



Community Energy Knowledge - Action Partnership Case Study
**SHERIDAN COLLEGE DISTRICT THERMAL –
 PARTNERING ACROSS BOUNDARIES**

Project Snapshot

Project Name	Sheridan College, Davis Campus
Key development partners	City of Brampton, Province of Ontario, Government of Canada
Definition	N/A – not aiming for net-zero
Status	Funding from senior levels of Government announced in Fall 2016
Sustainability framework	<i>Integrated Energy and Climate Master Plan</i>
Key energy features	District energy expansion
Grants	Funding from Federal Government and Post-Secondary Institutions Strategic Investment Fund

Municipal Snapshot¹

Municipal name	City of Brampton
Municipal Status	Lower-tier
Land area	266.71 km ²
Population (2006 census)	433,806
Population (2011 census)	523,911
Growth rate	20.8%
Population density per km ²	1,395.4
Within Greater Golden Horseshoe	Yes
Updated 2031 Places to Grow Population Target ²	727,000 ²



¹Statistics Canada. (2016, September). Retrieved from www12.statcan.gc.ca/census-recensement/2011/as-sa/fogs-spg/Facts-csd-eng.cfm?LANG=Eng&GK=CSD&GC=3521010

²Region of Peel. (n.d.). Retrieved from <https://www.peelregion.ca/planning/pdc/data/forecasts/population-2006-2031.htm>





DESCRIPTION OF MUNICIPALITY

The City of Brampton is a lower-tier suburban municipality located in the Regional Municipality of Peel. Brampton's population (2016) is estimated at over 600,000, making Brampton the fourth largest city in Ontario and ninth largest in Canada. Brampton is also one of the fastest growing municipalities, having grown by 20.8% between 2006 and 2011.

Brampton has a diversified employment base, including automotive (Chrysler), ICT (Rogers Communications), food and beverage (headquarters of Loblaws and Maple Lodge Farms), as well as transportation and logistics (Canadian Tire corporate distribution centre). Brampton is also home to large public institutions, including Sheridan College's Davis Campus and the Brampton Civic Hospital.

Largely auto-dependent, the City of Brampton has made some strides towards the development and improvement of its public transit system. Between 2010 and 2014 Brampton created and expanded its ZUM transit system which connects the City with employment hubs elsewhere in Peel as well as Vaughan and the City of Toronto. In 2015, the Province of Ontario announced funding for the Hurontario Light Rail Transit project along Hurontario Street from Port Credit in Mississauga to Steeles Avenue in Brampton. Construction on this \$1.6 billion project is expected to start in 2018.

Municipal Policy Framework

In June 2010, Brampton City Council adopted The City's Growth Plan Official Plan Amendment (GPOPA) to conform to the Provincial Growth Plan for the Greater Golden Horseshoe.³ This amendment enhances the City's sustainable planning framework by better defining elements of sustainable communities, and recognizing the preparation and management of strategic documents, such as environmental master plans and sustainable development guidelines, to guide both development and municipal decisions to ensure that the City's land use planning is sustainable.

The Official Plan generally supports the development of mixed-use, transit-oriented, and compact communities and promotes sustainable management practices and green building design standards (with reference to LEED). Official Plan general policies also support a green economic development strategy promoting green businesses and "eco-business zones", such as the one located in the Pearson Airport employment area.⁴

³ City of Brampton. (2015, September). Retrieved from http://www.brampton.ca/EN/Business/planning-development/policies-master-plans/Documents/Sept2015_Consolidated_OP.pdf

⁴ Toronto Pearson. (n.d.). Retrieved from <https://www.torontopearson.com/en/aboutpearson/environment/projectgreen/#>





DESCRIPTION OF PROJECT

Through the “Partnering Across Boundaries: Bringing Global Leadership to Academic-Municipal Collaboration on District Energy” project, Sheridan College is moving forward with a major investment to refurbish the existing district energy system at its Davis Campus in Brampton, and extend the system beyond the campus’s borders. In its initial expansion phase, the project aims to supply heating to the adjacent South Fletcher’s Sportsplex and Community Centre, run by the City of Brampton as well as proposed new privately-owned high-rise residential buildings to be built near the site. Through this investment, the Sheridan Davis campus intends to become an initial “anchor” or “node” for a district energy system in Brampton. Given the proximity of the campus to the terminus of the Brampton LRT at Hurontario and Steeles Ave (1km distance), there are likely to be additional opportunities to connect new development in the area to the system, assuming that governance, policy and financial challenges can be overcome.

