



**STAFF REPORT
ACTION REQUIRED**

**Development of Low-carbon Thermal Energy Networks
(District Energy)**

Date:	October 12, 2016
To:	Executive Committee
From:	Chief Corporate Officer
Wards:	All
Reference Number:	P:\2016\Internal Services\E&E\Ec16008e&e (AFS #23625)

SUMMARY

The purpose of this report is to inform the Executive Committee that:

- The Province has introduced cap-and-trade legislation that will both put a price on carbon emissions, and generate revenues for redistribution for investment in projects that reduce carbon emissions. The City needs to act quickly to ensure equitable access to these provincial funds.
- Transformational, large-scale, low-carbon thermal energy networks will be fundamental to enabling the City to achieve its Council-approved, long-term energy and climate goals. These initiatives will be eligible for provincial funding.
- The City intends to seek the advice of the marketplace to identify how to maximize the value of the opportunity to the City and to describe the structure of any business arrangements that may emerge from this evaluation.
- The City has been approached by several district energy developers who are interested in the large-scale development of renewable district energy systems. These organizations are well financed and have a demonstrated capability to deliver large scale energy projects.
- There are potential sources of revenue for the City.
- The next step will be to choose a partner(s) with whom to evaluate the opportunity and create a plan on which both parties can move forward.

RECOMMENDATIONS

The Chief Corporate Officer recommends that:

1. The Executive Committee direct the Chief Corporate Officer to:
 - a. Identify appropriate market partner(s) using the three stage approach (Request for Pre-Qualification; Request for Proposals; Negotiate with Top Two Bidders) outlined in the Partnership/Procurement Strategy section of this report; and
 - b. Report to the Executive Committee with recommended market partner(s) on or before its meeting of June 19, 2017.

Financial Impact

There is no financial impact resulting from the approval of this information report.

The City intends to investigate options for the development of low-carbon energy networks which may result in the City taking a financial position in the development of options identified in the studies. As such, the City intends to seek the advice and services of a company(s), or individual(s), having experience all aspects in the development of renewable, low-carbon energy systems.

There may be financial implications associated with pursuing options identified in the investigation stage. If so, staff will present council with appropriate supporting analyses and recommendations at that time.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information

DECISION HISTORY

At its meeting of November 30, December 1, 2, 4 and 7, 2009, City Council unanimously adopted Toronto's Sustainable Energy Strategy including recommendations for the development of district/distributed energy system in existing and new neighbourhoods to reduce greenhouse gas emissions and enhance energy security of supply.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.EX36.9>

At its meeting of July 11, 12 and 13, 2012 City Council approved a capital expenditure in the amount of \$4.5 Million from recoverable debt to create a new district energy system by connect existing energy generation assets at Exhibition Place to supply heating, cooling and water heating to hotel development on the grounds, as well as to existing event facilities including the Ricoh Coliseum, Coliseum Complex, Direct Energy Centre, Allstream Centre. Exhibition Place was also authorized by Council to enter into an energy services agreement with Hotel X to recover the capital investment and realize net new revenue for Exhibition Place.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.GM15.11>

At its meeting on May 5, 2015 City Council adopted the TransformTO Terms of Reference and re-affirmed its commitment to the previously adopted climate change mitigation targets.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PE3.6>

At its meeting on May 5, 2015 City Council reaffirmed the City's membership and commitment to the C40 network including climate change mitigation targets.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.EX5.15>

ISSUE BACKGROUND

In 2009, City Council unanimously adopted Toronto's Sustainable Energy Strategy including recommendations for the development of district/distributed energy systems in existing and new neighbourhoods to reduce greenhouse gas emissions and enhance energy security of supply.

In 2011, the Environment and Energy Division (EED) assessed the potential for new district energy development in Toronto: 27 locations were identified and mapped based on existing density and growth potential primarily in the growth centres and along the avenues - similar to transit networks, thermal energy networks favour density.

Since 2012, EED has been working with City divisions, agencies, and corporations on developing low-carbon thermal energy networks at priority locations, including: Exhibition Place and Six Points Intersection (Westwood Theatre Lands, a Build Toronto project).

In 2015, the City formally renewed the goal of reducing the City's greenhouse gas contribution by 80% of the 1990 levels by the year 2050 and created the TransformTO initiative to develop and implement the strategies necessary to accomplish it. By definition, we will need to identify initiatives that are transformational in nature – we will not meet our approved target by implementing incremental approaches to improved energy use. Low-Carbon Energy Networks are truly transformational in nature and have the capability to significantly reduce our collective energy and environmental footprint.

In 2016, the Province of Ontario announced its intention to implement a Cap-and-Trade mechanism to reduce the carbon footprint of the Province. The new rules and the incentive dollars they will create will change the energy economics in the province. The City must move forward with a strategy to develop low-carbon thermal energy networks now as the province formulates the rules regarding the dissemination of funds create by the cap-and-trade rules. Failure to do so will eliminate these locations as potential energy and environmental showcases, significantly impact the ability of the City to meet its long-term carbon reduction targets and will surely result in the City falling short of the long term targets approved by Council.

At this time, the City needs to identify an appropriate partner(s) having relevant district energy, renewable energy and Ontario energy market experience to assist in the advancement of this opportunity.

The City has had a previous, profitable experience with an investment in district energy. The time is now right to evaluate similar opportunities across the city.

COMMENTS

In 2000, Enwave was created as a partnership between the City of Toronto and OMERS to develop a low-carbon thermal energy network, the now world renowned Deep Lake Water Cooling system. The system extracts renewable energy from cold drinking water at Toronto Water's John Street pumping station. A thermal energy network of underground pipes supplies cooling to sixty of the most iconic buildings in Toronto, including City Hall, Police Headquarters, Provincial Legislature, Toronto Dominion Centre, and the Air Canada Centre.

In 2012, the City of Toronto and OMERS sold Enwave to Brookfield Asset Management (Brookfield) for \$488 Million. The City realized \$100 Million dollars in profit.

Partnership(s) to develop low-carbon thermal energy networks provide the necessary scale and long-range planning with the potential to attract billions of dollars in capital investments from pension and infrastructure investment funds.

There are revenue generation opportunities for the City from co-locating renewable/low-carbon energy sources with municipal infrastructure/assets for thermal energy networks (i.e. sewer heat recovery, ground-source heat pumps, solar thermal collectors, biogas/heat recovery from solid waste and wastewater treatment operations, wood-chips utilization from urban forestry operations).

As emission reduction projects, low-carbon thermal energy networks may qualify for incentives from Ontario's cap and trade revenues. The Province is in the process of establishing mechanisms and allocations to incent emission reducing projects. It is to the benefit of the City to engage with the province before the program is set-in-stone.

Technologies for local low-carbon/renewable energy supply for thermal energy networks may include:

- sewer heat recovery,
- ground-source heat pumps,
- solar thermal collectors,
- waste heat recovery,
- urban biogas utilization, and
- urban biomass utilization.

Transformational large-scale development of low-carbon thermal energy networks are a fundamental strategy to meet climate change targets adopted by City Council, attracting significant investments to the benefit of the local economy, generating revenue, ensuring energy does not become a limiting factor for growth, and improving energy resilience.

PARTNERSHIP/PROCUREMENT STRATEGY

Ontario's' new cap and trade legislation and anticipated revenues are changing the energy economics in the province in favour of low-carbon/renewable solutions including thermal energy networks to displace fossil fuel use, and reduce emissions from the built-environment.

The use of low-carbon/renewable thermal energy networks is a transformational strategy that the City can deploy to help attain its climate change targets.

The City will seek partners to evaluate, develop, and operate new low-carbon thermal energy networks in locations across the City. These partners will bring the following capabilities:

- Demonstrated ability to evaluate, design, build, and operate new low-carbon thermal energy networks.
- Knowledge and experience with the application of renewable energy technologies as energy sources to low-carbon thermal energy networks.
- Demonstrated capability to finance new energy systems of the magnitude contemplated in this report.
- Understanding of all business risks presented by investment in low-carbon thermal energy networks and a demonstrated ability to develop and implement appropriate risk mitigation strategies.
- Demonstrated knowledge of the Ontario energy marketplace, including the new cap and trade legislation and regulations and the potential long and short term impact on energy investments.
- Existing relationships within the vendor community servicing the district and renewable energy sectors in Ontario.
- Extensive experience and contacts within the commercial property management and development industry.
- An established base of clients that represent potential future users of the low-carbon energy systems.

The proposed partnership identification process will consist of three stages.

Stage 1:

The City has identified 27 energy nodes having district energy potential. The City will make this data available to prospective bidders and invite them to submit a Request for Prequalification (RFPQ) document. The RFPQ response document would provide data to the City describing the technical and financial capability of the proponent, their experience in developing and operating district energy systems and their experience in working with a Municipal partner in the development of a large, and complex, capital project. The City would review the submissions to ensure the proponents meet a set of pre-established criteria. Only those who are selected to proceed would be eligible to proceed to Stage 2.

Stage 2:

Prequalified participants would be invited to submit proposals to provide a range of services as defined in Request for Proposal (RFP) documentation. The preparation of the RFP documents will be critical to ensure that the City obtains the set of services, and their associated outcomes, that are expected, and would include: the nature of the partnership with the City, carbon footprint, timing of each development, etc. Bidders can elect to bid on opportunities based on single or multiple nodes. Each proposal will be scored against a set of pre-established, and weighted, scoring criteria. The top two bidders will be invited to move on to Stage 3.

Stage 3:

The top two bidders will be invited to negotiate an agreement with the City for the creation of partnerships to develop a district energy opportunity within the context of the nodes identified in stage 2.

CONCLUSIONS

- Ontario's cap-and-trade will both put a price on carbon emissions, and generate revenues for redistribution for investment in projects that reduce carbon emissions.
- The City needs to act quickly to ensure equitable access to these provincial funds to meet its emission targets of 30% reduction by 2020 and 80% reduction by 2050.
- Low-carbon thermal energy networks are transformational and fundamental to enabling the City to achieve its Council-approved, long-term energy and climate goals.
- The City has been approached by several thermal energy networks developers (district energy) who are interested in the large-scale development of renewable district energy systems. These organizations are well financed and have a demonstrated capability to deliver large scale energy projects.

- The City intends to identify how to maximize the value of the opportunity to the City and to describe the structure of any business arrangements that may emerge from this evaluation.
- There are potential sources of revenue in district energy projects for the City.
- The next step will be to choose a partner(s) with whom to evaluate the opportunity and create a plan on which both parties can move forward.

CONTACT

Jim Baxter, P. Eng., MBA
Director
Environment & Energy Division
Tel: 416-338-1295
Email: jbxater2@toronto.ca

Fernando Carou, B.A.Sc., P.Eng.
A/Manager, Energy Efficiency Office
Environment & Energy Division
Tel: 416-338-5479
Email: fcarou@toronto.ca

SIGNATURE

Josie Scioli, Chief Corporate Officer

ATTACHMENTS

Attachment 1 – Pre-identified locations for new Thermal Energy Networks (District Energy in Toronto)

Attachment 2 – What is Cap and Trade?