

District Energy in Toronto

Climate & Clean Air Coalition

Sustainable Technologies for Air-Conditioning Workshop

November 18th, 2017

Contents

- Why District Energy
- Enwave in North America
- Deep Lake Water Cooling
- Refrigerant Use Summary
- Future Growth

Why District Energy Matters?

District Energy is a **centuries-old proven solution,** utilized worldwide, representing a diversity of technologies to produce cooling, heating and power.

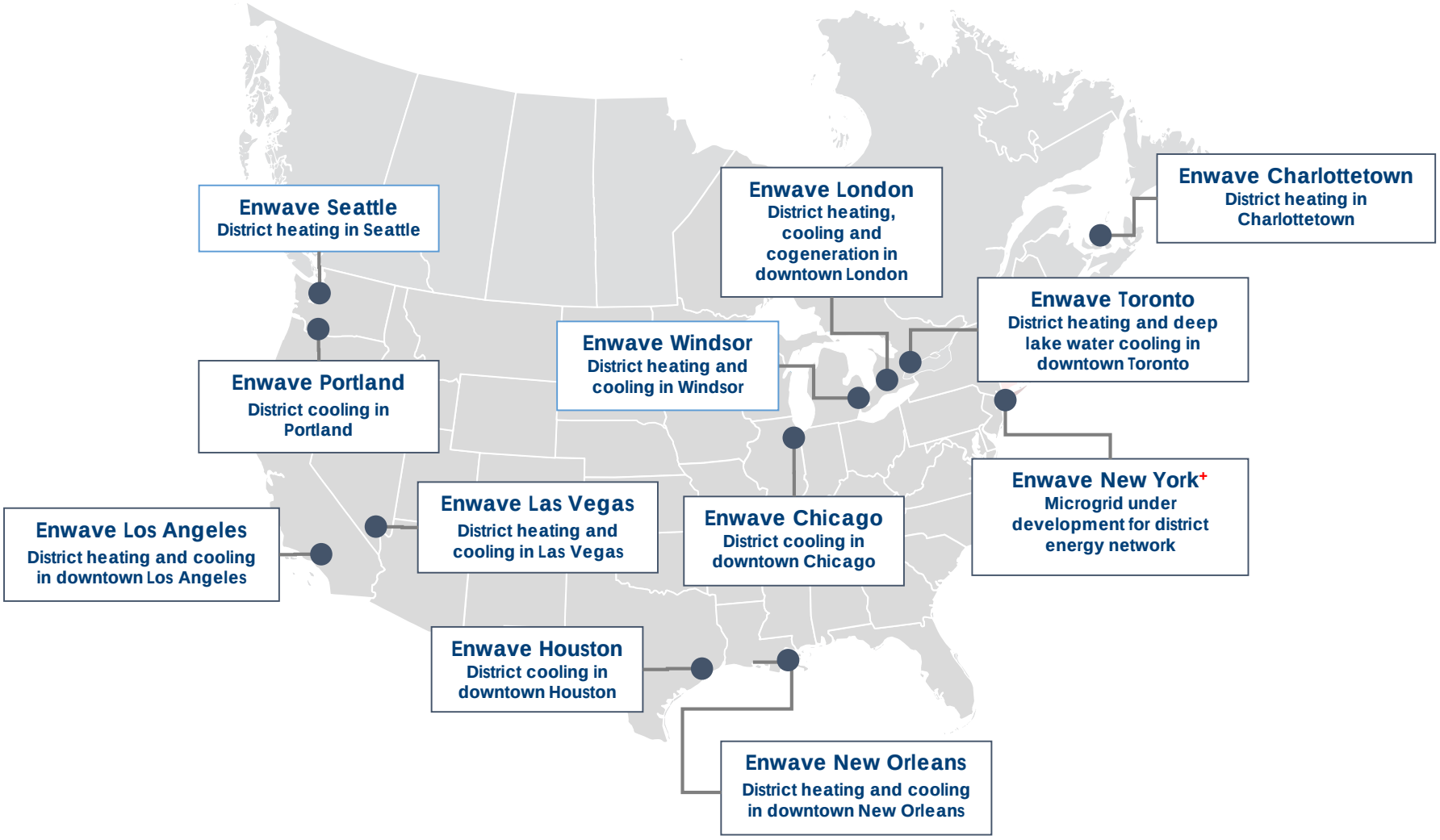
2013, United Nations Environment Programme report:

District energy is allowing cities to deliver cleaner and affordable heat and cool while dramatically reducing greenhouse gas emissions. District energy is a local solution that shifts control to municipalities who are best placed to handle local heating and cooling needs.

Larger cities have a huge appetite for energy, **consuming ⅔ of the world's energy and creating over 70% of global CO_2 emissions.**

The future lies in urban innovation and action. As the majority of humans will live in cities, it just makes sense that our solutions to climate change reside there too.

Enwave Across North America



+ New York is under development. We can give no assurance this project will be completed as planned.

How Deep Lake Water Cooling Works...

1. Pipes draw 4º C from the deepest part of Lake Ontario. This was is then treated to serve the cities drinking water supply

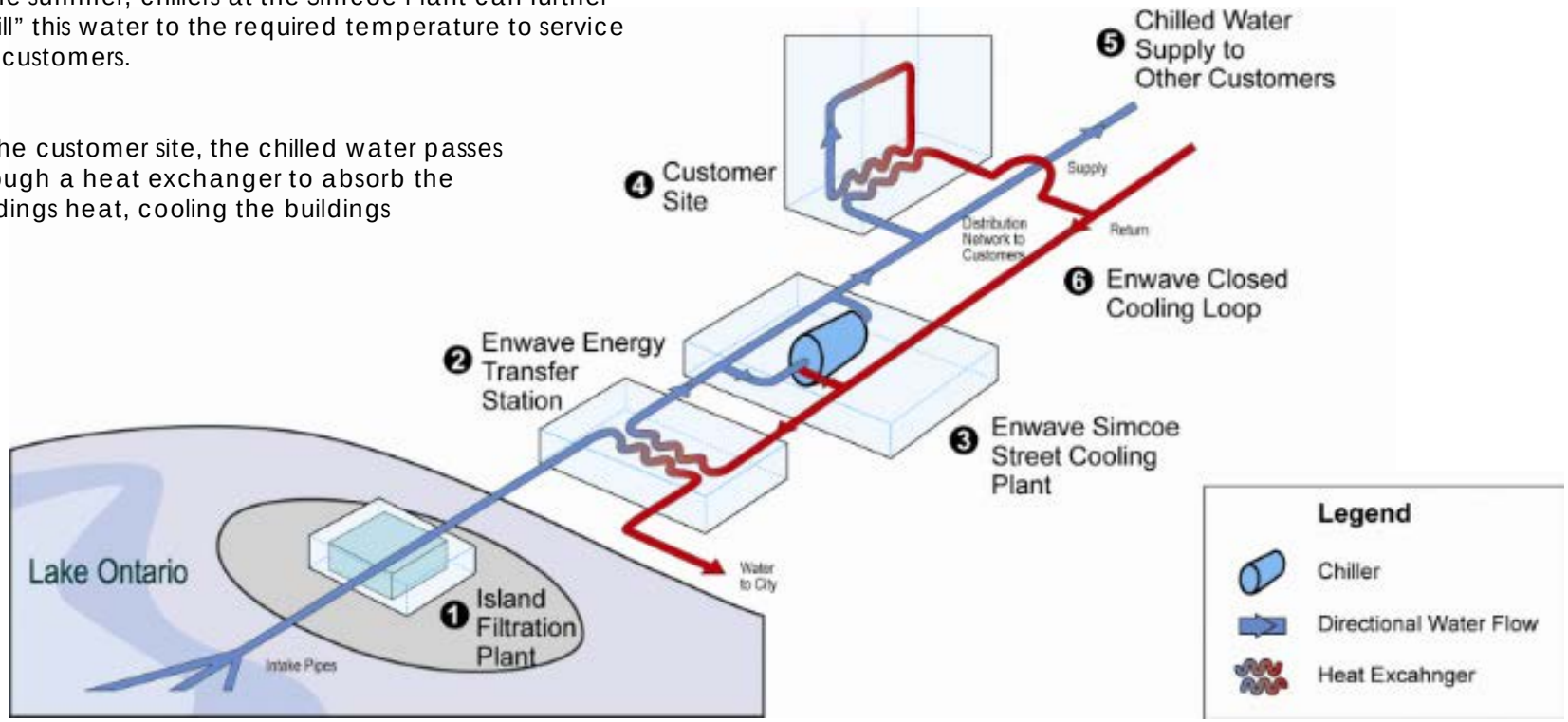
2. At the city's pumping station, Enwave transfers heat from the buildings into the departing drinking water supply. This is done through 18 pairs of heat exchangers

3. In the summer, chillers at the Simcoe Plant can further "chill" this water to the required temperature to service the customers.

4. At the customer site, the chilled water passes Through a heat exchanger to absorb the Buildings heat, cooling the buildings

5. Enwave's chilled water loop circulates to Toronto buildings, supplying chilled water and bring their heat back to the pumping station

6. The warmed water returns to Enwave's facility where its heat is transferred over to the drinking water, and the cycle is repeated



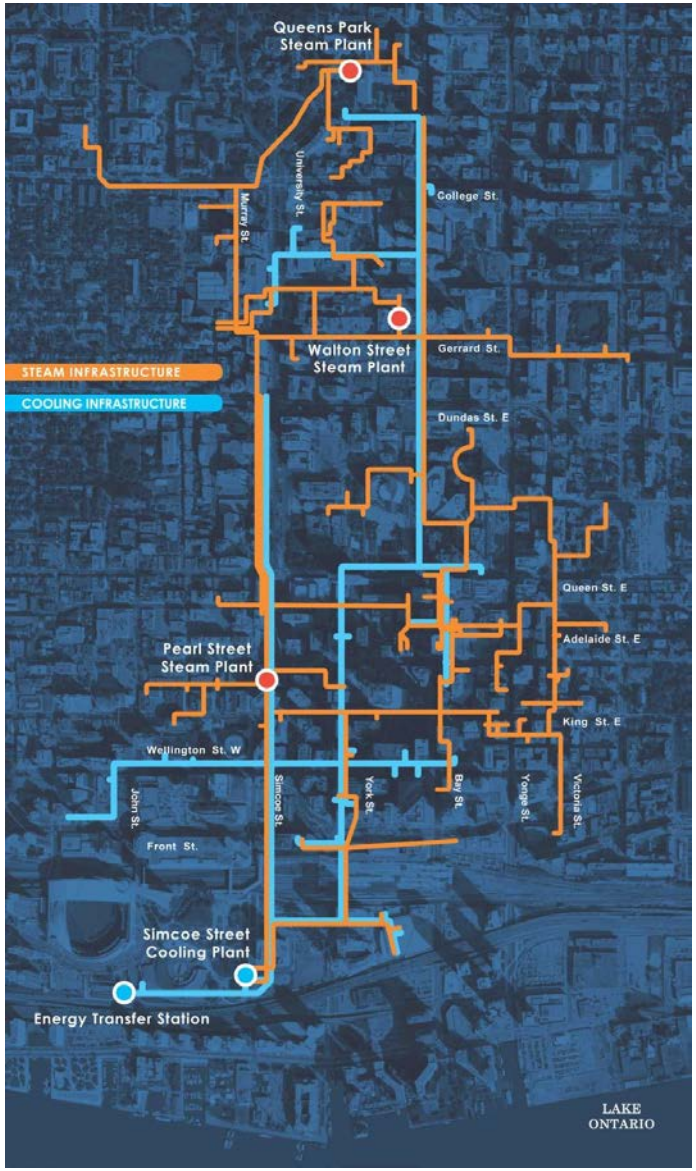
New Water Intake Deployment

One of Three Deep Lake Water Intakes

Our System in Toronto…

Enwave Toronto provides heating & cooling to over 150 customers

Our customers include hospitals, hotels and entertainment complexes, data centers, commercial and residential properties



Refrigerant Use Summary

Cooling Asset	Installed Capacity		GWP	ODP	Life Cycle GWP/ODP Factor (1)
	(Tons)	(eMW cooling)			
Deep Lake Water Cooling	42,000	147.7	-	-	-
Chillers (R-134a)	25,800	90.7	1320	0	-
Chillers (R-1233zd)	7,250	25.5	1	0	-
System	**75,050**	**263.9**	**454 (2)**	**0 (2)**	**21**

(1) – As defined by LEED, EAc5 – Enhanced Refrigerant Management, credit achieved < 100
(2) – Capacity weighted GWP & ODP

On a System Basis, Global Warming and Ozone Depleting Potentials are Very Low

Offering Responsible Refrigerant use to the City of Toronto

Future Growth Plans

Expanding Deep Lake Water Cooling

Integrating Thermal Storage

Use of Next Generation Refrigerants

Benefits

Further Use of Non Refrigerant Based Cooling

Leveraging the lake source cooling further

R-1233zd - GWP = 1, ODP = 0



Thank You!

Carson Gemmill
Director, Engineering
Enwave Energy Corporation