South Fletcher’s Sportsplex and Community Centre is a 15,666 m² facility which hosts 4 ice rinks, and an Olympic-sized pool. It also contains multi-purpose rooms for community events, and a branch of the Brampton public library. The facility is more than 20 years old and therefore much of the energy infrastructure is nearing the end of its useful life. In terms of energy use the facility consumed 4,769,900 kwh of electricity and 592,849 m³ of natural gas in 2014. Total annual energy costs at the facility are more than \$1 million per year. The 1300 tonnes of GHG emissions resulting from this energy use rank the facility among the top 10 emitters amongst municipal indoor recreational facilities in Ontario.⁵

By connecting this facility to Sheridan’s campus district energy system, there are opportunities for significant energy use and GHG reductions. The Project is an implementation action that has emerged from Sheridan College’s Integrated Energy and Climate Master Plan (IECMP).⁶ Through the IECMP Sheridan has established energy conservation (50%) and greenhouse gas reduction (60%) goals for 2030 relative to a 2010 baseline. The IECMP also establishes Sheridan’s goal of becoming a role model for other post-secondary institutions in terms of demonstrating the business case for the development and implementation of low carbon energy technologies.

⁵ 2014 energy and GHG data reported to Government of Ontario.

⁶ Sheridan College. (2013, June). Retrieved from https://www.sheridancollege.ca/~-/media/Files/Sheridan%20College/About/Sustainability/sheridan_iecmpfinalreport_public_v2.pdf



Rationale for selecting as a case study

This project provides an example of institutional leadership in the broader public sector on energy and climate issues, and a model for leveraging existing public sector institutional complexes (e.g. universities, colleges, hospitals) located within Ontario municipalities to anchor the development and expansion of a district energy network. These large institutions provide an anchor for district energy investments, guaranteeing sufficient heat and electricity demand over time to justify the upfront investment. Through partnerships with host municipalities, university and college campuses in municipalities across the Greater Golden Horseshoe can serve as nodes for the expansion of district energy into neighbouring areas, including residential, commercial and institutional land uses.

Existing policy/tools at time of planning application

*City of Brampton and Region of Peel Official Plans*⁷

Both Brampton's and the Region of Peel's OP policies provide support for sustainable development practices such as mixed-use compact and transit-oriented development, and specifically support the use of renewable and district energy systems in the City.

Sheridan College's Integrated Energy and Climate Master Plan (IECMP) has established energy conservation by **50%** and greenhouse gas reduction by **60%** goals for 2030.

At the upper-tier level, the Official Plan for the Region of Peel includes objectives addressing energy and climate through land use planning, low carbon energy systems and conservation.⁸ OP policies support energy demand management initiatives by area municipalities, including promotion of opportunities for district energy systems. OP policies encourage area municipalities to incorporate into their OP's policies on energy efficiency, district energy, renewable energy, low carbon vehicles, and building retrofits.⁹

Brampton's OP policies also refer to ambitions of creating a long-term energy plan for the City's downtown.

The Official Plan also includes policies specific to energy and climate, not limited to the following:

- 4.6.15.2.3: The City will endeavour to protect and enhance air quality and contribute to energy conservation through implementing a sustainable planning framework which promotes...green urban and building design standards, and the use of alternative or renewable energy and district energy systems.
- 4.6.15.2.5: Given that the City intends to develop a long term energy plan for the City's Downtown, future proposals in the downtown may be required to submit studies that show how they contribute to the operation of the plan.

⁷ City of Brampton. (2015, September). Retrieved from https://www.brampton.ca/EN/Business/planning-development/policies-master-plans/Documents/Sept2015_Consolidated_OP.pdf

⁸ Region of Peel. (2014, October). Retrieved from https://www.peelregion.ca/planning/officialplan/pdfs/ROP_Consolidation_October_2014.pdf

⁹ Ibid.



*City of Brampton Environmental Master Plan*¹⁰

Brampton's Environmental Master Plan (2014) establishes an objective of increasing the use of low carbon energy resources to support GHG reductions in the City (goal 5). The Plan sets out actions to support achievement of this objective, such as:

- Develop OP policies requiring new development applications to submit an energy plan detailing reduction targets and strategies
- Prepare a feasibility study for district energy in Brampton's Central Area
- Develop a Community Energy Plan that features local action plans focused on high-energy use areas
- Energy management and renewable energy strategy for city-owned facilities

*Region of Peel Climate Change Strategy*¹¹

Peel's Climate Change Strategy sets a long-term GHG reduction target of 80% below 1990 levels by 2050. With respect to low/zero carbon communities, the Strategy includes an action to "prepare a joint feasibility study to determine how to optimize the use of alternative energy sources through community energy planning and through pilots of district energy systems in Peel.

