



Burlington **FVB ENERGY INC** The Planning Partnership

Let's Energize Burlington!
Sustainable Solutions for a Sustainable Future:
Integrated Community Energy Systems

February 27 2017

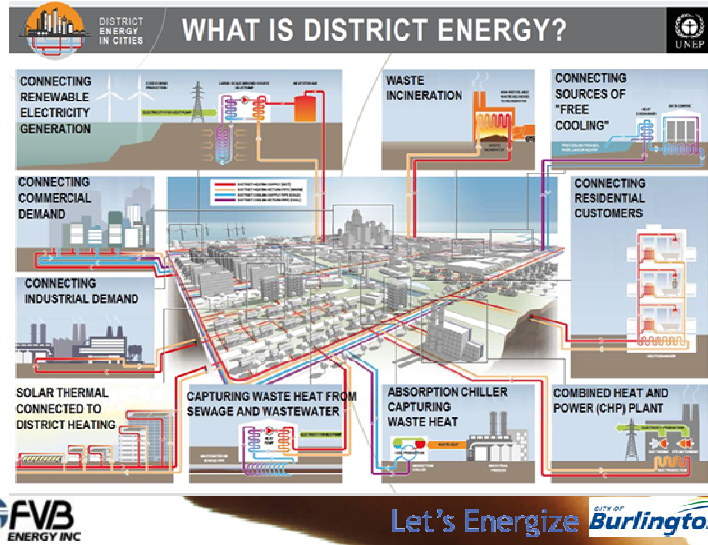
*District Energy Systems –
A move toward carbon neutrality.*

“One of the least-cost and most efficient solutions in reducing emissions and primary energy demand is the development of modern (climate resilient and low-carbon) district energy in cities.” – United Nations Environment Programme



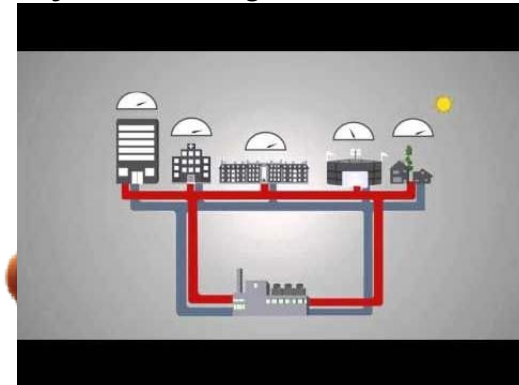
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What is District Energy System?



What is District Energy?

A key to achieving low-carbon communities



International District Energy Association - District Energy: Key to Achieving Low-Carbon Communities
<https://www.youtube.com/watch?v=7BznKyEb0bc>

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Let's Energize **CITY OF Burlington**

What is District Energy?



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District Energy Opportunity

Key Characteristics of a Successful District Energy System

- ✓ Density – High density buildings
- ✓ Distance – Close, within 3 km from the energy centre
- ✓ Anchor load to provide start up and financial stability
- ✓ Customers – Connecting new buildings is better and a mix of uses is desirable
- ✓ A motivated municipality with the political vision, will, and leadership toward energy sustainability.



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City of Burlington – District Energy Opportunity

Characteristics of the Downtown Burlington District Energy Node

- ✓ Density – Burlington is “growing up” (not out), high density buildings anticipated in the downtown core,
- ✓ Distance – 1 million sq.ft in 1 km from the City Hall within the next 5-10 years
- ✓ Anchor load – new building developments
- ✓ Customers – mix of residential, office, hotel
- ✓ A motivated municipality with the political vision to be carbon neutral.



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City of Burlington – District Energy Opportunity

How can Burlington move toward carbon neutrality?

The common thread in low carbon communities around the world is the development of a district energy system (thermal grid).

Connect buildings that the city either owns or has some influence over (i.e. in the permitting/planning process, ownership, lease)



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City of Burlington – District Energy Opportunity

The Burlington Downtown Core District Energy Feasibility

4 Scenarios Studied:

1. Heating only
2. **Heating only with CHP**
3. Heating + CHP + Cooling
4. **A CHP based DES**



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Scenario 2: Heating Only + CHP

Embedded energy centre in a new downtown development

- \$7.0 M capital investment
- 8.0% IRR, 20 Years
- 11.5 Year simple payback
- Business case could be improved with an incentive type program (i.e. IESO saveONenergy PSUI program 10% IRR/10 year simple payback).



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Scenario 4: CHP DES Heating Only

A CHP installation with an electricity host connected to 2 neighbouring buildings as a thermal energy host

- ⦿ \$2.9 M capital investment (after \$900 K incentive under IESO saveONenergy PSUI program)
- ⦿ 10.5% IRR, 20 Years
- ⦿ 9.3 Year simple payback



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City of Burlington – Benefits

- ⦿ Increased resiliency
- ⦿ Increased overall efficiency
- ⦿ Lower environmental impact.
- ⦿ Potential to use renewable and waste energy sources
- ⦿ Interior mechanical room space savings for buildings
- ⦿ Lower costs for building owners
- ⦿ Economic development
- ⦿ Long term city asset



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City of Burlington – District Energy Feasibility Summary

Scenario 2 is a good opportunity to start a DES in the City of Burlington.

- Best potential for growth
- Moderate \$7.0 M capital investment and return on investment of 8.0%.

Scenario 4 is a good project and primarily an energy play

- Minimal capital investment \$2.9 M (after incentive)
- Good 10.5% return on investment
- Helps the electricity and thermal energy customers
- More challenged with respect to growth.



Let's Energize The City of Burlington logo, which includes the text "CITY OF Burlington" with a stylized blue and green wave graphic to the right.

City of Burlington – District Energy Opportunity

Questions?



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