



Community Energy Knowledge - Action Partnership Case Study

LONDON'S WEST FIVE COMMUNITY – BUILDING A NET ZERO ENERGY COMMUNITY

Project Snapshot²

Developer	Sifton Properties
Energy partner	S2E Technologies
Definition	Net Zero Energy
Status	First office building and ~90 rental townhouses in 2017
Site area	28 hectares
Number & type of residential units	2000 units (<i>townhomes, apartments and condos</i>)
Commercial & office space	32,500 m ²
Gross residential density	71 units per hectare
Landscaped open space	Designed around a central park and trail system
Building heights	1 to 18 stories (<i>heights exceeding twelve stories may be permitted at key locations</i>)
Pre-development use	Agriculture; vacant greenfield
Certification	Pursuing Net-Zero certifications for buildings and the community from the CHBA
Sustainability framework	Customized
Key energy features	Beyond-code energy efficiency, solar PV, electric vehicle charging, potential for district energy
Key water features	Green roofs, high-efficiency appliances, rainwater collection
Grants	MITACS, SR&ED

Municipal Snapshot¹

Municipal name	City of London
Municipal Status	Single tier
Land area	420.57 km ²
Population (2006 census)	352,395
Population (2011 census)	366,151
Growth rate	3.9%
Population density per km ²	1,395.4
Within Greater Golden Horseshoe	No



¹List of municipalities in Ontario. (2017). Retrieved from https://en.wikipedia.org/wiki/List_of_municipalities_in_Ontario

²Welcome to West Five. (2015). Retrieved from <http://www.questcanada.org/files/download/9e1bc3e6335cd95>



DESCRIPTION OF MUNICIPALITY

With an estimated population of 381,000 the City of London is the fifth largest municipality in Ontario. While not within the Growth Plan for the Greater Golden Horseshoe, Council has endorsed a population projection of 544,700 residents by 2031.

Located in the heart of some of the most agriculturally-productive farmland in Ontario, the City developed around an economic base of food and beverage-processing, which continues to be a major focus of the local economy (e.g. Labatt Breweries). Once a major manufacturing centre in Southwestern Ontario, economic restructuring has meant that public sector institutions (universities, colleges and hospitals) are now a more important employment base for the City's economy, as are the growing information communication technologies (ICT) and digital media sectors.³

Over the past 40 years, London has largely grown outwards through urban sprawl, consuming large amounts of prime agricultural land.⁴ Today, the City sees economic transition towards sustainable planning and economic development as a path towards prosperity. The 2016 Official Plan – The London Plan – establishes a strategic direction for London to “become one of the greenest cities in Canada”, and in so doing sets the groundwork for a Green City Strategy that will chart a path towards the City having a smaller per capita ecological footprint than most cities in the Canada.⁵

Of interest, London built Canada's first district energy system in 1880. This system has since grown to serve most of the downtown core.

Municipal Policy Framework

As the work to complete the West Five plan and planning application was underway, the City of London was simultaneously updating its municipal policy framework. The new policy framework better supports net zero energy development.

A new official plan was approved in 2016. The London Plan, as it is called, was developed after an extensive two-year conversation (ReThink London, 2012/2013).⁶ The London Plan sets the broad policy framework for sustainable development in the City. It recognizes the critical importance of a compact built form to minimizing or reversing growth in the City's infrastructure gap, improving health outcomes in the context of an aging population, and for protecting remaining prime agricultural land within its municipal boundary. It sets strategic directions for the City, including that London becomes one of the greenest Cities in Canada.

Specific policies within the new official plan provide support for the creation of a Green Strategy as well as a Community Energy Action Plan to support more environmentally-friendly and affordable energy usage and to enhance local air quality.⁷ This includes energy conservation, energy efficient design, passive solar, strategic tree planting, waste heat utilization, and increased local, distributed production of energy through combined heat and power generation, district energy, ground-sourced thermal energy, solar thermal and photovoltaic, bioenergy and energy from waste.⁸ The new official plan also encourages new policy tools for energy efficiency and renewable energy, such as Local Improvement Charges for energy retrofits, and incentive mechanisms for sustainability within the development approvals process.