*City of Brampton Sustainable Community Development Guidelines (SCDG)*¹²

Peel's The SCDG's are a framework of performance indicators and targets for new development in the City of Brampton that apply to all Secondary Plan, Block Plan, draft plan of subdivisions and site plans. These guidelines have been incorporated into the City's Development Design Guidelines. New developments are required to meet a minimum threshold for approval by the City.

For Secondary Plans Areas, the guidelines recommend that consideration for energy conservation, renewable energy be included, and that opportunities for integrated energy systems such as district energy be outlined.

At the Block Plan level, the guidelines recommend provision of low carbon community energy systems where feasible, and encourage new commercial industrial and institutional developments to such systems. The guidelines also recommend consideration of energy demand management opportunities, including on-site renewable energy systems and passive solar.

With respect to draft plan of subdivision and site plans, the guidelines again encourage new ICI developments to connect to district energy facilities, and recommend consideration of constructing all new low and medium density residential development to be "solar ready". The guidelines furthermore recommend, where feasible, that community energy systems be integrated into new subdivisions and site plans, and that consideration be given to the purchase of renewable energy for local utilities.

Sheridan College Integrated Energy and Climate Master Plan (IECMP)

Sheridan College's IECMP sets ambitious energy and GHG reduction targets for the institution. The Plan sees reinvestment in the College's existing district energy systems at the Brampton and Oakville campuses as a major element of the Plan. The reinvestment provides an opportunity for the college to work with its local municipal partners to extend these existing systems outside of the campus borders and thereby support broader energy conservation and GHG reduction efforts at the community-wide scale.

¹⁰ City of Brampton. (2014, May). Retrieved from http://www.brampton.ca/EN/Business/planning-development/projects-studies/Documents/Environmental%20Master%20Plan/Final%20Documents/Brampton%20IAP_11_10_2014.pdf

¹¹ Peel Region. (2011, June). Retrieved from <https://www.peelregion.ca/planning/climatechange/reports/pdf/climate-chan-strat-rep.pdf>

¹² City of Brampton. (2013, September). Retrieved from <https://www.brampton.ca/EN/Business/planning-development/guidelines-manuals/Documents/SCDG.pdf>

Sheridan is constructing a fully-integrated, college-wide network using global best practice. Their goal is to demonstrate that off-the-shelf design and expertise, found in leading jurisdictions, can be used to build an effective district energy system in Canada. They have found technical implementation is not the key barrier, but rather development of an effective business case founded on realistic pricing. Sheridan is developing a living training laboratory to address common barriers to district energy, such as conflicting information from various consultants and “custom built” projects that result in substantially higher project costs in Canada and by being a role model for how district energy can be done successfully in Canada. Sheridan worked with the City of Guelph and other municipal partners to develop a Strategic Implementation Network (SIN), comprising leading global practitioners, to assist its team with the design, development, construction and implementation of the network.¹³

Policy amendments precipitated by the planning application

None as of yet. This project is proceeding in advance of municipal planning policy for district energy in the area – e.g., a district energy feasibility study.

Emerging policy/tools precipitated by the development

None as of yet but anticipated should the municipal project proceed.

Enabling Federal and/or Provincial interventions

This \$21.4m project is supported financially by the Federal Government through its Post-Secondary Institutions Strategic Investment Fund (\$9.9m), the Provincial Government (\$2.2m), with the remainder coming from Sheridan College itself.¹⁴



Plan of the Phase 2 extended Brampton district energy network.

¹³ Partnering Across Boundaries: Bringing Global Leadership to Academic-Municipal Collaboration on District Energy. (2016).

¹⁴ Sheridan. (2016, October). Retrieved from <https://www.sheridancollege.ca/news-and-events/news/canada-and-ontario-invest-millions-in-district-energy-project-at-sheridan.aspx>



STAKEHOLDER PERSPECTIVES

Developer perspectives

Alignment: municipal and institutional strategic mandates

Sheridan College, as a public academic institution, has a strategic mandate to support economic and social development by collaborating with municipalities, communities and industries on applied research and educational programming.¹⁵ Sheridan's collaborations with municipalities across its three campuses in Brampton, Oakville, and Mississauga, are seen as an institutional strength that contributes to the revitalization of local industries and communities while supporting experiential learning opportunities for learners through its partnerships.

