TORONTO

REPORT FOR ACTION

Wastewater Energy Transfer Program

Date: November 17, 2021
To: Infrastructure and Environment Committee
From: Director, Environment & Energy
Wards: All

SUMMARY

This report proposes the launch in Q1 2022 of the first stage of a new, city-wide evaluation framework for initial connection requests for potential Wastewater Energy Transfer (WET) projects, as was requested by Council in 2019.

WET projects involve a connection to City wastewater (sewer) infrastructure for the non-contact exchange of renewable thermal energy to displace fossil fuel use in buildings, which is Toronto's largest source of greenhouse gas (GHG) emissions. Enabling WET projects is therefore a key part of implementing the TransformTO Net Zero Strategy.

Toronto's sanitary trunk sewer network is estimated to have the capacity to potentially support well over twenty WET projects. Once in operation, these projects would **reduce approximately 200,000 tonnes of GHG emissions annually while unlocking value for the City through the sale of thermal energy.**

An evaluation framework is necessary for timely processing of connection requests and to ensure projects do not negatively affect operation/integrity of Toronto Water infrastructure.

Stage 1 - Launch Q1 2022 for project intake to gauge interest, size/types of projects, and specific locations/timelines.

- Renewable energy developers/building owners visit a City webpage to undertake self-serve project screening and submit a preliminary application.
- EED staff review the application for completeness so that Toronto Water staff can provide the applicant with information needed for preliminary design/business case.

Prior to launching Stage 2 in Q2/Q3 2022, which would enable full applications to the program, staff will establish an efficient back-office process for post-screening detailed application review with other key Divisions, including: Toronto Water, Transportation Services, Engineering & Construction Services, Corporate Real Estate Management, and Legal Services.

RECOMMENDATIONS

The Director, Environment & Energy recommends that:

1. City Council endorse facilitating the use of the City's wastewater infrastructure, right-of-way, and property where feasible to facilitate renewable thermal energy projects aimed at significantly reducing greenhouse gases emissions and moving the City closer to achieving its net zero emissions goal.

2. City Council direct the Deputy City Manager, Corporate Services, and the Deputy City Manager, Infrastructure & Development Services, to establish a working group consisting of the Division Heads or their designates from the Environment & Energy, Toronto Water, Corporate Real Estate Management, Transportation Services, Engineering & Construction Services, Legal Services, Financial Planning and any other necessary Divisions, to develop an implementation plan for Recommendation No. 1 that includes, without limitation, post-screening application review process and procedures, design and technical standards, template agreements, real estate valuations, and project revenue allocations.

3. City Council direct the Director, Environment & Energy, to report to the Infrastructure and Environment Committee in Q2 2022 with details about the implementation plan for the WET Program and with recommendations for authority needed to launch the full program.

FINANCIAL IMPACT

There will be no financial cost to the City of Toronto from WET projects. Costs related to the design, construction, operation and maintenance of WET projects will be the responsibility of project proponents.

WET projects, once in operation, will generate revenue for the City from the sale of thermal energy to renewable thermal energy project developers. The Q2 2022 staff report will address how program revenues are collected and disbursed to support ongoing program operations and expansion.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

On July 16, 17, 18 and 19, 2019, City Council requested the General Manager, Toronto Water, in consultation with the Director, Environment & Energy and the City Solicitor, to report back with recommendations for advancing WET pilot projects and "that information from these pilot projects be used to develop recommendations for a

wastewater energy transfer policy, and that staff report back to City Council through the Infrastructure and Environment Committee in the third quarter of 2020".
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.MM9.13

On September 30, October 1 and 2, 2020, City Council directed the Deputy City Manager, Corporate Services or designate, in consultation with the General Manager, Toronto Water, to include in TransformTO reporting an update on the pilot projects and wastewater initiatives to reduce emissions, "and to use such reported information to develop a wastewater energy transfer policy as requested by City Council."
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.MM24.20

COMMENTS

Background

Wastewater energy transfer (WET) refers to a thermal energy exchange between a thermal load and the municipal wastewater system, where the load (e.g. a building or a district energy system) can take heat from, and/or reject heat (cooling) to the municipal wastewater system. This exchange can occur in-building, with the trunk sewer network, and at wastewater treatment plants.