³ Digital Creative. (2017). Retrieved from <http://www.ledc.com/digital-creative>

⁴ Statistics Canada. (2016, March). Retrieved from <http://www.statcan.gc.ca/daily-quotidien/160322/dq160322a-eng.htm>

⁵ The London Plan. (2016, June). Retrieved from <http://www.london.ca/business/Planning-Development/Official-Plan/Documents/London-Plan-Final-July2016-spreads-reduced.pdf>

⁶ The London Plan. (2016). Retrieved from <http://www.thelondonplan.ca/>

⁷ City Building Policies. (2016, July). Retrieved from <http://www.london.ca/business/Planning-Development/Official-Plan/Documents/City-Building-Policies-LP-July-2016-Spreads.pdf>

⁸ Ibid.





DESCRIPTION OF PROJECT

West Five is a 28-hectare greenfield property located in the northwest of the City of London. The lands are part of the surrounding larger RiverBend Community of new and planned residential development.

The lands that comprise the RiverBend Community were annexed into the city boundaries in 1993. Community planning commenced in the mid to late 1990s to establish the use designations for the newly-annexed lands. These early plans contemplated a conventional suburban development form reflecting the market realities of the day. With time, demand for mid-rise and high-rise developments increased. Land use plans for the area began to intensify but around a traditional arterial road pattern.

In the mid-2000s, Sifton Properties began development of a new vision for the West Five lands as a walkable, mixed-use community. These plans were put on hold after the market crash of 2008 but were renewed again a few years later.

Today, West Five has been planned as a complete community including a mixture of office, retail, residential and public open spaces. The community is to be a model of “smart” community design incorporating significant energy saving and renewable energy initiatives to achieve net zero energy. The design is pedestrian-oriented and has numerous green spaces, including a central park.

The first net zero energy office building and ~90 townhouses will be completed in 2017. The project is expected to take 10 to 15 years to complete.



Rationale for selecting as a case study

The West Five development was chosen as a case study due to (1) developer's stated aspirations to build a net zero energy community and (2) municipal planning policy interventions to support the development.

The plan sets greenhouse gas (GHG) reduction goals for **80%** reduction in total GHG emissions from 1990 levels by **2050**.

Existing policy/tools at time of planning application

*City of London Official Plan*⁹

The official plan, at the time of the West Five application, had been approved in 1989. While there had been amendments along the way, it did not include any energy-related policies.

*RiverBend South Secondary Plan*¹⁰

In 2014, Sifton Properties brought forward a new Secondary Plan for the RiverBend South Community. The new vision was based on a complete community with a range of housing choices, healthy living and active transportation, the integration of greenspaces and the natural environment, and environmental sustainability. The RiverBend South Secondary Plan now forms part of The London Plan, the City's new official plan.

The Secondary Plan included several energy-related objectives for achieving the principle of environmental sustainability including encouraging ENERGY STAR^{®11}, LEED^{®12} and other green standard buildings, the use of renewable and alternative energy sources, where feasible, and active transportation.



⁹ London's Official Plan. (2014). Retrieved from <https://www.london.ca/business/Planning-Development/Official-Plan/Pages/OfficialPlanDocument.aspx>

¹⁰ Riverbend South Secondary Plan. (2014, August). Retrieved from <https://www.london.ca/business/Planning-Development/secondary-plans/Documents/RBS-Secondary-Plan-April-2014.pdf>

¹¹ Energy Star for New Homes. (2016). Retrieved from <http://www.nrcan.gc.ca/energy/efficiency/housing/new-homes/5057>

¹² LEED: The International Mark of Excellence. (2016). Retrieved from http://www.cagbc.org/CAGBC/LEED/CAGBC/Programs/LEED/Going_green_with_LEE.aspx?hkey=54c44792-442b-450a-a286-4aa710bf5c64

*Community Energy Action Plan (2014-2018)*¹³

The City's first Community Energy Action Program, funded partly through the Federation of Canadian Municipalities' Green Municipal Fund, was approved in 2014.