This strategic mandate allows the college to make investments in new technologies and infrastructure that support advanced learning outcomes for students. Unlike a private developer, which often looks for short-term payback (3-5 years) on capital investment and is reluctant to apply new technologies, academic institutions like Sheridan are in a position to accept longer-term paybacks (10-15 years) on investments in innovative technologies that align with their strategic mandate. Sheridan's District Energy Centre will be located in the Skilled Trades Centre (STC) on the Davis campus, and surrounded by glass, providing an opportunity for skilled trades students to see first-hand how a low carbon energy network functions.

This alignment with the College's strategic mandate is further reinforced by a strong economic and environmental rationale associated with the project. The Davis Campus's existing district energy system is relatively inefficient with the primary and secondary systems competing and the infrastructure and connections in need of upgrading. Investment in a modern district energy system will result in significant long-term cost savings and GHG emissions reductions for the college, helping achieve targets set out in its Integrated Energy and Climate Master Plan (IECMP). Sheridan's Integrated Energy and Climate Master Plan framework and the additional components of the district energy project present a major contribution to creating a pathway to a net zero emissions campus.

This project also aligns with the City of Brampton's strategic mandate to drive energy conservation at municipally owned facilities like South Fletcher's Sportsplex, as outlined in the City's strategic plan and Environmental Master Plan, and Brampton's Conservation and Demand Management (CDM) plan,¹⁶ developed to comply with provincial legislation.¹⁷

Alignment: capital planning timelines

In addition to the alignment in strategic mandates, this project also presents fortuitous alignment in capital planning timelines between institutional, municipal, and private sector stakeholders in the area surrounding Sheridan's Davis campus. Sheridan College's IECMP had identified refurbishment of the district energy system at Davis campus as a strategic opportunity, and capital planning to move the project forward had begun in early 2016. At the same time, City

¹⁵ Sheridan College Strategic Mandate Agreement. (2014). Retrieved from <http://www.tcu.gov.on.ca/pepg/publications/vision/SheridanAgreement.pdf>

¹⁶ City of Brampton. (2014, July). Retrieved from <https://www.brampton.ca/EN/City-Hall/OpenGov/Open-Information/Energy-Consumption-Reports/Brampton%20CDM%20Plan%202014-2019.pdf>

¹⁷ Government of Ontario. (2011, August). Retrieved from <https://www.ontario.ca/laws/regulation/r11397>



staff was beginning to explore capital upgrades at the South Fletcher Sportsplex to renew aging energy infrastructure at the facility and drive energy conservation, and private sector developers were proposing new high-rise residential buildings to the west of the campus. Whereas the typical business-as-usual approach at the facility and the new buildings would be to house mechanical equipment in each individual building, the aligned timing with Sheridan college's planning process means that both will be designed to be "district energy ready",¹⁸ which opens the opportunity for catalytic and collaborative investment to drive low carbon energy innovation that supports the shift to net-zero communities in Ontario.

Both the Region and the City have Official Plan policies that broadly support **low carbon** supply and energy conservation.

Low carbon leadership- top-down and bottom-up

At the municipal-level there is high-level awareness that low carbon thinking is needed in future planning. The Region of Peel has established GHG reduction targets for 2020 and 2050, and both the Region and the City have Official Plan policies that broadly support low carbon supply and energy conservation. Brampton's Environmental Master Plan serves as the City's GHG mitigation action plan, and the City has invested in numerous actions that will result in GHG emissions reductions at both the municipal corporate-level, and the community-wide scale.

In addition to this top-down leadership from municipal governments, this project provides an example of bottom-up leadership from a major institutional stakeholder in the City and Region. As an institutional actor with significant capital investment, and consolidated decision-making authority, Sheridan College is positioned to take on a leadership role on low carbon energy action in Brampton and Peel. By proving the business case for district energy technology, and spearheading inter-sectoral collaboration to develop a viable governance model, Sheridan is acting as a catalyst for climate action at the municipal scale and serves as a model for other post-secondary institutions in Ontario to follow.