In Canada, several WET projects are either operating, under construction, or planned, including: Vancouver's False Creek Neighbourhood Energy Utility; Halifax's Cogswell Redevelopment Area; and Mississauga's Lakeview Village. Notable WET programs are operating in Metro Vancouver Regional District and in King County, Washington.

Toronto's first WET project - Largest in the world

Toronto's first WET project by Noventa Energy Partners is in pre-construction design at Toronto Western Hospital (TWH). By recovering heat from the City's trunk sewer network this 17 MW (thermal) project will reduce the TWHs natural gas use by 90%, avoiding 10,000 tonnes of CO_2 annually. By also rejecting heat to the trunk sewer, this project reduces peak electricity demand by approximately 5 MW, which takes pressure off the Toronto Hydro distribution system and creates capacity to support electrification.

In order to understand city-wide potential for WET projects, staff are working with a consulting team comprised of Reshape Strategies, Kerr Wood Leidal, and Smith + Andersen to develop an evaluation framework that will help answer two key questions:

- What is the location and quantity of thermal energy available, taking into account Toronto Water's required operating conditions?
- What is the project review process and what are the program rules necessary to enable WET project city-wide?

WET Program Stage 1: Present city-wide opportunity and initiate project intake

The first stage of this initiative involves launching a City of Toronto website that will provide information about the city-wide WET opportunity, and allow interested parties to

submit an inquiry for required data to build their business cases in advance of submitting a full application. This preliminary stage will disclaim any City responsibility to develop and implement a full program by any particular date.

Modelling using Toronto Water flow and temperature data indicates that the City's trunk sewer network has the potential to support a heat demand of approximately 300 MW (Table 1). This would be equivalent to nearly 20 projects of a size similar to the Noventa-TWH project without affecting influent temperatures at wastewater treatment plants. However, not all subsections of the network can support projects this size, and not all projects would demand such heat, so it is likely there will be many more projects ranging in size from 300 kW to 20 MW.

Table 1. Summary of Available Heat (Winter Dry Weather Flow Scenario)

Network sub-section	Max Flow (L/s)	WWTP Temp (ºC)	Max Heat (MW)
Etobicoke	376	18.1	9.6
Humber	3,548	18.1	90.5
Don-Coxwell	1,969	19.6	62.7
Don-North Toronto	688	18.9	19.8
Interceptors	5,728	17.4	131
Highland	2,005	16.7	40.6
Total	12,344	17.9	291

In total, the trunk sewer network could eventually support WET projects that would avoid approximately 200,000 tonnes of CO2 annually. For context, this would represent over 2% of emissions from buildings city-wide (2018). Refer to Attachment 1 for a map of the sanitary trunk sewers network and estimated heat recovery potential.

Environment & Energy and Technology Services will publish a webpage that will enable project proponents to undertake self-screening for project viability, and then submit requests for confidential information required to undertake preliminary due diligence. This will provide an early indication of the project pipeline, which will help to further inform Stage 2.

WET Program Stage 2: Post-screening detailed application review process

An interdivisional working group consisting of Environment & Energy, Toronto Water, Corporate Real Estate Management, Transportation Services, Engineering & Construction Services, Legal Services, and other Divisions as necessary, will address several important issues, including:

- Application circulation, review and commenting, including fees;
- Engineering design standards for sewer interconnection;

- Delegated authorities required for project approvals;
- Template agreements;
- Permit requirements
- Real estate valuation; and
- Allocation of project revenues.

This work will be informed by inputs from the consulting team (e.g. sample project business cases), and lessons learned from the Noventa-TWH project review process.

Next steps

Enabling WET projects city-wide would unlock a large source of renewable thermal energy to significantly displace fossil fuel use in buildings and reduce GHG emissions. This proposed WET program is thus a key action to support implementation of the TransformTO Net Zero Strategy.

Following completion of Stage 1, City staff will report back to Council with details about the WET Program and request the necessary delegated authority to launch circulation and detailed review to enable projects.

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SIGNATURE

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ATTACHMENTS

Attachment 1 - Map of Sanitary Trunk Sewers and Heat Recovery Potential