The plan sets greenhouse gas (GHG) reduction goals for London that are consistent with provincial targets:

- 6 percent reduction in total GHG emissions from 1990 levels by 2014,
- 15 percent reduction in total GHG emissions from 1990 levels by 2020,
- 80 percent reduction in total GHG emissions from 1990 levels by 2050.

The plan also establishes a range of sector-specific measurable goals with respect to energy demand and low carbon energy supply. In addition to setting out strategic actions for the City to implement to 2018, the plan identifies specific actions that key stakeholders from both the public and private sector have agreed to implement as part of London's Community Energy Action Plan. This makes London's CEP a unique blend of action and authority between government, non-government, and private sector stakeholders.

Of relevance to this case study are actions that the London Home Builders Association has committed to in order to support improved energy efficiency in new single family housing stock. The LBHA has committed to work with the City to determine whether a 15 percent energy reduction in residential energy use per person is a high target or is in fact achievable. It has also committed to conduct education and outreach to its members and the broader contractor community in London regarding low carbon energy technologies.

The Community Energy Action Plan informed the development of The London Plan, the new official plan for the City.

Policy amendments precipitated by the planning application

Application for Approval of Draft Plan of Subdivision/Official Plan and Zoning By-law Amendments

In 2015, an application for approval of draft plan of subdivision and official plan and zoning by-law amendments was submitted by Sifton Properties to the City of London. All planning approvals for West Five, including site plan, were received in 2016.

The purpose of the planning application was to permit the development of a mixed-use community consisting of commercial, office and medium and high density residential uses. The special policy for the area supported and promoted sustainable and renewable energy initiatives, including solar electricity generation, district heating, ecologically efficient transportation systems, and green infrastructure technology. Consideration of the need for alternative development standards for streets, utilities and infrastructure was also included.

*West Five is intended to be a showcase of sustainable design and development. The goal is to achieve Net Zero annual energy usage to the extent feasible through various design considerations. The City will encourage and facilitate opportunities for partnerships, incentives and funding opportunities that assist in implementing sustainability initiatives, and may consider alternative development standards for streets, utilities and infrastructure.*¹⁴

¹³ Community Energy Action Plan. (2014, July). Retrieved from <https://www.london.ca/residents/Environment/Energy/Documents/Community%20Energy%20Plan.pdf>

¹⁴ Policies for Specific Areas. (n.d.). Retrieved from <http://www.london.ca/business/Planning-Development/zoning-by-law/Documents/Chapter-10.pdf>

Emerging policy/tools precipitated by the development

An outcome of the West Five project has been the partnership of the City of London with S2E Technologies and three other municipalities (Waterloo, Kitchener, and Kingston) to identify municipal policies and programs which help or hinder developers from pursuing net zero energy development.¹⁵ The project will consider 8 potential project sites (2 in each municipality). Investigations will also consider financing (e.g. business models and incentives) and technology barriers. The project has been funded, in part, by the Federation of Canadian Municipalities' Green Municipal Fund and final results are expected in mid 2018.

Enabling Federal and/or Provincial interventions

Funding has been sought from several places over the years including: Federation of Canadian Municipalities Green Municipal Fund, Sustainable Development Technology Corporation (SDTC), and Individual Research Assistance Program (IRAP). Scientific Research and Experimental Development (SR&ED) tax credits and MITACS assisted with achieving the net zero energy goals. MITACS accelerate program was used extensively to develop a team of highly qualified graduate students (PhD and Masters level) to support the development of the project feasibility study.

STAKEHOLDER PERSPECTIVES

Municipal perspectives

Building champions and support through community and stakeholder engagement

The vision and goals for the project were communicated to key senior administrative and operational municipal staff from across the corporation (e.g. building, planning, and engineering) well in advance of the planning application. In doing so, the developer built strong administrative support for the project – it became a strategic corporate priority. Senior management support was instrumental in ensuring many road blocks were addressed particularly related to alternative development standards. This level of engagement of senior management was not “business as usual” and important given the new standards and technologies being proposed.