Technology isn't the barrier – governance, ownership and finance is

District energy is a global best practice that has been employed for decades in progressive European cities. District energy serves more than 10% of total heat demand in continental Europe, a number that rises to 50% in some Northern European nations. European cities in a northern climate (such as Copenhagen, Helsinki, and a large part of the Ruhr Valley) are moving toward carbon-neutrality from buildings by expanding their district heating networks and using lower carbon fuels. While the technology is proven, the biggest barriers to deployment in the Ontario context are related to questions of financing, ownership and governance.¹⁹

This project provides an opportunity to explore the governance and financing issues associated with district energy. Sheridan College can move forward with the project in partnership with the municipality, providing a living lab to demonstrate potential governance and financial models for municipalized district energy networks.

Municipal Support

Sheridan College engaged early in the planning process with senior administrators and elected officials at the City of Brampton to make them aware of their capital plans, and seek support for the idea of expanding system beyond campus boundaries. Given that the City of Brampton has high-level policy supporting district energy, the College found receptive ears

¹⁸ Key technology requirements often include hydronic heating (i.e. a central heating system that utilizes hot water) within the building, adequate space, and piping a right-of-way external to the building to connect to the district energy system.

¹⁹ Environmental Commissioner of Ontario (2013). *Municipal District Energy Systems: Charting a Path to Greener Heating and Cooling*. <https://media.assets.eco.on.ca/archive/2015/03/2012-Energy.1.pdf>

at both the political and administrative level. This support has been instrumental in moving the conversation forward with the adjacent facility, as well as with the neighbouring private sector developer.

Municipal perspective

Strategic Leadership

Strategic leadership by the College was identified as an important success factor for this project. Sheridan College staff took on a comprehensive stakeholder engagement effort to seek alignment in planning and investment timelines. This proactive engagement was credited in deferring planned capital upgrades at the Sportsplex that would have precluded collaboration with the college and diverting that capital to enable interconnection with the district energy system.

Planning objectives

There is high-level support for district energy in the municipal planning policy framework, however no plan or budget to support the roll-out in the City. While The Secondary Plan for the area has no policy to require district energy connection, site plan application review could require a DE feasibility study be completed.

Regulations and approvals

Council approval is required for this expansion project to move forward. Thus far Council has permitted City staff to undertake due diligence and has provided a letter of support to continue discussions on feasibility and financial impacts.²⁰ Once complete, Council will evaluate the feasibility study being jointly prepared by the college and the City, and if it supported the project, would direct staff to set aside budget and undertake site plan application and submit a building permit application. It is anticipated that a capital funding submission to Council will occur in 2017.

Municipal energy resources

The creation of an Energy Manager position within the City has created opportunities for intra-municipal coordination between departments (planning, engineering, building) that didn't exist previously. This is seen as a major catalyst for moving the district energy conversation forward within the City. It also meant that the municipality had the internal resources to engage effectively with Sheridan College.

In addition the City has created an Environment section that is charged with implementing the City's Environmental Master Plan throughout the corporation and with external partners including the Region of Peel, Conservation Authorities, neighbouring local municipalities, businesses, non-profits and utilities.

²⁰ City of Brampton. (2016, May). Retrieved from https://www.brampton.ca/EN/City-Hall/meetings-agendas/Community%20%20Public%20Services%20Committee/20160518cpssc_Agenda.pdf





Lessons learned and replicability

- Academic institutions can be an important champion for low carbon investment at the municipal scale. They have a strategic mandate for innovation and sustainability, tend to have a geographically concentrated presence, and are able to leverage provincial and federal funding for investment in campus capital upgrades with a view to long-term benefits.
- Given that existing district energy systems on academic campuses are typically outdated and in need of refurbishment, there is an opportunity to explore on a province-wide basis the feasibility of leveraging refurbishment to expanded systems to adjacent facilities or communities with sufficient heat demand load.
- Employing global best practice, technologies and practitioners can advance the development of district energy in Canada.
- Top-down municipal climate policy needs to be complemented by bottom-up commitments by major institutional and private sector stakeholders within communities to direct capital investment towards achieving low carbon objectives.
- Inter-sectoral engagement can uncover opportunities to align capital planning timelines to support mutual objectives for low carbon supply and energy conservation.
- The lack of a clear provincial policy framework supporting municipal district energy is constraining investment. Questions surrounding capital cost recovery models in the absence of an ability for municipalities to require interconnection to district energy in approving of plans of subdivision, site plans and development permits.
- The presence of a dedicated municipal energy manager position in the City has helped to create the space for conversations necessary for inter-sectoral collaboration to succeed.



In partnership with:

