Strategy (strategy, this document) to guide the ongoing work of the Task Force to oversee implementation;

2. 2019 Analytical Report (with appendices) that outlines the evidence-based rationale for the strategy; and

3. 2019 Engagement Report (with appendices) that outlines the engagement and consultation process that culminated in the strategy.

These three documents also reflect the Task Force planning process (Figure 1). Both the analytical and engagement process informed the development of the strategy and the identification of priority projects for the first five years.

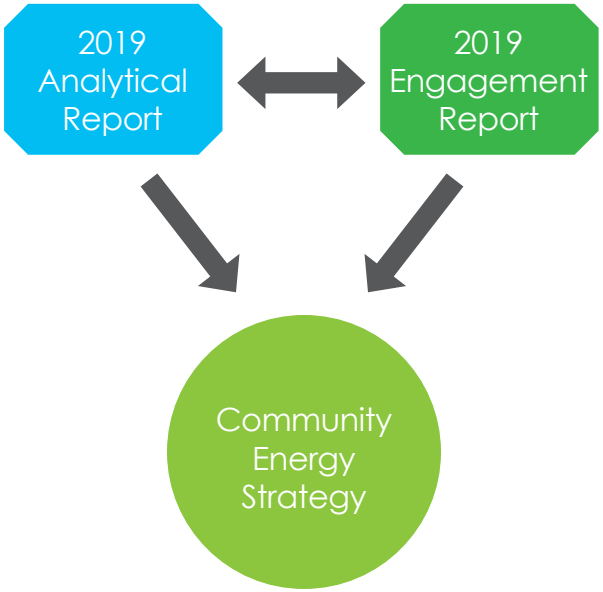

Figure 1: Relationship between the three documents resulting from the community energy planning process

Figure 2: 2019 Oakville Energy Task Force composition

Oakville Energy Task Force

Recognizing that the implementation of this strategy is a community-wide effort and requires action from many stakeholders, the Task Force was formed and held its inaugural meeting on January 23, 2019. The Task Force serves an ongoing role to leverage community relationships and act as a knowledgeable and trusted connector and advocate for this strategy.

The founding Task Force members accepted a mandate to oversee the community energy planning process and serve as an ongoing champion of implementation by establishing an Implementation Management Office (see Governance and Delivery Oversight).

The Task Force established the following mission: **To champion community-driven energy solutions.**

Task Force membership is comprised of a broad cross-section of community stakeholders (Figure 2). More information on the year-long convening of the Task Force to develop this strategy can be found in the 2019 Engagement Report.

As a member of the Task Force, the Town of Oakville has several key roles in community energy planning that include:

- serving as a convener and facilitator of the planning process;
- ensuring an enabling policy environment for strategy implementation;
- supporting economic development opportunities;
- leading by example through their own corporate activities and
- promoting energy literacy and climate action with residents and local businesses.

See Appendix 1 for a further description of the municipal role.

The Analytical Process and Key Findings

A Project Working Team was established and comprised of representatives from the Town of Oakville, Sheridan College, Oakville Hydro, Enbridge Gas, Halton Region and the consulting team of Garforth International llc. The Project Working Team led the analytical process and reported on their findings and recommendations to the Task Force. Their work is summarized in the 2019 Analytical Report and followed these primary steps:

1) Establish a baseline for energy use, emissions and costs for 2016[4].

2) Propose evidence-based goals for energy use, emissions reductions and cost recovery for 2041 to the Task Force[5].

3) Model energy use, emissions and costs in 2041 with no action.

4) Undertake efficiency simulations that consider global best practice and local opportunities.

5) Recommend a preferred strategy to achieve the 2041 goals.

6) Identify evidence-based priority projects for the first five years.

[4] The baseline year was aligned to census year of 2016.

[5] The time horizon of 2041 was chosen to align with the planning horizon used in the Province's A Place to Grow: Growth Plan for the Greater Golden Horseshoe, Halton's Regional Official Plan and Oakville's Official Plan (Livable Oakville).

The data below highlights Oakville's energy use, emissions and costs in 2016 (Baseline) and what the modelling revealed about Oakville's energy use, emissions and costs in 2041 (Base Case) without implementing this strategy (Figure 3). The scope of the analysis and this strategy includes all electricity, natural gas, gasoline and diesel use for all sectors within the municipal boundary of Oakville.

Most of Oakville's energy costs come from gasoline and diesel, most emissions come from gasoline and natural gas and most energy waste cost comes from electricity, confirming that any strategy should be designed to address our use of all three energy networks.

Baseline 2016 Oakville	Base Case, without implementing this strategy 2041 Oakville
Oakville used 37 million Gigajoules of energy.	Growth in population and employment increase energy use by 28%.
The 1) transportation, 2) homes and buildings, and 3) industrial, commercial and institutional (ICI) sectors each comprise approximately one third of Oakville's energy use.	No material change.
$620 million spent on electricity, natural gas, gasoline and diesel within the community.	Spending estimated to increase to $1.2 billion (low risk) to $2.5 billion (high risk).
Less than 20% of the money spent on energy remained in the Oakville economy.	No material change.
On average, homes and buildings in Oakville are approximately half as efficient as global benchmarks.	Gap widens against global best practice.
On average, Oakville residents release 6.6 tonnes per capita of greenhouse gas emissions each year.	Emissions reduce to 5 tonnes per capita due to a projected increase in vehicle efficiency and reduction of carbon intensity of the natural gas grid.
Emissions twice global best practice and 10 times the Paris Agreement.	No material change.
Systemic and end-user inefficiencies cause 50% of the total energy paid for in Oakville to be lost as waste.	No material change.
The Town of Oakville's corporate energy use for facilities and fleet represents only 1.35% of the community's energy use.	No material change.

Figure 3: Comparison of 2016 Baseline and 2041 Base Case findings

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Goals

The goals were based on assessment of local data in 2016 relative to global best practice. The Task Force chose pragmatic over aspirational goals, meaning they can be achieved with existing technologies, processes and systems. Notwithstanding this decision, the Task Force recognizes achieving these goals represents a transformation of Oakville's energy system and that the strategy should be updated regularly to respond to changes in climate policy, energy policy, technology and global best practice.

The Task Force's winning aspiration is to shape Oakville's energy future by creating the right conditions for public and private sector community action to achieve the following goals:

Energy Efficiency Goal

Increase energy efficiency by at least 40% by 2041.

The energy efficiency goal is based on a 2016 baseline. Efficiency includes the entire energy system from supply through distribution to end-use.

Emissions Goal

Enable transition to a goal of carbon neutrality by reducing greenhouse gas emissions by at least 50% by 2041.

This emissions goal is based on a 2016 baseline. Emissions also consider the entire energy system from supply through distribution to end-use.

Economic Goal

Return at least $7 billion in cumulative energy cost savings to the community by 2041.

These energy savings are returned to consumers through future cost avoidance and consider opportunities for savings from the entire energy system from supply through distribution to end-use. Energy dollars remain in the local economy benefiting local consumers and creating jobs.

Local job creation occurs in three ways:

1. Direct jobs are created by businesses that support improvements to energy efficiency (e.g., construction trades) or design, build and/or operate local supply and distribution systems.
2. Indirect jobs are created in supply chains that deliver goods and services to businesses in the direct job category.
3. Induced jobs are created when workers in direct or indirect jobs spend their new earnings on goods and services.

The economic goal is based on a low-price range of projected energy cost increases (see the 2019 Analytical Report for more detail). Should energy costs increase more quickly, the potential return to the community would be greater. This goal is based on strategy implementation beginning in 2020. Given the unpredictably of energy costs, this goal should be reviewed every 5 years and adjusted, if necessary, to reflect actual costs and more current forecasts.

Guiding Principles

A sustainable energy system balances the opportunity to benefit the environmental, economic, social and cultural future of Oakville. Throughout the planning process, the Task Force identified several key principles to guide decision making. They have been considered in developing both this strategy and the 2020 - 2025 priority projects and will guide future decision making and performance metrics.

Environmental

- Respect for climate science guides our transition towards climate neutrality.

Energy

- Energy performance is benchmarked against global best practice.

Economic

- All energy-related investments meet acceptable risk-adjusted returns.
- Energy costs are competitive compared to comparable North American communities.
- Local employment is generated.

Reliability and Resiliency

- Energy systems are designed to meet the challenges of changing user expectations, climate uncertainty and new technology options.
- Service level quality in 2041 meets or exceeds 2016 levels.

Implementation Framework

Many inputs were considered in developing this strategy, including:

- an understanding of Oakville's energy use, emissions and costs in 2016 and projected for 2041;
- Town of Oakville's Official, secondary and master plans;
- community engagement;
- the results of simulated future scenarios considering several energy efficiency measures;
- global best practice and benchmarks and
- an assessment of local opportunities.

The strategy is a road map to achieve the vision and goals. The framework for this strategy is illustrated in Figure 4.

The Task Force approved four strategic directions:

1. Home and Building Efficiency
2. Industrial Efficiency
3. Local Supply and Distribution
4. Transportation Efficiency

The Task Force also approved 13 objectives and targets for 2041, along with 12 priority projects for the first five years to support the strategic directions. A summary of the 13 objectives is found in Appendix 2.

The following subsections provide an overview of each strategic direction which includes:

- the strategic challenge and opportunity,
- objectives and targets for 2041 and
- 2020 – 2025 priority projects.

Oakville Energy Vision

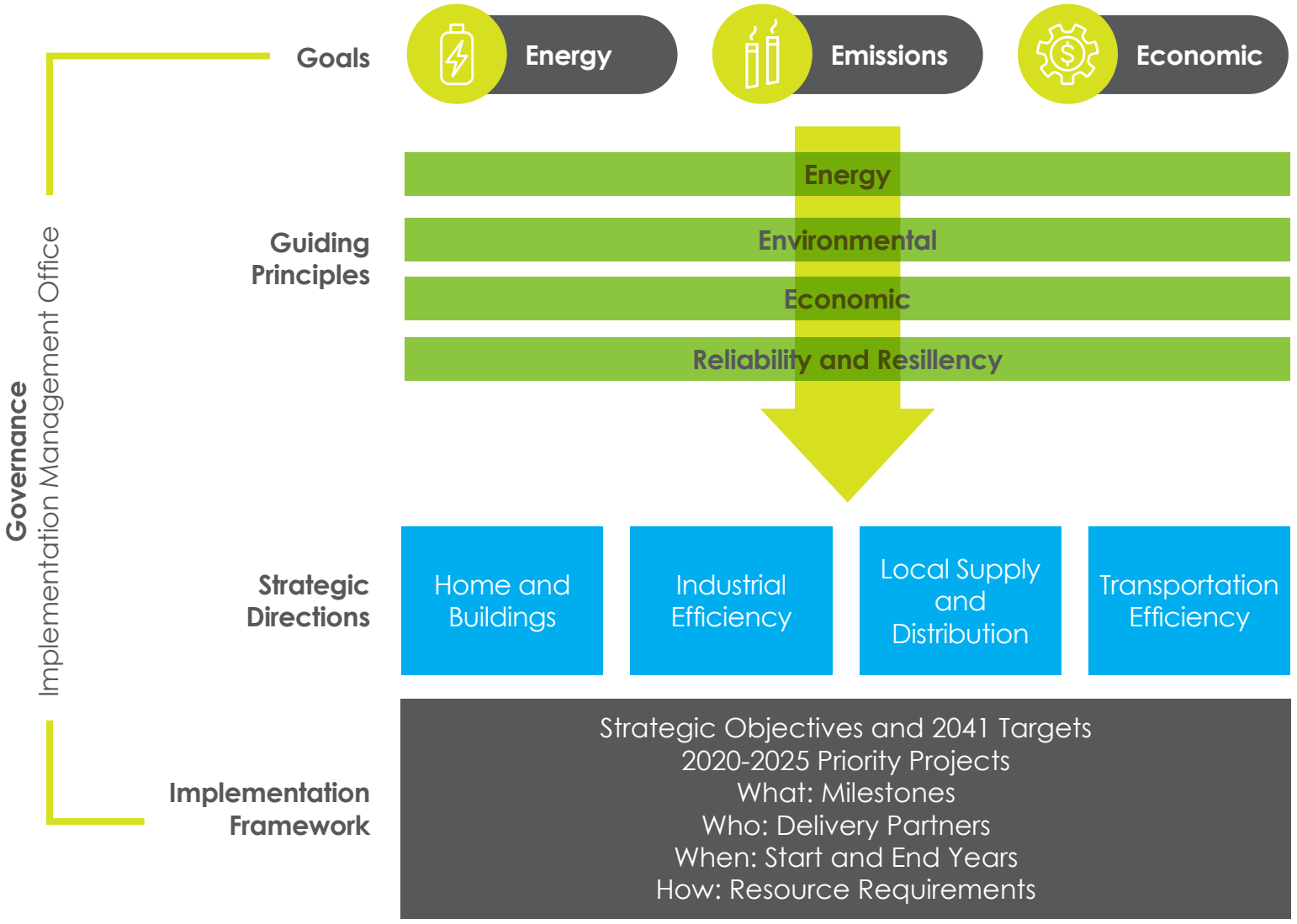


Figure 4: Community Energy Strategy and implementation framework

Governance and Delivery Oversight

Strategic Challenge and Opportunity

To ensure that this strategy does not 'sit on a shelf', priority projects are implemented in the short-term, and the 2041 goals are achieved over the long-term, it is necessary to dedicate resources to oversee, coordinate and report on overall progress. This resource will be the Implementation Management Office (IMO). Figure 5 demonstrates the high-level governance framework for implementation as a community initiative. It is critical that the IMO be an independent entity in public interest to allow greater flexibility and alignment with the mission of the Oakville Energy Task Force to deliver community-driven solutions. Further information on the IMO can be found in Appendix 3.

Financing

The Implementation Management Office will seek to be sustainably financed through partnerships and priority projects. Like any new entity, the IMO requires seed funding and as a community organization it is appropriate and advantageous to derive these funds from multiple sources including commercial sponsorship, Town of Oakville, Halton Region, the Province, Federal Government and other granting agencies.

	Implementation Management Office (IMO)	Delivery Partners
Governance	Board of Directors and Oakville Energy Task Force	IMO
Management/ Administration	Executive Staff	
Project Management & Implementation	Program Leaders	Priority Project Leads and Resources

Figure 5: Overview of proposed implementation governance framework

Governed by the Board of Directors with the Oakville Energy Task Force, the Implementation Management Office's mission is to lead and champion community-wide implementation of the Community Energy Strategy and achieve the 2041 energy efficiency, emissions and economic goals. The Office will lead tasks including:

Program Planning and Delivery

- Plan, coordinate and deliver 2020 - 2025 priority projects with partners.
- Ensure program governance, funding and resourcing align with the strategic objectives of the IMO and priority projects.
- Provide strategic oversight and technical advisory services for project delivery.
- Access global knowledge base and subject matter experts.

Stakeholder Engagement and Communications

- Build a network of cross-sector stakeholders and partners.
- Provide strategic, promotional and funding support to delivery partners.
- Secure funding opportunities from the private and public sectors.
- Communicate and engage regularly with stakeholders, the public and funding partners.
- Develop a brand and virtual presence.
- Coordinate future Task Force/Board meetings and touchpoints for guidance.

Transparency and Accountability

- Identify key performance metrics related to management and administration of IMO and priority projects.
- Validate business cases and verify results.
- Link and coordinate priority projects to identify resource efficiencies and accelerate implementation where possible.
- Report on progress to the public, investors, funders and the Task Force.

Management

- Anticipate and plan for future resourcing on an as-needed basis.
- Write and partner to submit grant applications.
- Develop a budget and medium- to long- term revenue model.

Underlying all the strategic objectives is an overarching enabling recommendation to make Oakville a smart energy community by continuing to use data and evidence-based decision making to optimize energy efficiency, GHG emissions reductions and energy costs.

2020–2025 Priority Projects:

The following were identified as near- and mid-term priority projects to activate implementation.

	Priority Projects	Milestones	Start Year	End Year	Delivery Partner	Estimated Resource Requirements
1)	Establish Task Force governance, management and IMO Business Plan including: • governance principles • governance framework • functional and organizational structures • risk and legal considerations • budget	Task Force's ongoing role as strategy champion affirmed Strategy endorsed by Town of Oakville Council with commitment for ongoing participation and support Non-profit organization incorporated Implementation Management Office established and launched with acceptable resources Board of Directors established Executive Director hired Business Plan initiated	2020	2020	Oakville Energy Task Force	Recommendations presented in Appendix 3
2)	Advocate for the use of data and evidence-based decision making	Mid-term public report card on progress made on strategy's implementation Strategy's five-year update initiated	2023	2025	Oakville Energy Task Force	Embedded in IMO's Business Plan
3)	Promote energy and climate literacy	Actions for residents to contribute to strategy and 2020 - 2025 priority projects identified Presentations to advance understanding of the 2020 - 2025 priority projects made at 10 Oakville events	2020	2023	Halton Climate Collective; Sheridan College; Town of Oakville; Local Environmental and Community Groups	In-kind time

Strategic Direction 1: Home and Building Efficiency

Strategic Challenge and Opportunity

Canada: Energy efficiency is the first fuel of a sustainable global energy system.[6] Nationally, the built environment is the third largest emitting sector and most of today's homes and commercial and institutional buildings will still be in operation in 30 years.[7] Consequently, this sector has been identified a priority for action by the federal, provincial and territorial governments.

Oakville: Retrofitting existing homes and buildings and ensuring new construction is delivered to the highest energy standards will be essential to achieving this strategy. The built environment represents more than half of Oakville's 2016 energy use and 40% of its GHG emissions. Oakville's homes alone contribute 27% of the community's GHG emissions. However, on average, existing homes and buildings in Oakville are approximately half as efficient as global benchmarks, underscoring the opportunity to increase the energy performance of the residential sector while reducing emissions and costs. Considering Oakville's designated growth under the Province's Growth Plan, there is also an opportunity to integrate opportunities for local energy supply and distribution to improve urban efficiency (see Priority Area 2: Local Supply and Distribution).

	Strategic Objective	2041 Target
A	Increase efficiency of existing homes.	Achieve a 30% residential sector efficiency gain by retrofitting 80% of existing homes.
B	Increase efficiency of existing buildings.	Achieve a 30% commercial and institutional sector efficiency gain by retrofitting 60% of existing buildings.
C	Increase delivered efficiency of new homes and buildings.	17% Ontario Building Code efficiency gain.[8]

2020–2025 Priority Projects:

The following priority projects were identified as near- and mid-term actions to work towards the 2041 targets.

[6] International Energy Agency: https://www.iea.org/topics/energyefficiency/

[7] Natural Resources Canada

[8] This target assumes Ontario Building Code updates in 2022 and 2032 each of which delivering a 10% efficiency gain.

	Priority Projects	S.O.*	Milestones	Start Year	End Year	Delivery Partner	Estimated Resource Requirements[9]
1.1)	Complete a business case for establishing a company to deliver energy retrofits for homes and buildings in Oakville	A	Business case approved	2020	2020	Oakville Enterprises Corporation and TBD	$120,000
1.2)	Incorporate a company to deliver standardized retrofits based on the results of the business case	A	Established in the business case	2021	2022	To be determined by the business case	Output of the business case
2.1)	Complete a business case for establishing an Energy Performance Labelling Program for homes and buildings in Oakville	C	Business case approved	2022	2022	Proposed as energy retrofit company	$75,000
2.2)	Establish Energy Performance Labelling Program based on the results of the business case	C	Established in the business case	2022	2023	To be determined by the business case	Output of the business case
3)	Implement the Town of Oakville's Corporate Energy Conservation and Demand Management Plan	B	20% reduction in overall corporate energy consumption and a 30% per capita reduction in corporate building emissions by 2024 based on a 2014 baseline achieved	2020	2024	Town of Oakville	$1,235,000[10]
4)	Continue to integrate Home and Building Efficiency targets into municipal policy, regulations and processes, and ensure municipal measures are identified to achieve this strategy: • investigate application of Community Improvement Plans (CIPs), Local Improvement Charges (LICs), Tax Increment Financing (TIF) and planning tools (e.g. urban design guidelines, zoning, etc.) for implementation	A B C	100% relevant policies updated	2020	2025	Town of Oakville	Internal operations

*Strategic Objective

[9] The Resources are estimates and inclusive of staff and direct operating costs.

[10] Town of Oakville 2020 Energy Conservation and Demand Management Plan.

Priority Projects Background

1. Energy Retrofits

The current energy efficiency retrofit market for home and building owners and contractors is relatively unattractive. Historically, market uptake of retrofit programs has been low in Canada. From the perspective of the contractor, the effort to prepare customized retrofit proposals is high and the closing rate is low. Low volumes and the fact that every project is specific to each household means that material and labour costs are expensive and performance guarantees are risky. From the home and building owners' perspective, obtaining understandable bids from various contractors is burdensome. They are responsible for finding their own sources of funding based on their individual credit rating. Finally, with low market uptake retrofit costs typically exceed the value of energy savings, even over many years.

Offering standardized energy retrofits to homes and buildings at high volumes, with the priority market for the first five years being homes, addresses these challenges. Contractors benefit from increased project predictability, improved margins and vastly higher project volumes. Home and building owners benefit from a simplified transaction, guaranteed pricing, lower cost pre-financed retrofits and a simple billing and payment mechanism.

Property-assessed financing has the distinct advantage of tying the efficiency investment to the property and not the owner, mitigating the risk to the home or building owner that their payback period is longer than the time they remain (or intend to remain) in the home or building. Provincial Local Improvement Charges (LIC) regulations were amended

in 2012 to enable voluntary energy and water efficiency upgrades of private homes and buildings, allowing Ontario municipalities to provide long-term, low-cost financing for residential, commercial and industrial building energy and water conservation retrofits. This is done through a special assessment that is added to the property tax bill and paid by owners over a period. Attractive interest rates and borrowing terms can be achieved for home and building owners while reducing or eliminating their up-front capital costs.

2. Energy Performance Labels

The International Energy Agency (IEA) recommends mandatory energy labelling of homes and buildings to promote efficiency. Natural Resources Canada offers a voluntary home energy labelling program. In addition to direct energy consumption, European Union best practice includes GHG emissions and source energy indicators in their labelling programs.[11] According to the Pembina Institute, the uptake of voluntary home labelling programs in Canada has been hampered by a lack of familiarity with the rating system and a shortage of comparator homes in the market.[12] Both barriers would be addressed through a mandatory program. Disclosure of the energy performance of homes and buildings transform the market for energy efficiency. The energy retrofit company is proposed as the potential administrator of the program, although this would be confirmed during the development of the business case.

3. Municipal Role: Leading by Example

The Town of Oakville has approved a 2020 Corporate Energy Conservation and Demand Management Plan. Although the Town of Oakville municipal operations (fleet, transit and facilities) only used 1.35% of the community's total source energy use in 2016, the municipality has an opportunity to showcase and engage the public on the benefits and impacts of improved energy performance through their actions.

4. Municipal Role: Enabling Policy

The Town of Oakville approves policies and by-laws that guide the growth and development of the community. Currently, the Town of Oakville's Official Plan and North East and West Secondary Plans directly support the Local Energy Supply and Distribution strategic objectives. Along with that, there are additional policies, regulations and processes that can be continually aligned with this strategy to maintain and enhance a municipal policy environment that enables local stakeholders to take action.

[11] Intelligent Energy Europe, "Improving Dwellings by Enhancing Actions on Labelling of the EPBD" (2011). Found at: https://ec.europa.eu/energy/intelligent/projects/en/projects/ideal-epbd

[12] Pembina Institute, "Home Energy Labelling Requirement at Point of Sale: Pilot Program Design" (2012). Found at: https://www.pembina.org/pub/home-energy-labelling-requirement-at-point-of-sale-pilot-program-design

Strategic Direction 2: Industrial Efficiency

Strategic Challenge and Opportunity

Canada: Industrial activity is most often regulated and guided by broader global best practices and standards. They are driven to reduce their bottom line with continuous improvement in energy management. Many companies also have corporate-wide emissions standards responding to both customer pressure and public opinion.

Oakville: Relative to other sectors, Oakville's industrial sector demonstrates better energy and emissions performance when compared to global best practice. There is an opportunity to share this energy management expertise within the community.

Strategic Objective	2041 Target
Proliferate best practice to all local industry	Achieve a 20% industrial sector efficiency gain.

D

2020–2025 Priority Projects:

The following priority project was identified as a near-term action to work towards the 2041 targets. It should be noted that many priority projects identified under the other three Strategic Directions will also engage local industry.

	Priority Projects	S.O.*	Milestones	Start Year	End Year	Delivery Partner	Estimated Resource Requirements[9]
5)	Establish a community of practice to share industrial energy management expertise	D	Ad hoc collaborative team with practice sharing agenda established	2020	2020	TBD	In-kind

* Strategic Objective

Strategic Direction 3: Local Energy Supply and Distribution

Strategic Challenge and Opportunity

Canada: The deployment of technologies to generate and/or distribute energy locally offer two primary benefits: 1) lowering the carbon impact of meeting the heating, cooling and hot water needs of homes and buildings through the distribution of heat and cooling; and 2) reducing system losses associated with the current centralized energy system.

Over 50% of the energy spent to power homes, buildings, industry and transportation is lost through end-user and system inefficiencies. System losses include energy that is lost when it is converted from one form to another (e.g., when natural gas is used to generate electricity) and during transmission from one location to another.

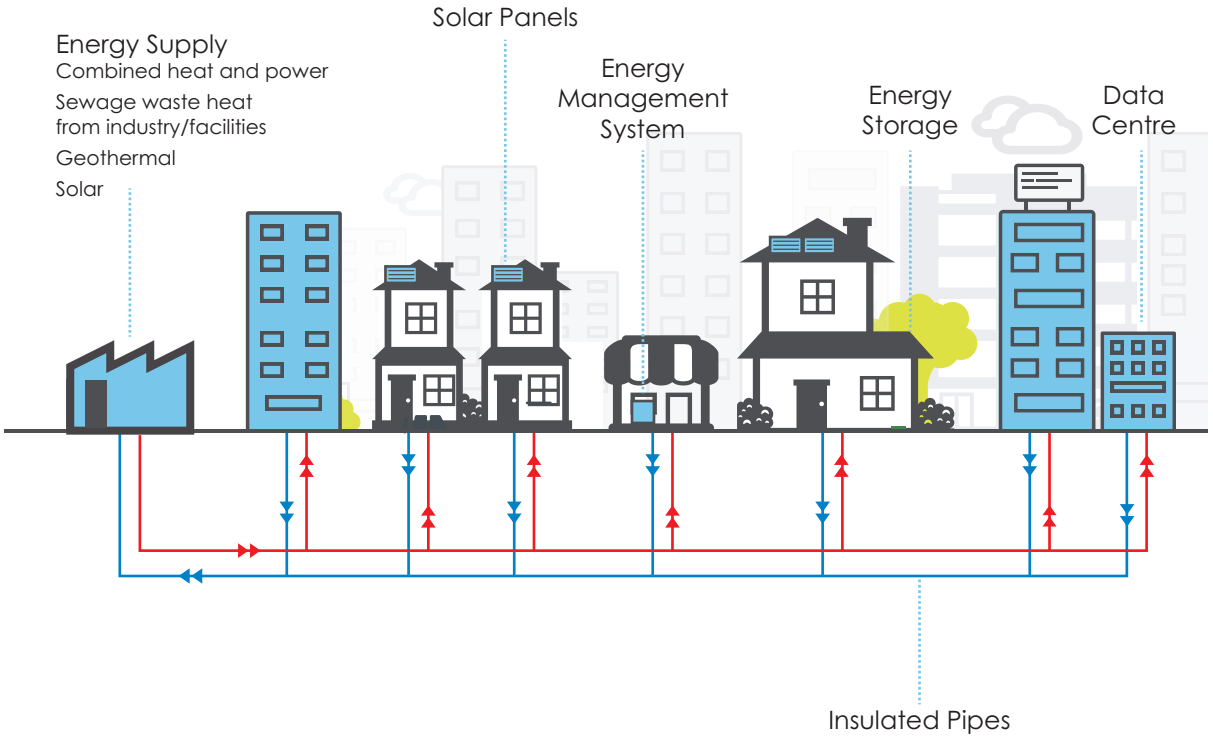


Figure 6: Modern district energy system[13]

Oakville: Natural gas to heat homes and buildings accounts for almost half of Oakville's community GHG emissions. Modern district energy (see Figure 6) is an internationally recognized pathway to decarbonize urban heating.[14] Oakville's anticipated growth and densification creates new opportunities to utilize district heating (and cooling). Modern district energy systems facilitate the creation of a flexible portfolio of many kinds of low carbon heat sources. These can include large solar-thermal arrays, biofuel boilers, combined heat and power (CHP), sewage waste heat recovery, geothermal arrays, and even boilers using renewable electricity. Only CHP was considered in the efficiency simulation so any opportunities to include other low carbon heat sources will further reduce the GHG impacts of heating and cooling. CHP would also contribute to increasing local electricity generation and reducing system losses. The highest system losses in Oakville are associated with electricity use. Increasing local electricity generation could reduce the economic impact of these losses on the community. Currently local solar photovoltaic electricity generation only accounts for 0.1% of total electricity used in Oakville.

Strategic Objective	2041 Target	
Implement district energy in high growth districts with a mix of combined heat and power and other low carbon heating and cooling sources[15]	Serve 70% of existing target property and 80% for new target property with district heating in areas targeted for densification or new growth.	E
Install solar hot water in lower growth districts[16]	Serve 10% of hot water and heating needs in homes not served by district energy with solar hot water.	F
Generate significant amounts of solar power installed on suitable rooftops and other locations[17]	Supply 8% of Oakville's electricity needs with locally generated solar power.	G

2020–2025 Priority Projects:

The following priority projects were identified as near- and mid-term actions to work towards the 2041 targets.

[14] http://www.districtenergyinitiative.org/

[15] See the 2019 Analytical Report for identified high growth EPDs.

[16] Solar hot water systems could be offered to homeowners by the proposed Energy Efficiency Retrofit Company (Priority Project 1).

[17] Solar power systems could be offered to homeowners by the proposed Energy Efficiency Retrofit Company (Priority Project 1).

	Priority Projects	S.O.*	Milestones	Start Year	End Year	Delivery Partner	Estimated Resource Requirements
6.1)	Complete a business case for establishing a company to distribute thermal energy to homes and buildings	E	Business case approved	2020	2020	Oakville Enterprises Corporation and TBD	$250,000
6.2)	Create a district energy company, based on the results of the business case	E	Thermal utility incorporated Additional key performance indicators established in the business case	2020	2024	To be determined by the business case	Output of the business case
7)	Develop Integrated Energy Master Plans (IEMPs) for high growth areas for opportunities for district energy and/or near-net zero neighbourhoods	C E	At least 2 private-sector IEMPs completed for high growth areas	2020	2024	TBD	$100,000 each
8)	Develop Portfolio/Campus Integrated Energy Master Plans (IEMPs)	B C	At least 2 institutional-sector IEMPs completed	2020	2022 2024	TBD	$150,000 each
9)	Continue to integrate Local Energy Supply and Distribution targets into municipal policy, regulations and processes, and ensure municipal measures are identified to achieve this strategy: • encourage the development of Energy Master Plans for all major developments • investigate application of Community Improvement Plans (CIPs), Tax Increment Financing (TIF) and planning tools (e.g. urban design guidelines, zoning, etc.) for implementation • promote an enabling municipal policy environment for near-net zero neighbourhoods • promote an enabling municipal policy environment for district energy • promote an enabling municipal policy environment for solar hot water and solar power • increase capacity (both staffing and financial) to ensure targets, policies and plan are integrated successfully • encourage alignment and coordination with the Region	E F G	100% relevant policies updated	2020	2025	Town of Oakville	Internal operations

* Strategic Objective

Priority Projects Background

6. District Energy Company

A barrier to growing district energy networks in Canada is the lack of an appropriate governance structures. Scaled district energy networks are typically run as a thermal utility by a company that operates all the plants and networks, ensures service quality and manages the metering and billing of the heating and cooling services. The network allows for economies of scale since the generation of heat in a few centers is more efficient than having thousands of boilers each heating individual buildings. It also cheaply captures and delivers valuable energy otherwise wasted in electricity generation, industrial and other processes and redistributes that energy to other consumers.

Modern district energy systems facilitate a flexible portfolio of many kinds of low carbon heat sources and can be changed relatively easily and inexpensively over time. Additional heating sources include large solar-thermal arrays, biofuel boilers, CHP, sewage waste heat recovery, geothermal arrays, and even boilers using renewable electricity. None of these future possibilities have been included in the current analysis to reflect current global best practice are possible upsides to further reduce the GHG impacts of heating and cooling.

7. Private-sector Integrated Energy Master Plans

Integrated Energy Master Plans (IEMPs) are the equivalent of a Community Energy Strategy but developed at the scale of a portfolio of properties or for a neighbourhood or subdivision. In addition to promoting efficiency of the built form, they identify opportunities to integrate local supply and distribution at a campus or neighbourhood scale. High growth areas (identified in the 2019 Analytical Report) associated with new intensification are candidates for an IEMP. Greenfield development is also a candidate for an IEMP to support the development of near-net zero neighbourhoods (NNZN).

8. Institutional-sector Integrated Energy Master Plans

Examples of potential portfolio IEMPs include Halton Catholic District School Board, Halton Community Housing Corporation, Halton District School Board, Halton Region, Sheridan College and the Town of Oakville.

9. Municipal Role: Enabling Policy

The Town of Oakville approves policies and by-laws that guide the growth and development of the community. Currently, the Town of Oakville's Official Plan and North East and West Secondary Plans directly support the Local Energy Supply and Distribution strategic objectives. Along with that, there are additional policies, regulations and processes that can be continually aligned with this strategy to maintain and enhance a municipal policy environment that enables local stakeholders to take action.

Strategic Direction 4: Transportation Efficiency

Strategic Challenge and Opportunity

Canada: The transportation sector represents almost 25% of national GHG emissions. Almost half of these emissions arise from the use of personal vehicles. The modern Canadian built form has been largely designed around personal vehicle use and, as such, it will take consistent and co-ordinated efforts to shift public investments in infrastructure and changes in behaviour.

Oakville: Transportation accounts for almost half of community-wide GHG emissions and total dollars spent of energy in Oakville. Over 70% of transportation activity is person vehicle use. The current level of electric vehicles in Oakville is approximately 0.1%, although growing. The current share of cycling and walking is 3%. Given the scale and complexity of the transportation challenge, systemic change must be policy-driven and involves coordination and action from all levels of government.

[18, 19] Alignment between the 2041 target and targets found in existing municipal plans is proposed as a priority project.

[20] EV charging systems could be offered to homeowners by the proposed Energy Efficiency Retrofit Company.

[21] No priority projects are assigned to this strategic objective for the first 5 years. See Appendix 7 of the 2020 Analytical Report for further detail.

	Strategic Objective	2041 Target
H	Reduce average trip length	Reduce average trip length by 5% for Light-Duty Vehicles.
I	Increase trips by walking and cycling	Increase the share of passenger kilometers travelled (PKT) by walking and cycling to 10%.[18]
J	Increase trips by bus	Increase the share of passenger kilometers travelled (PKT) by bus to 10%.[19]
K	Increase trips by GO Train	Increase the share of passenger kilometers travelled (PKT) by GO Train by 15%.
L	Increase use of electric vehicles[20]	Increase electric share of light-duty vehicle to 30% and heavy-duty vehicle to 10%.
M	Increase efficiency of vehicles[21]	Increase efficiency of gas/diesel vehicles by 36% and electric vehicles by 20%.

2020–2025 Priority Projects:

The following were identified as near-term and mid-term actions to work towards 2041 targets.

	Priority Projects	S.O.*	Milestones	Start Year	End Year	Delivery Partner	Estimated Resource Requirements
10)	Continue to integrate Transportation Efficiency targets and emissions lens into municipal planning tools and processes as well as master plans (e.g., Switching Gears: Oakville's Transportation Master Plan, Active Transportation Master Plan, Transit Strategy) and ensure municipal measures are identified to achieve this strategy: • promote an enabling municipal policy environment for electric vehicle charging stations and electrifying fleets • continue to promote alignment and coordination with the Region and other levels of government	H I J K	100% of relevant policies updated	2020	2025	Town of Oakville	Internal operations
11)	Increase public electric vehicle charging stations at municipal owned sites	L	4 to 44 public vehicle chargers installed[22]	2020	2021	Town of Oakville	$40,000 -$630,00
12)	Pursue opportunities to electrify local transit and corporate fleets	L J	Identify opportunities to work with other levels of government to procure electric buses At least one electric Oakville Transit bus in service At least two fleet electrification studies completed by various sectors	2020	2025	Town of Oakville and TBD	TBD

* Strategic Objective

[22] The number installed depends on funding from Natural Resources Canada.

Priority Projects Background

10. Municipal Role: Enabling Policy

Local governments manage the growth and development of their communities and influence whether we build more compact, walkable, bike- and transit-friendly communities. They also have an important role to continue to work with and strengthen plans and policies at all levels of government. Currently, the Town of Oakville has several master plans and initiatives that directly support the Transportation Efficiency strategic objectives. Building on that, is a sustained and enhanced need for action by working with others (government, private sector, community) to invest in and promote actions that reduce the impacts from the transportation sector.

Definitions and Explanations

Base Case
a business-as-usual projection of Oakville's energy future if the Community Energy Strategy is not implemented.

Baseline
establishes energy use or emissions at a certain point in time. A 2016 baseline was chosen for the strategy to align with the 2016 Census.

Carbon neutrality
refers to achieving net zero greenhouse gas emissions by balancing emissions with removal or eliminating greenhouse gas emissions altogether.

Combined heat and power (CHP)
an energy efficient technology that generates electricity and captures the heat that would otherwise be wasted to provide useful thermal energy—such as steam or hot water—that can be used for space heating, cooling, domestic hot water and industrial processes.

Community Energy Planning
a data-informed process to understanding where and how energy is used within a municipal boundary to identify local opportunities and priorities for increasing energy efficiency, reducing greenhouse gas emissions and lowering energy costs.

Community Improvement Plan (CIP)
tool that allows a municipality to direct funds and implement policy initiatives toward a specifically defined project area.

Community of Practice (CoP)
a group of people who share a craft or a profession.

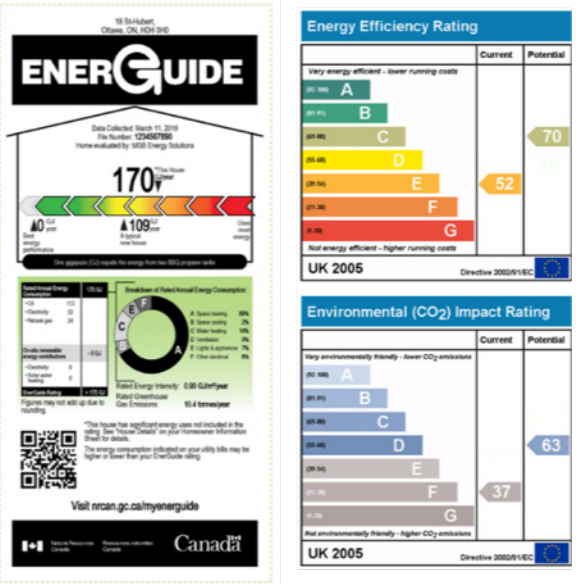
District energy (DE) Systems
networks of hot and cold-water pipes, typically buried underground that are used to efficiently heat and cool buildings using less energy than if the individual buildings were to each have their own boilers and chillers.

Efficiency Case
a simulated future scenario that considers how different combinations of measures can impact the projected outcome of Oakville's energy use, greenhouse gas emissions and energy costs.

(Integrated) Energy Master Plan
the equivalent of a Community Energy Strategy but developed at the scale of a portfolio of properties, or a neighbourhood or subdivision.

Energy Performance Labels (EPLs)

measure the energy efficiency and environmental impact (CO2 emissions) of a home (see examples).



Framing Goals

established at the beginning of the analytical process and to evaluate the performance of the Base Case and Efficiency Case simulations.

Gigajoule (GJ)

a unit of measurement of energy. A gigajoule is 1 billion joules.

Greenhouse gas (GHG)

gases that absorb and emit radiant energy within the thermal infrared range. Primary GHGs include water vapor, carbon dioxide, methane, nitrous oxide and ozone.

Near-net zero (NNZ)

implies little or no energy is drawn from the electricity grid or from pipelines, and little or no greenhouse gas emissions are released or are offset by local renewable energy generation.

Near-net zero neighbourhoods (NNZN)

The strategy is using the term to indicate neighbourhoods (and developments in those neighbourhoods) that should limit caused GHG emissions to be at least 80% less than the Base Case, or roughly aligned with the 2050 Paris Agreement. The approach to building NNZN emphasizes the "Neighborhood" not individual "Buildings". Hence, the need to evaluate different scenarios in the development of an Energy Master Plan that encompasses end-use efficiency and energy supply and distribution.

Oakville Energy Task Force (Task Force)

a team of community champions and principal advisors for the Community Energy Strategy.

Project Working Team

leaders of the analytical and engagement processes and was comprised of representatives from the Town of Oakville, Sheridan College, electricity and gas utilities, Halton Region and the consulting team of Garforth International llc.

Provincial Growth Plan

entitled the Growth Plan for the Greater Golden Horseshoe, it establishes population and employment targets for 2041 for all municipalities within the region. Municipal official plans must be in conformity with these targets.

Standardized retrofits

a similar set of energy efficiency measures made to homes and buildings of a certain property type and age.

Appendix 1:
Municipal Role in Developing and Implementing Community Energy Plans

A municipal government is a key stakeholder in the Community Energy Strategy but only one stakeholder among many. They have four key roles.

Convener & Facilitator

Municipal governments have the moral authority to convene stakeholders to establish a vision and goals for the community.

The Town of Oakville and Sheridan College came together to facilitate the development of a comprehensive community energy planning process for Oakville and convened the Oakville Energy Task Force. The town secured funding from the Federation of Canadian Municipalities and the Government of Ontario as well as contributed funding. This funding was then matched by partner Sheridan College.

The community-based Implementation Management Office will succeed in promoting transformational change with an endorsement and support by the municipal government, particularly in the first five years.

Policy Maker

Municipal governments approve policies and by-laws that guide the growth and development of the community. Consequently, they have an important role to continually ensure their policies and by-laws are aligned with this strategy's vision and goals to, among other things, enable local stakeholders and product and service providers in the transitioning energy market.

The following priorities for municipal alignment with the strategy have been identified for the Town of Oakville:

1. Continue to integrate Home and Building Efficiency targets into municipal policy, regulations and processes, and ensure municipal measures are identified to achieve this strategy:
   - investigate application of Community Improvement Plans (CIPs), Local Improvement Charges (LICs), Tax Increment Financing (TIF) and planning tools (e.g. urban design guidelines, zoning, etc.) for implementation

2. Continue to integrate Local Energy Supply and Distribution targets into municipal policy, regulation and processes, and ensure municipal measures are identified to achieve this strategy:
   - encourage the development of Energy Master Plans for all major developments

- investigate application of Community Improvement Plans (CIPs), Tax Increment Financing (TIF) and planning tools (e.g. urban design guidelines, zoning, etc.) for implementation
- promote an enabling municipal policy environment for near-net zero neighbourhoods
- promote an enabling municipal policy environment for district energy
- promote an enabling municipal policy environment for solar hot water and solar photovoltiac power
- increase capacity (both staffing and financial) to ensure targets, policies and plan are integrated successfully
- encourage alignment and coordination with the Region

3. Continue to integrate Transportation Efficiency targets into municipal planning tools, processes and master plans (e.g., Transportation Master Plan, Active Transportation Master Plan, Transit Master Plan) and ensure measures are included to achieve targets and specifically:
   - promote an enabling municipal policy environment for electric vehicle charging stations and electrifying fleets
   - continue to promote alignment and coordination with the Region and other levels of government

Economic Development

Municipal governments, through their Economic Development departments and organizations, can play a key role in retaining existing businesses and attracting new businesses by promoting and supporting the value-added opportunities described in this strategy.

Leading by Example

Municipal operations (e.g., facilities, fleet, transit) represent a small percentage of the energy use in a community. The Town of Oakville municipal operations only used 1.35% of the community's total source energy use. Nevertheless, they have an important role to demonstrate corporate leadership in the community. The Town of Oakville has shown considerable leadership in reducing energy use and GHG emissions associated with their operations through their Corporate Energy Conservation and Demand Management Plan, Sustainable Design Guidelines, use of renewables and other energy management projects.

Promoting Energy Literacy & Climate Action

Municipal governments have many opportunities to engage with residents and business owners to promote the benefits of implementing this strategy. As well, they can partner and support community-led initiatives. The Town of Oakville has advanced environmental literacy through annual events including, but not limited to, ClimateXChange, Midnight Madness, Children's Festival and Fire Prevention Day.

Appendix 2: Summary of Strategic Objectives

Strategic Direction	#	Strategic Objective	2041 Target
Home and Building Efficiency	1A	Increase efficiency of existing homes.	Achieve a 30% residential sector efficiency gain by retrofitting 80% of existing homes.
	1B	Increase efficiency of existing buildings	Achieve a 30% commercial and institutional sector efficiency gain by retrofitting 60% of existing buildings.
	1C	Increase delivered efficiency of new property	Achieve a 17% Ontario Building Code efficiency gain.
Industrial Efficiency	2A	Proliferate best practice to all local industry	Achieve a 20% industrial sector efficiency gain.
Local Energy Supply & Distribution	3A	Implement district energy in high growth districts with a mix of combined heat and power and other low carbon heating and cooling sources	Serve 70% of existing target property and 80% for new target property with district heating in areas targeted for densification or new growth.
	3B	Install solar hot water in lower growth districts	Achieve a 30% commercial and institutional sector efficiency gain by retrofitting 60% of existing buildings.
	3C	Generate significant amounts of solar power installed on suitable rooftops and other locations	Supply 8% of Oakville's electricity needs with locally generated solar power.

Strategic Direction	#	Strategic Objective	2041 Target
Transportation Efficiency	4A	Reduce average trip length	Reduce average trip length by 5% for light-duty vehicles.
	4B	Increase trips by walking and cycling	Increase the share of passenger kilometers travelled (PKT) by walking and cycling to 10%.
	4C	Increase trips by bus	Increase the share of passenger kilometers travelled (PKT) by bus to 10%.
	4D	Increase trips by GO Train	Increase the share of passenger kilometers travelled (PKT) by GO Train to 15%.
	4E	Increase use of electric vehicles	Increase electric share of light-duty vehicles sales to 30% and heavy-duty vehicles sales by 10%.
	4F	Increase efficiency of vehicles	Increase efficiency of gas/diesel vehicles by 36% efficiency gain and electric vehicles by 20%.

Appendix 3:
Oakville Energy Task Force Recommendations for the Implementation Management Office

From November 2019 to February 2020, a sub-committee of the Oakville Energy Task Force (Task Force) met to develop recommendations for the Implementation Management Office (IMO). These recommendations build a framework for the IMO as a starting point to support accelerated development of the entity. Ultimately, it will be the role of the IMO to evolve these recommendations into a Business Plan.

Mission Statement

The IMO will lead and champion community-wide implementation of the Community Energy Strategy and achieve the 2041 energy efficiency, emissions and economic goals.

Organization Structure

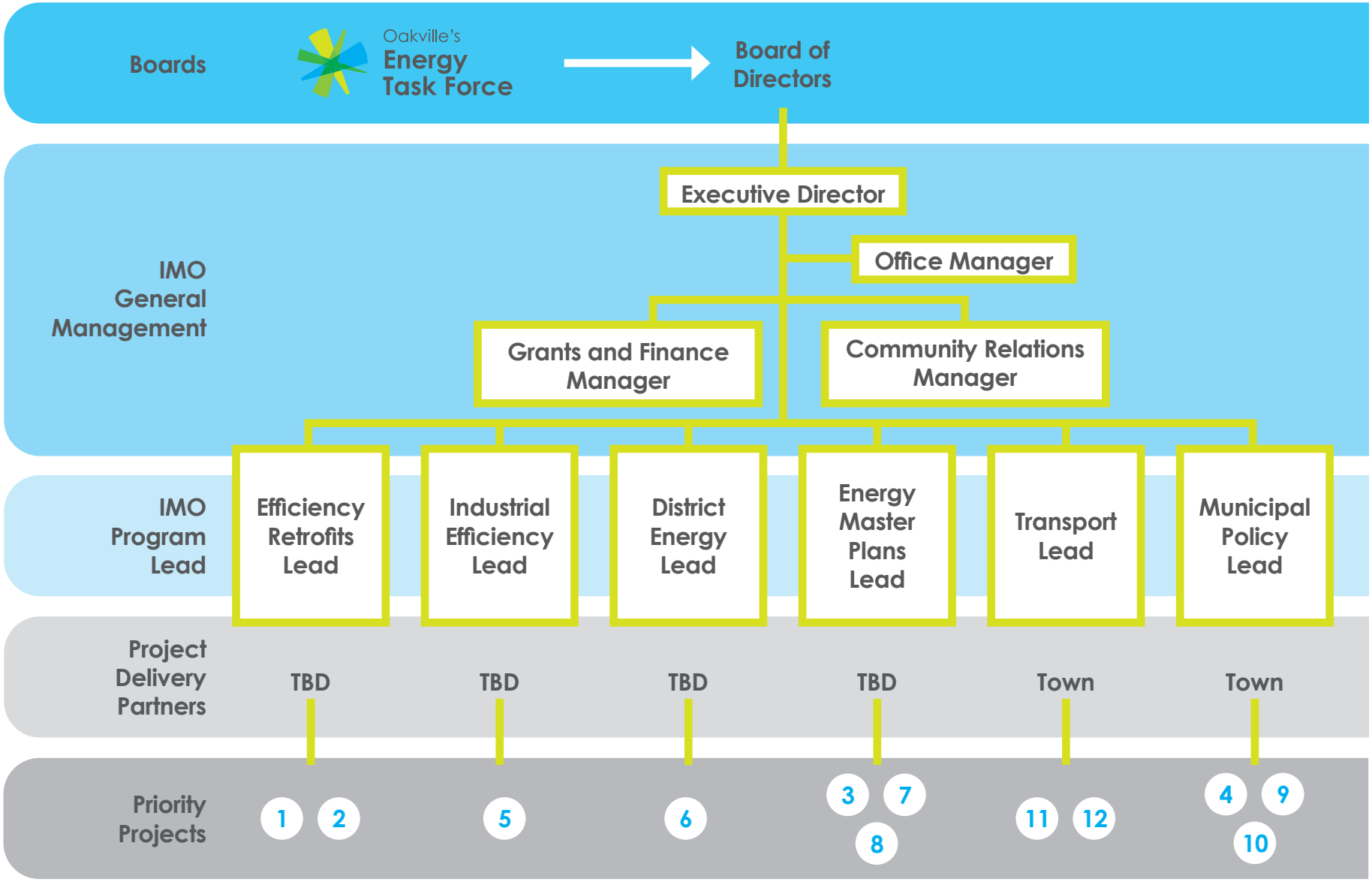
The Task Force recommended organization structure, Appendix 3, Figure 1, reflects the scale of the transformational opportunity unlocked through the implementation of this strategy. To succeed in fulfilling its mission, the IMO must be adequately resourced to directly support Delivery Partners and work towards a self-sustained funding model.

Budget for IMO

The Task Force's recommended budget is presented in Appendix 3, Figure 2. It includes cost estimates for IMO operations. It does not include costs to deliver priority projects, as resource estimates are included in this strategy for each project.

Financing and Staffing

The Task Force recommends early cash contributions should prioritize staffing General Management positions, where Program Leads may be filled by in-kind contributions on a temporary basis. The Task Force will be seeking funding through granting agencies, all levels of government and through private or commercial sponsorship. It will be imperative for the success of the IMO that multiple community members provide cash and in-kind contributions.



Appendix 3, Figure 1: Task Force Recommended Organization Structure

Function	Base	Bonus	YR1 %	2020	2021	2022	2023	2024
Executive Director	$ 125,000	10%	75%	$ 103,125	$ 138,875	$ 140,264	$ 141,666	$ 143,083
GM Assistant/Office Manager	$ 45,000	5%	50%	$23,625	$ 47,723	$ 48,200	$ 48,682	$ 49,169
Grant/Finance Manager	$110,000	10%	67%	$ 81,070	$ 122,210	$ 123,432	$ 124,666	$ 125,913
Community Relations Manager	$75,000	5%	50%	$ 39,375	$ 79,538	$ 80,333	$ 81,136	$ 81,948
IMO General Management Net Payroll				$ 247,195	$388,345	$ 392,228	$ 396,151	$ 400,112
Employer paid benefits				$64,271	$ 100,970	$ 101,979	$ 102,999	$ 104,029
IMO General Management Total Payroll				**$ 311,466**	**$ 489,315**	**$ 494,207**	**$ 499,150**	**$ 504,141**
Retrofit Strategy Lead	$ 75,000	5%	67%	$ 52,763	$ 79,538	$ 80,333	$ 81,136	$ 81,948
IEMP Strategy Lead	$ 75,000	5%	67%	$ 52,763	$ 79,538	$ 80,333	$ 81,136	$ 81,948
Industrial Strategy Lead	$ 75,000	5%		$ -	$ 79,538	$ 80,333	$ 81,136	$ 81,948
District Energy Strategy Lead	$ 75,000	5%	67%	$ 52,763	$ 79,538	$ 80,333	$ 81,136	$ 81,948
Transportation Strategy Lead	$ 75,000	5%	25%	$ 19,688	$ 79,538	$ 80,333	$ 81,136	$ 81,948
Policy Lead	$ 75,000	5%	67%	$ 52,763	$ 79,538	$ 80,333	$ 81,136	$ 81,948
IMO Program Leads Net Payroll				$ 230,738	$ 477,225	$ 481,997	$486,817	$ 491,685
Employer paid benefits				$ 59,992	$ 124,079	$ 125,319	$ 126,572	$ 127,838
IMO Program Leads Total Payroll				**$ 290,730**	**$ 601,304**	**$ 607,316**	**$ 613,389**	**$ 619,523**
IMO Total Payroll				**& 602,196**	**$ 1,090,619**	**$ 1,101,524**	**$ 1,112,539**	**$ 1,123,665**
Other Costs								
Legal costs as % of payroll	1.00%			$ 6,022	$ 10,906	$ 11,015	$ 11,125	$ 11,237
Travel/Misc as % of payroll	2.00%			$ 12,044	$ 21,812	$ 22,030	$ 22,251	$ 22,473
Communications and Marketing Costs as % of payroll	10.00%			$ 60,220	$ 109,062	$ 110,152	$ 111,254	$ 112,366
Storefront rent	$ 20,000			$ 20,000	$ 20,200	$ 20,402	$ 20,606	$ 20,812
Total Other Operational Costs				**$ 98,286**	**$ 161,980**	**$ 163,599**	**$ 165,236**	**$ 166,888**
IMO Annual Operating Total				**$ 700,482**	**$ 1,252,599**	**$ 1,265,123**	**$ 1,277,775**	**$ 1,290,553**

Appendix 3, Figure 2: Task Force Recommended Preliminary Budget for IMO Operations

Project Working Team

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Oakville's

Energy Task Force

Community-driven energy solutions