The project was also well supported politically given the alignment with Council's strategic plan (2014-2018) and The London Plan. Several members of London City Council had campaigned on the “green” community vision that had emerged from ReThink London.

Sifton Properties also held numerous community meetings in advance of the application which was considered a best practice. There was overall support for the sustainability aspects of the development and more traditional concerns were raised (e.g. impact of parking, traffic volumes).

The role of innovators

In an ideal world, a municipality would include climate change and energy policy objectives in their Official Plan first. These policies would then inform the development of Secondary Plans and implementing Master Plans - e.g., a community energy plan. However, in practice, opportunities to update planning tools are taken when they arise. This was certainly the case in London as the municipality worked to align several policy documents as they developed their new official plan – The London Plan. This has created a more positive policy environment for future net zero energy projects.



¹⁵ The results of this research were not available for this case study.



In the case of this project the sustainable vision for the project came from the private-sector. Development innovators play an important role in driving change in municipal policies, standards and processes.

While there have been other London industry innovators, the West Five project is pushing the envelope. This will continue to challenge the municipality to respond to new technologies and alternative development standards.

Flexibility

Greater flexibility was sought by the developer, through the zoning by-law amendment, to support the sustainability goals. Greater flexibility was also sought in the approvals process i.e. the approvals for draft plan of subdivision and site plan were completed simultaneously. In the same way an integrated design process was required to best achieve the project's sustainability goals, a coordinated and integrated development approvals process was also necessary.

Municipal Energy Resources

The Environmental Programs division, responsible the Community Energy Action Plan, has worked closely with London developers and homebuilders for many years to promote energy efficiency. A collaboration on the London Energy Efficiency Project in the latter part of the last decade promoted the uptake of new energy technologies at the individual building scale.

While there have been other London industry innovators, the **West Five** project is pushing the envelope.

The Environmental Programs division has served to “connect the dots” between different stakeholders including developers, homebuilders, building inspectors and technology providers as well as intra-municipal stakeholders. This municipal resource, which sits outside of the regulatory world, has been important in providing a platform for nurturing net zero energy home and community building in London. The project to examine barriers to net zero community building is a natural evolution of this earlier work.

Developer perspectives

Vision

The net zero energy vision for the West Five project has been led by Sifton Properties and S2E Technologies; it proceeded any energy policies in the official plan. Developing goals for sustainability, including net zero energy, at the beginning of the design process was important for success.

Stakeholder and Community Engagement

Engaging early and often is considered a best practice to build necessary support in the community and among stakeholders for something new.

Engagement of stakeholders was also a core strategy to mitigate the risks associated with an innovative project. For instance, significant time was invested in educating municipal building inspectors about the new energy technologies that they would be dealing with at inspection. Delays at inspection can have significant consequences for a project.

Collaboration is essential, among all stakeholders, to support net zero energy communities. If the government is looking to accelerate the transition to net zero homes it has two choices:

1. regulate, but this can be confrontational; or
2. work collaboratively with the industry to change the way communities are built.



Stakeholder and Community Engagement

In 2013, S2E Technologies began work on a feasibility study for sustainable urban living. The feasibility study considered many aspects of sustainability including new technologies to reduce carbon footprint. The feasibility study also tested the response of the market to net zero communities.

Over 90 researchers were engaged in the feasibility study. S2E Technologies raised all the funding to conduct the feasibility study which was, naturally, highly attractive to Sifton Properties. The role of post-secondary institutions, and research, have played an important role in moving forward on net zero energy community design and business models.

A key outcome of the feasibility study was the development of a financing model that would support West Five achieving net zero energy at very little, or no cost, to the builder or the home buyers. The financing model was based on the development of a micro-utility through a partnership between Sifton, S2E and London Hydro. The micro-utility will provide efficient energy services to the community while externalizing the incremental capital cost of achieving net zero energy from the developer's perspective.

The feasibility study played an instrumental role in securing corporate support at Sifton Properties to accept the additional risks inherent in building a net zero community.

Integrated Design

The leadership of both Sifton Properties and S2E Technologies converged in a timely way. The vision to develop West Five as a complete community created the right conditions to pursue net zero energy. Sifton Properties engaged an architect to lead the development of the master plan concept for the community. S2E Technologies, as the energy developer, was at the table from the beginning of the design process and the findings of the feasibility study were integrated into the community plan.

Local energy infrastructure

New local energy infrastructure is key to achieving the energy goals.

District electricity – i.e., micro-grids, will manage electricity produced within the community. Net metering will sell any excess electricity generated to the grid. Electricity generation is solar PV although combined heat and power may be considered in the future. District heat will be considered as higher density phases of the development come on line. However, the energy efficiency being achieved in lower density developments – e.g., townhouses, means heat loads will be insufficient to support district heat. The first office building has been built to be district energy ready but will be heated with best available technology today; air-sourced heat pumps distributing heat through VRF (Variable Refrigerant Flow). The town-homes will be heated individually with small air-sourced heat pumps.

S2E Technologies, Sifton Properties and London Hydro are investigating a joint partnership to develop a micro-utility to provide energy services to the community.



The risks of being an innovator

Being an innovator in the development sector comes with considerable risks. These risks can be a deterrent for many in the development industry. For Sifton Properties and S2E Technologies, West Five has also been about making a difference and leaving a legacy.

New approaches invariably cause delays and add costs to the development approvals process. This can be the case even with municipal policy in place. There is often a lack of alignment between planning policies, and the practices and standards used by municipal engineers and building services. Several strategies were used to mitigate this risk. Key municipal stakeholders were brought together early in the process to raise awareness of the project and build strategic support for making it work. The City also appointed an internal champion, from the Development and Compliance Services Department, for the project whose role was to “oil the machine” and help break down silos within the municipality. While these strategies helped, approvals for alternative development standards were still challenging and, in some cases, not possible.

London Hydro’s regulatory environment is also making implementation challenging despite strong support by the CEO for the micro-utility. The current regulatory framework presents many barriers to optimizing the use of distributed energy resources.

To accelerate net zero energy community buildings, governments, at all levels, could do more to support innovators, helping to mitigate their risks.

The ability to attract experienced talent - i.e., individuals who have hands-on experience building net zero energy homes and communities, is also emerging as a challenge.

Cost of land

There is a concern that escalating land costs will be a barrier to net zero energy communities already come with extra costs. Sifton Properties has owned the West Five lands for many decades so land costs were relatively low for this project. The municipality has expressed interest in seeing a “West Five” development in the downtown but land prices would be too prohibitive.

Marketability

While there is high market acceptance of detached homes and townhouses in the London market, changing demographics are increasing the demand for a more urban lifestyle. However, there is a concern that the experience of urban living promised in the marketing of West Five will take many years to achieve.

Prices also need to be competitive with the market. The development of a micro-utility enabled the business model but also brought marketing challenges because this approach to supplying energy is new to the Ontario market. The first townhouses are strategically rentals to provide greater control over the homes during the early testing of systems.

There are positive impressions associated with the term “net zero” but it will not be the primary marketing message for the development. Research found that the term “smart” had the potential to engage broader cross-section of the market. People are able to define “smart” in many ways.





Lessons learned and replicability

- Articulating a vision for sustainability early helped; engaging early and often built support in the community and helped to educate stakeholders
- Political and administrative champions are important; assigning an internal municipal champion can also help to address barriers
- Research institutions are playing a key role in advancing sustainable technologies and designing new business models. Government support through programs like MITACS provide an essential pipeline of highly qualified professionals to support innovation in the energy space
- More work is required to align aspirational planning policies with operational practices and standards; greater collaboration between local government and industry innovators is recommended; and governments can help reduce their risks
- Integrated community design is essential to achieving net zero energy goals; energy developers need to be engaged early in the design process
- Starting with rentals allows the builder greater control over energy systems in the early testing phase
- The recruitment of experienced talent by the private sector is a potential challenge.
- Municipal energy resources can help nurture a positive environment for net zero energy building
- Governments wanting to accelerate the development of net zero energy communities and other innovative development approaches will need to support innovators and help mitigate their risks



In partnership with:

