

Wastewater may be a valuable energy source

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The energy stored in Toronto's municipal wastewater could be harnessed to run water treatment facilities and contribute power to the city grid, says new University of Toronto research. The study, published in the August issue of the *Journal of Energy Engineering*, is the first to measure the energy content of the raw municipal wastewater in the Ashbridges Bay, North Toronto, Highland Creek and Humber plants. The research revealed that the wastewater contained enough organic material to potentially produce 113 megawatts of electricity or close to 990 million kilowatt hours a year.

"With a 20 per cent recovery of that potential energy into electricity, the wastewater treatment plants could produce enough electricity for their own operation," says civil engineering professor David Bagley, who conducted the research with lead author and PhD candidate Ioannis Shizas. "Any recovery of potential energy above that can be returned to the grid."

Bagley and Shizas used bomb calorimetry, a technique that measures the heat content of materials, to determine the amount of energy stored in wastewater's organic matter. The city plants currently use aerobic treatment, a process by which microbes decompose organic matter in the presence of oxygen. By using anaerobic digestion instead, in which microbes decompose matter without oxygen, the process' byproduct of biogas - methane-rich gas with an energy content approximately 75 per cent that of natural gas - could become a valuable energy source in the future.

"We're moving towards a future where we see our wastewaters and other wastes as resources," says Bagley. "If electricity costs go up, like they have in places like California, this could be a cost-effective and renewable energy source."

Source: University of Toronto

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