



Getting to Zero

Our Energy Guelph's strategy to implement the Pathway to Net Zero Carbon

2020.09.29

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Executive summary

Our Energy Guelph aims to make Guelph a net zero carbon community by 2050. Our Pathway to Net Zero Carbon describes how we will make this happen, and the benefits - environmental, economic, and social - that will result. This strategy document describes how OEG will implement the Pathway. Our approach consists of “left brain” (technical) and “right brain” (capacity) aspects.

The technical aspect consists of PACE (Property Assessed Clean Energy) financing of energy efficiency retrofits on private property, as well as large-scale community energy projects such as conversion of the City’s organics composting facility to anaerobic digestion for producing renewable natural gas. It also includes OEG’s capital finance approach, starting with seed capital and then moving on to combine institutional investment and a Local Climate Bank that will mobilize investment from individual Guelphites.

The capacity aspect will build public support, participation, investment, and behaviour change. It will include outreach to business, to individuals and households (mainly handled by eMerge Guelph Sustainability), and to youth.

OEG also intends to propagate its model, and its successful climate action approaches, to other communities. This will be accomplished through a playbook, consulting services, and franchising.

This strategy will make OEG self-sustaining, achieve Guelph’s climate change mitigation objectives, and help other communities to do likewise.

Overview: Two approaches, one goal

This document describes the strategic plan that OEG will implement to bring about a zero carbon future in Guelph and beyond.

OEG will work in two primary ways to achieve the target of making Guelph a net zero carbon community by 2050:

1. Left brain

The physical changes to our human-made surroundings - infrastructure, equipment, and built form - that will eliminate carbon emissions while enhancing resilience to shocks and stresses. This includes the 25 actions in the Pathway, as well as the means to finance them.

2. Right brain


Changes in attitudes and behaviour - at individual, household, organizational, neighborhood, and community-wide levels - that will ensure that the “left brain” actions are successful and sustained.

OEG will also explore and develop opportunities to replicate successful programs and approaches in other communities.

Approach 1: Left Brain

The Pathway will eliminate our community's contribution to climate change. Many assume that this outcome can only be accomplished with massive public sector spending - borrowed, raised through new taxes, or diverted from existing programs that will have to be curtailed or cancelled. Fortunately, this assumption turns out to be incorrect.

The Pathway will require an investment of \$3.2 billion over 30 years, or about \$100 million per year. That is an eye-popping number, but less so if one considers that Guelph already spends nearly \$500 million per year on energy. Most of that money leaves the community, much leaves the province, and some even leaves the country, contributing little to the health of the local economy. The \$100M annual investment of the Pathway is not like a utility bill, however - it is more like an RRSP contribution, as it repays the initial investment and more. The total direct financial benefit will be \$4.9 billion, for a net present value of \$1.7 billion and an internal rate of return of



nearly 9%. Put another way, for every dollar put in, one gets \$1.53 back. The Pathway will also create an average of 1,300 jobs.

The above estimate of the financial benefits only considers three things:

1. Utility bills savings from increased efficiency
2. Revenues from energy that is generated locally
3. Savings from reduced maintenance

The Pathway will also create numerous indirect benefits that were not included in the economic analysis, including reduced emergency room visits arising from air-pollution-induced respiratory distress, improved health outcomes from quieter neighborhoods and hence better quality of sleep, and economic spinoffs from new businesses that set up shop in Guelph to help deliver the Pathway.

To make this a reality, OEG will need to implement 25 technical actions to transition to a low-carbon economy. OEG also needs to create a way to finance all that, and a revenue stream to ensure the organization can continue leading climate action in the community.

The 25 Actions


The full list of 25 actions that comprise the Pathway, and will bring about Guelph's net zero carbon future, is provided in the Appendix. It can be boiled down to the following four items:

1. Use less

Energy efficiency does not mean freezing in the dark; it means eliminating waste. Only eleven percent of primary energy makes it to end use - the rest is lost. By reducing energy waste, we can also reduce the amount of primary energy we need, the amount of money we spend on it, and the greenhouse gas (GHG) emissions that go along with it. For example, better insulation, more energy-efficient windows and doors, and improved weatherstripping will all help reduce the amount of air that leaks out of homes, businesses, and institutions in our community- making them more comfortable, more quiet, and more healthy; not to mention much easier and cheaper to heat and cool. Guelph is seeing entire subdivisions of net zero homes being constructed; existing buildings can also be renovated to reach net zero, or close to it.

2. Make more

As we reduce the energy we need, we can increase the energy we make ourselves. We aim for Guelph to satisfy more - maybe even all - of its energy needs from local, carbon-free, renewable sources. These include solar energy,



renewable natural gas, biomass, and possibly wind energy (produced not within the city, with all its obstacles to free movement of wind, but rather at the city's edge or in the countryside beyond). Entire communities in Germany have become net energy exporters, turning energy from economic bleed to economic boon. Guelph can strive to do the same.

3. Use it wisely

Heating, cooling, electricity, and transportation systems are often designed as if they are completely separate and unrelated things. It is obviously ridiculous to have both the furnace and air conditioner running in a building at the same time. Is it any less ridiculous to have one building burning fuel for heating while the one next door consumes electricity for cooling? Or to burn gas in a boiler for industrial process heat, while also using electricity produced from a natural gas power plant that is located dozens of kilometres away, belching waste heat into the air? If instead the buildings are connected together and use cogeneration technology to produce both heat and electricity from the same fuel, energy needs can be drastically reduced.

4. Plan it away

Our neighborhoods tend to be specialized - schools here, homes there, shops somewhere else, and other businesses somewhere else still. It's nearly impossible to live in such a community if you don't have a car. If, instead, our communities are planned according to the principle of mixed use, it becomes possible to live, work, shop, play, and learn all without getting in a car and instead either walking, biking, or taking public transit to get where one needs to go. Such communities aren't just more walkable - they're also more affordable, more liveable, and don't force their inhabitants to use copious amounts of energy to live their daily lives.

To establish momentum and build the brand of OEG, several actions will be bundled together into PACE and the multicomponent centrepiece project (both of which are described below in the section entitled *Priority Actions*).

Money to make it happen

The capital financing approach for the Pathway consists of three stages:

1. Seed capital
2. Institutional investment
3. Local Climate Bank

Each stage is described in more detail below.

1. Seed capital

The biggest challenge with project capital is establishing momentum and critical mass. There are few financial products available that are designed to help start a program like the Pathway, and to get it to the point where it can graduate to large-scale institutional investment.

OEG is applying for funding from the Federation of Canadian Municipalities (FCM) under the Community Efficiency Financing program of the Green Municipal Fund. This program offers a low-interest loan of up to \$10 million, along with a grant of up to \$5 million. It will be used solely to finance the startup of the PACE program, including the first tranche of PACE loans.

A second initiative is in progress to finance one component of the centrepiece program mentioned above. This will likely involve a 3rd party playing the role of financier as well as owner/operator, with OEG playing the role of facilitator and convenor.

2. Institutional investment

Once PACE and the centrepiece project are well on their way, OEG will solicit the next round of funding from institutional investors such as pension funds and insurance companies. The goal of this financing stage will be to reach the critical mass necessary to obtain a rating from a bond rating agency such as Standard & Poors or the Dominion Bond Rating Service, to minimize the interest rate for debt that OEG issues and to pave the way toward the final financing phase.

3. Local Climate Bank

OEG aims to reduce energy operating costs and to maximize the amount of these costs that are spent in the local community. While it may be necessary to bring in capital from outside of Guelph, it would be preferable to build local self-reliance by using local capital and to build local prosperity by having the returns on that capital remain in the community. In addition, there are 444 municipalities in Ontario, and more than 2,000 coast to coast to coast. Each of those municipalities likely has a similar economic story as Guelph's Pathway, and if each follows the same financing approach it will lead to a mad rush for capital from a relatively small number of players.

To address these two factors, OEG intends to build a fund to finance climate projects in the community: a Local Climate Bank. This entity, likely a fund administered by an existing financial institution, will use local capital to

finance local projects that produce local environmental, economic, and social benefits while delivering local financial returns.

This entity will allow members of the community to invest savings in an ideally RRSP-eligible vehicle that will in turn finance projects in the Pathway. This will not just produce returns for the individual investor, but also clean the air, reduce and eventually eliminate GHG emissions, create local jobs, and contribute to local prosperity.

Over time, we expect that the Local Climate Bank model will propagate to other communities. OEG is participating in a global network of communities that are building this model and aiming to make that propagation happen.

In well-off cities like Guelph, it is likely that the amount of capital will eventually exceed the available investment opportunities. Conversely, other communities - be they sparsely populated, economically disadvantaged, or both - will not have sufficient financial means to exploit all of the opportunities inherent in their transition to a post-carbon economy. Guelph, and wealthy communities like it, will have the option to export their excess investment capital to communities that need it - in Ontario, across Canada, and around the globe.

Money to keep OEG running

OEG also needs funding to maintain its operations - payroll, occupancy costs, information technology, and other items. There are four principal ways that OEG will obtain these revenues:

1. Initial startup funding
2. Serving as convenor/facilitator for major projects and programs
3. Taking an equity stake in high-leverage projects
4. Fees for other services

Each revenue source is described in more detail below.

1. Startup funding

In May of 2019, Guelph City Council committed to provide the funds to start the economic engine of the Pathway. This investment of \$700,000 was allocated from a one-time dividend arising from the merger of Guelph Hydro and Alectra Utilities. It provides 100% of the operating budget for year one of OEG's operations, declining to 50% by year five.

2. Fees for services

Programs such as GEMS Plus and Random Acts of Green (see below) are expected to generate modest revenues for OEG. These revenues will help offset some expenses, but are not expected to be significant enough to make OEG self-sufficient.

3. Convenor/facilitator

In projects involving multiple parties, there is a recognized role for the entity that serves as convenor and/or facilitator for the project. This entity performs such tasks as:

- Identifying the parties that may play a role
- Pitching the project to each party
- Securing their commitment to participate
- Convening the group to come to agreement on the terms for the project
- Following up to finalize legal arrangements

The value of this role is generally considered to be 3-5% of the overall project value. It is anticipated that this value will exceed the associated OEG costs, in some cases by a considerable margin. However, it will be “hand to mouth” revenue which does not recur year over year and therefore must be earned in each case.

4. Return on equity

Once OEG has revenues exceeding expenses for a sustained period, it will be able to amass the necessary capital to take an equity stake in projects. This is the “brass ring” revenue generation opportunity, as it will create sustained flows of cash that will continue for the life of each project without the need for additional expenditure.

Approach 2: Right Brain

Neither the projects that will deliver a net zero carbon community, nor the mechanisms to finance those projects, will be viable without public approval. In addition, the projects will not attain their goals without supportive changes in behaviour. It is therefore every bit as important for OEG to build the necessary public support and to foster the necessary behavioural change as it is to build the projects themselves.

Outcomes



The “right brain” approaches are intended to achieve the following outcomes:

1. Individuals and organisations that have made the necessary changes to habits, practices, and processes to bring about a net zero carbon future.
2. Citizens that are aware of the challenges of climate change, making their views known to the community and to elected officials, and voting for candidates that support continued climate action.
3. Citizens that make investments from their savings in a fund that finances the programs and projects that will bring Guelph’s net GHG emissions to zero.

Specifically, the “right brain” approaches are encourage the following actions:

1. Join in

Achieving a net zero carbon future will require changes in personal habits and organizational culture. For example, people and businesses will need to shift from purchasing internal combustion engine vehicles to purchasing (or at least using¹) electric vehicles (EVs). “Right brain” approaches will foster these behavioural changes. For some of these changes, programs such as PACE will be available to help. “Right brain” approaches will therefore also include marketing of these programs to the general public, and preparing the public in advance so that they are aware of, receptive to, and enthusiastic about these programs.

2. Chime in

Some technical actions will require participation from the municipality, and possibly other orders of government. For these actions to be successful, the public must support them. It is therefore critical that the public understands what these initiatives are and why they are important, and hence that they visibly support them in ways that are evident to elected officials. This will ensure that those elected officials make policy decisions based on that public support. They can show this support in various ways, including:

- Making their support known to others in the community, through social media posts and traditional media approaches like Op/Ed contributions.
- Communicating their support to elected officials, through letters/emails, signing petitions, and delegating to Council.

¹ Many experts anticipate that private, personal ownership of human-driven internal combustion engine vehicles will decline dramatically over the coming decade, to be replaced by fleets of autonomous, connected, electric and shared (ACES) vehicles. For more information, see <https://www.rethinkx.com/transportation>.

- Voting for candidates that support continued climate action.

3. Buy in

The Local Climate Bank financing approach described above will require that members of the public vote with their pocketbooks, by allocating savings such as self-directed RRSP funds into the Local Climate Bank. “Right brain” approaches will hence include measures to develop investor confidence and to encourage these financial commitments.

The goals of public support and behaviour change will be accomplished in the following ways:

1. Outreach to business
2. Outreach to households
3. Outreach to youth

Each of these items is described in detail below.

Outreach to Business

Private enterprise will either be a key enabler for the Pathway, or a key obstacle. OEG aims to engage with businesses of all sizes to help them to make the necessary changes to deliver a post-carbon future. So far, this is being accomplished through Guelph Energy Managers (GEMs). OEG aims to add two complementary “flavours” of GEMs to complete its service offering: GEMs Plus and GEMS Elite.

1. GEMs

This program brings together the largest businesses and institutions in Guelph, providing their energy and environment managers with a community of practice to help increase energy management knowledge and experience.

GEMs quarterly meetings are hosted by one of the members. The meeting begins with a roundtable discussion in which each member provides an update on the energy, climate, and environment projects that have been working on. Next is the “Ask the Expert” segment, consisting of a presentation by an individual with in-depth knowledge of a topic of general interest to the group. Finally, the host presents a deep-dive case study on a project they have undertaken. After the formal part of the meeting is adjourned, the event concludes with a tour of the facility, usually highlighting elements of the project presented in the case study.

During the pandemic, we have temporarily replaced these in-person meetings with webinar-style events.

2. GEMs Plus

Taking a cue from the success of the nearby Sustainable Waterloo Region, OEG aims to create a Green Economy Canada hub in Guelph. This will provide an enhanced value-add to the GEMs program on a fee-for-service basis.

Members will:

- Establish an enterprise-wide sustainability goal
- Develop a baseline to determine their starting point
- Create an action plan to achieve the goal
- Implement the action plan
- Report on progress toward the goal
- Publicly celebrate success

3. GEMs Elite

Small and medium-sized enterprises (SMEs) typically do not have the financial means to hire a dedicated energy/environment manager. In recognition of this, OEG aims to provide a service similar to the Roving Energy Manager program that the Independent Electricity System Operator once offered. Recent graduates of energy management education programs, overseen by one or more retired or semi-retired energy managers, would assist SMEs with establishing and achieving sustainability goals using an approach similar to GEMs Plus. The program would operate on a strict cost recovery basis, possibly with assistance from grant programs and sponsorships.

The SME sector is also expected to benefit greatly from the Random Acts of Green mobile device app (see below).

Outreach to households

eMerge Guelph Sustainability has long offered programs to help households to reduce costs and to become more sustainable. These include the Home Tune-Up program and promotion of household adoption of EVs. OEG will work with eMerge to integrate and cross-promote their respective programs. The Home Tune-Up program in particular will offer a significant marketing channel for the OEG PACE program. Other opportunities include “off ramps” from OEG-supported youth outreach programs (see below) to eMerge programs, to help participants continue learning - and living - sustainability.

Outreach to youth

By creating and supporting initiatives to engage youth in sustainability action, OEG will enhance and accelerate the Pathway. This will occur in the following ways:

1. **Household Action.** Youth will engage their families in conversations about sustainability, ideally leading to enrolment in partner programs like the eMerge Home Tune-Up and ultimately PACE-financed retrofits and other actions like EV purchase.
2. **Purchasing Power.** Youth will support businesses that make visible efforts to become more sustainable, voting with their dollars on their own initiative, as well as through programs such as Random Acts of Green.
3. **Political Support.** Youth will take a leadership role in sustainability action in the community, contributing political support for the OEG agenda personally (through their votes and by engaging with political leaders) as well as by setting a visible example for the rest of the community to follow.
4. **Future Hires.** Youth will choose academic pathways that provide the skills and knowledge necessary to launch careers in the sustainability area, potentially joining OEG or partner organizations as paid staff.

For the past two years OEG has led a community of practice called Education, Communication, Outreach, and Awareness (ECO). With an interest in general sustainability topics, this group brings together the following types of participants:

1. **Message.** These participants have particular content that they wish to deliver to the community, and have included OEG (and, prior to OEG's launch, the City of Guelph Climate Change Office) as well as the City of Guelph Environmental Services Department (including both Water Services and Solid Waste Management).
2. **Medium.** These participants either offer some kind of program that directly works with youth (My World, My Choice! and Youth Action on Climate Change), or provide support for such programs (University of Guelph Office of Student Experience; University of Guelph Sustainability Office).
3. **Audience.** These participants connect the "Medium" participants with youth. The Upper Grand District School Board and the Wellington Catholic District School Board have both been represented.

ECO has provided oversight and support in various ways for the following programs:

1. My World, My Choice!
2. Youth Action on Climate Change
3. Planet Protector Academy
4. Community climate events
5. Random Acts of Green

Each of these is described in more detail below.

1. My World, My Choice! (MWMC)

This program brings University of Guelph students into high school and middle school classrooms, where they mentor the younger students on sustainability. A typical program will start with an experiential learning exercise that teaches participants both what negative impact they may be having on the planet, and what positive impact they could have if they made different choices.

The participants then break into teams and over the following few weeks they devise and implement a sustainability project in their school, neighborhood, faith community, or some other venue. The program concludes with a convening event at which awards are given to teams that delivered outstanding accomplishments.

Plans are in development for MWMC to deliver a new program with the working title *Canada's Next Top Sustainable Leader*, modelled on similarly-named programs from other domains (e.g. fashion, advertising).

2. Youth Action on Climate Change (YACC)

YACC aims to develop not environmental activists, but environmental leaders. In contrast to MWMC, it operates outside of the classroom. It helps youth to develop the skills required to engage constructively with elected representatives from various orders of government.

YACC participants help to gather data to assist with evidence-based decision making, for example identifying which road routes would produce the most significant increase in cycling uptake if safe, separated bike lanes were provided.

3. Planet Protector Academy (PPA)

Targeted at Grades 2-4, this superhero-themed, multimedia-rich program encourages children to take on sustainability “missions” which they complete at home with the help of family. This not only provides learning opportunities for students, it also enlists parents and siblings in the process, broadening the educational reach of the program and increasing its impact. This approach also provides opportunities for the “off ramps” to related community events (e.g. Bike Month, eMerge Home Tune-Up program) mentioned earlier.

4. Community climate events

In association with the University of Guelph Sustainability Office and other partners, OEG has either delivered or assisted with various events in the community that help build awareness about climate change and offer opportunities for like-minded individuals to connect and collaborate. These have included:

- **Local Action on Climate Change**, a forum featuring Guelph's elected leaders from all three orders of government, with a keynote address by now-former Environmental Commissioner of Ontario Diane Saxe
- **Climate Change Town Hall**, organized by Guelph Member of Parliament Lloyd Longfield in conjunction with students from the UGDSB Headwaters program
- **Climate Change Pub Night**, an informal gathering offering the opportunity for members of the community to learn more about OEG and its affiliated programs in a relaxed setting

5. Random Acts of Green (RAOG)

This mobile device app and online community encourages and gamifies sustainable behaviour by offering points in exchange for performing "green" actions. These points can then be exchanged for discounts at local businesses.

In addition to offering an educational opportunity, the app also helps users to save money and expand the number of sustainable local businesses they frequent.

The app offers two opportunities for businesses. Smaller, retail-oriented businesses can participate by offering rewards. This increases customer patronage and enhances the "green" credentials of the business.

Larger, business-to-business enterprises can also benefit by purchasing a "join code", which they can then offer to their employees so that they all join the app as a virtual community. This serves as an employee attraction, engagement, and retention tool. It also offers the potential for employees to take what they've learned about sustainability in their home lives and bring it into the workplace, enhancing the business' image both internally as well as externally, and offering the potential for employees to make suggestions that reduce waste, save money, and enhance the bottom line.

Priority actions

The first actions that OEG will pursue in support of the Pathway consist of the following:

1. PACE
2. Community energy projects
3. Business-focused capacity building

These are described in more detail below.


PACE

More information on PACE is available in the report presented to Guelph City Council in January 2020². PACE will enable a number of technical actions in the Pathway:

- Action 3: Retrofit 98% of pre-1980 dwellings by 2050, with retrofits achieving thermal and electrical savings of 50%.
- Action 4: Retrofit 98% of dwellings built between 1980-2017 by 2050, with retrofits achieving average thermal and electrical savings of 50%.
- Action 5: Retrofit 98% of pre-2017 Industrial, Commercial, and Institutional (ICI) buildings by 2050, with retrofits achieving average thermal and electrical savings of 50%.
- Action 7: Air source heat pumps are added to 50% of residential buildings and 30% of commercial buildings by 2050. Ground source heat pumps are added to 20% of residential and 40% of commercial buildings by 2050.
- Action 8: Solar photovoltaic (PV) systems are installed on 80% of all buildings by 2050. These PV systems provide on average 30% of consumption for building electrical load for less than 5 storeys and 10% for multi-unit buildings greater than 5 storeys and commercial buildings.
- Action 9: Heat pumps for hot water installations are scaled up to 80% of residential buildings by 2050, and 50% of commercial buildings by 2050.

While these actions constitute only one quarter of the actions in the Pathway, they account for 49% of emissions reductions. The list is therefore heavily weighted towards actions with larger carbon impact. These actions also constitute 50% of the investment dollars, so again the list is heavily weighted toward actions requiring the most investment.

² <https://pub-guelph.escribemeetings.com/filestream.ashx?DocumentId=1919>



The availability of PACE financing can also play a role in Action 11: A 16 megawatt (MW) seasonal storage district energy system is installed in the downtown area. It could do this by enabling the retrofits necessary to make a building compatible with district heating and cooling. For example, a building with a steam radiator heating system could use PACE financing to retrofit the conversion to a hot water system.

In addition, PACE financing can facilitate Action 12 (67 MW of energy storage is installed by 2050 to reduce the curtailment of the ground-mounted PV) by financing storage devices on private property³. This would include home battery systems that provide both energy resilience (replacing a backup generator) and the opportunity to arbitrage between cheap nighttime and expensive daytime electricity rates.

PACE financing can also facilitate Action 22 (100% of new passenger vehicles are electric by 2030) and Action 23 (95% commercial vehicles are electric by 2030). PACE could be used to procure and install an EV charger. However, note that the cost of such equipment is not material compared to the cost of the vehicle, so additional tools may be needed to encourage EV adoption.

Finally, with changes to the enabling legislation and other regulations, PACE could finance the difference between a code-built and a high-performance building. This would enable the following actions:

- Action 1: Incrementally increase the number of net zero new homes to 100% by 2030.
- Action 2: Incrementally increase the number of non-residential buildings that achieve Passive House levels of performance to 100% by 2030.


Note that PACE is actually not a technical action in and of itself, but rather an enabler for the technical actions mentioned above.

Financing PACE

As mentioned above, OEG has applied for funding from FCM under the Community Efficiency Financing program of the Green Municipal Fund. If the application is successful, OEG plans to use the FCM funding as leverage for the transition to private capital. Otherwise, OEG will push ahead with securing private capital immediately as a “Plan B”.

OEG plans to work in partnership with PACE Atlantic to promote PACE program adoption in other communities. If a financing partner is secured, this could open the door to widespread adoption of the program. In return for its advocacy and capacity

³ This action also includes some utility-scale storage integrated with the distribution grid; PACE would not be applicable to projects of that nature.



building work through PACE Canada (see below), and its role in securing this financing, it is proposed that OEG levy a fee of 0.1% of project value.

Community energy projects

PACE is about reducing energy consumption and fostering on-site generation at the level of individual buildings. However, the Pathway will also require projects to provide renewable energy generation capability at the community scale. Examples include:

1. Producing renewable natural gas from organic waste via anaerobic digestion
2. Producing electricity using a ground-mount solar PV array located on a decommissioned landfill
3. District heating using biomass such as farm waste

It is anticipated that the first two projects will be pursued in the coming two years. The last will depend on the speed with which the Guelph Innovation District is developed, as it is anticipated to yield the first tranche of customers.

Ideally, these projects will be bundled into a multicomponent centrepiece program that combines public transit, active transportation, solar energy production, and thermal energy generation and distribution, addressing six of the 25 actions in the Pathway. A white paper on this project is currently in development.

Early in the 2021 fiscal year, OEG will be working with the national nonprofit QUEST (Quality Urban Energy Systems of Tomorrow) on a project entitled AIRE (Accelerating the Implementation of Renewable Energy) to develop a generalized protocol for early-stage business planning related to major community energy projects. In collaboration with the University of Guelph, this project will identify suitable financing models and will help define the role of key stakeholders, in our case OEG and the municipality. The project will also provide revenue over and above that provided by the City of Guelph, and therefore represents the first step toward financial self-sufficiency for OEG.

Business-focused capacity building

Guelph's ICI sector will play a pivotal role in achieving the net zero carbon goal. The following ICI capacity-building programs will be prioritized, and are described in the section entitled *Approach 2: Right Brain*, below:

1. GEMS Plus (Green Economy Canada)
2. GEMS Elite
3. Random Acts of Green

Timeline of key initiatives

The key initiatives planned for the next one to three years are shown below. Each item is either a technical change or capacity building. OEG will either assume a leadership role or a supporting role for a partner organization. The timing indicates when the initiative is expected to launch.

Item	Description	Type	Role	Timing
1	R-PACE (Residential PACE) - Low Rise	Technical	Lead	FY2020Q4 or FY2021Q1
2	R-PACE - MURBs (Multi-Unit Residential Buildings)	Technical	Lead	FY2020Q4 or FY2021Q1
3	C-PACE (ICI)	Technical	Lead	FY2023
4	Anaerobic digestion of green bin waste to produce renewable natural gas	Technical	Support	FY2020Q4 or FY2021Q1
5	Solar farm on closed Eastview landfill	Technical	Support	FY2022Q1
6	GEMS Plus (Green Economy Canada)	Capacity	Lead	FY2020Q4
7	GEMS Elite (GEMS Plus for SMEs)	Capacity	Lead	FY2021Q4
8	Random Acts of Green	Capacity	Support	In progress

First Guelph, and then...everywhere?

To date, municipalities have been a primary driver for climate action in Canada. However, municipalities have neither the means nor the mandate to propagate successful approaches beyond their borders. Organizations like FCM can assist through the communities of practice they create, but these still have only a limited ability to replicate winning solutions. This has meant that climate action success stories tend to stay where they originate, and only move further afield with great difficulty.

OEG is different. While it is based in Guelph, it is free to set up operations in any community where it is welcome. Many municipalities have, for example, declared a climate emergency, but few have experience with implementing climate solutions. OEG can help.



There are at least four models that OEG can employ for disseminating approaches that have been demonstrated to work:

1. Partnership
2. Playbook
3. Consulting
4. Franchising

Each of these is described in greater detail below.

Partnership

In communities that have already implemented the third-party nonprofit model for climate action, a partnership will be of mutual benefit. For example, a collection of communities all collaborating on PACE financing could attain the critical mass necessary for a rating from a recognized bond rating service, as mentioned under the *Institutional Investment* heading, above. This would dramatically reduce the cost of borrowing, improving revenue streams arising from project equity positions and strengthening the overall financial health of the organization.

There would also be cost savings and other synergies that arise from common approaches for such organizational elements as sales and marketing, information technology, and legal structures.


Playbook

OEG can develop a documented methodology as a guide for other municipalities. This would explain climate action approaches that OEG has found to be successful, how they were implemented, and what is necessary to sustain them in the long term.

This method would allow participating communities to replicate OEG's outcomes simply and at minimal expense. It would be appropriate in communities that already have considerable capacity, in terms of both municipal staff side and community organizations. The QUEST AIRE project is a starting point for developing this method.

Consulting

OEG could offer consulting services to assist communities to set up their own version of OEG. This would be a more hands-on approach than the playbook, with OEG staff participating directly in program planning, community engagement, problem solving, and so forth. It would be offered under a fee-for-service



arrangement, potentially on a contingent basis if there is difficulty obtaining the necessary funds.

This approach would be suitable in communities with less capacity, or less willingness to deploy that capacity for the purposes of climate action.

Franchising

In communities with little willingness or ability to engage in direct climate action, OEG could set up a franchise. This entity would replicate all applicable aspects of OEG in the host community.

Ideally this arrangement would come with some financial commitment on the part of the municipality, to demonstrate a willingness to work collaboratively with the franchise. This commitment could take the form of a low- or no-interest loan.

Conclusion

OEG has the drive, the ability, and the opportunity to make Guelph a net zero carbon community by 2050 or sooner. This strategic plan presents a roadmap for how that will be accomplished, and how it will be replicated in community after community. The end result will be a long list of cities, towns, counties, and other regions that have risen to the challenge of climate change, mastering and eliminating their GHG emissions, while dramatically enhancing their prosperity.

Appendix: The 25 actions

The Pathway to Net Zero Carbon includes the following actions:

Action	Description
	BUILDINGS
	New buildings
1	Incrementally increase the number of net zero new homes to 100% by 2030.
2	Incrementally increase the number of non-residential buildings that achieve Passive House levels of performance to 100% by 2030.
	Existing buildings
3	Retrofit 98% of pre-1980 dwellings by 2050, with retrofits achieving thermal and electrical savings of 50%.
4	Retrofit 98% of dwellings built between 1980-2017 by 2050, with retrofits achieving average thermal and electrical savings of 50%.
5	Retrofit 98% of pre-2017 industrial, commercial, and institutional buildings by 2050, with retrofits achieving average thermal and electrical savings of 50%.
6	Every building will be recommissioned on a ten-year cycle, achieving energy savings of 15% on pre-2017 building stock.
	ENERGY SYSTEM
7	Air source heat pumps are added to 50% of residential buildings and 30% of commercial buildings by 2050. Ground source heat pumps are added to 20% of residential and 40% of commercial buildings by 2050.
8	Solar photovoltaic (PV) systems are installed on 80% of all buildings by 2050. These PV systems provide on average 30% of consumption for building electrical load for less than 5 storeys and 10% for multi-unit buildings greater than 5 storeys and commercial buildings.
9	Heat pumps for hot water installations are scaled up to 80% of

	residential buildings by 2050, and 50% of commercial buildings by 2050.
10	20 megawatts (MW) of commercial scale ground mounted solar PV is installed per year between 2018 and 2050.
11	A 16 MW seasonal storage district energy system is installed in the downtown area.
12	67 MW of energy storage is installed by 2050 to reduce the curtailment of the ground-mounted PV.
13	50 MW of wind energy is installed by 2050 outside of city limits.
14	Local production is maximised, and additional renewable natural gas is imported to displace natural gas consumption in buildings.
15	100 kilowatts of run of river hydro electricity generation is added.
	TRANSPORTATION
16	Transit is introduced in areas with high density and insufficient transit.
17	The transit fleet is fully electrified by 2050.
18	The cycling and walking mode share is increased.
19	The percentage of trips that are rideshare is doubled by 2050.
20	A car-free downtown is created by 2040.
21	The municipal fleet is electrified by 2050.
22	100% of new passenger vehicles are electric by 2030.
23	95% commercial vehicles are electric by 2030.
24	100% of new vehicles are autonomous by 2035.
	INDUSTRY
25	The efficiency of process motors is increased by 50% by 2050.