



Mapping & Using Wastewater for Building Heating & Cooling

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NZ Size & Climate Zones













Energy is neither created nor destroyed.

It can be transferred from one object to another or transformed from one form to another.

Law of conservation of energy.

[The First Law of Thermodynamics]

Wastewater Networks = Massive Energy Collection















Wastewater Flows Match Building Needs







AC Makes Urban Heat Island Worse







ASHRAE Headquarters - Altlanta







2 year 'Apples for Apples' ASHRAE study in Atlanta

Same building, same usage, two identical floors



Geothermal AC VS Air based AC



Groundwater system used ~1/2 energy of VRF



















Wastewater Can:

- **1. Heating:** Replace Fossil Fuels
- 2. Cooling: Reduce Electrical Energy Consumption, Save Potable Water & Reduce Urban Heat Island

Unused Assetts & Resources







 The Infrastructure is already there!
~\$7b - \$9b already invested in Auckland.



2. The Energy is already there!(Donated for free by citizens).

How Useful is Wastewater?







How Useful is Wastewater?





1.3 Energy Efficiency | TRANSITION 01



Unlocking the Potential of Energy Efficiency and Renewable Energy

UNWHABITAT

LCLFI

1.3 ENERGY EFFICIENCY

1.3.1 TAKING ADVANTAGE OF LOW-EXERGY ENERGY SOURCES

"Wastewater flows combined with chillers and district cooling could meet approximately 30–35 per cent of the cooling demand of commercial buildings in many cities within temperate zones." Nick Monten, HUBER SE, 2014

The use of energy sources such as nuclearpowered electricity or fossil fuels to provide space heating, hot water or cooling astrvices can be compared to "using a chainsaw to cut butter" – it is inefficient and an extreme waste of resources (Lovins, 1976). This is because these energy sources are treatment plants, data centres and CHP plants.

Cogeneration in modern CHP plants is typically 80–90 per cent efficient, meaning that almost all of the primary energy burned is converted to useful final energy. The significant amount of heat captured as benefit from interconnection with other networks. Interconnecting of networks enables any excess energy that is produced to be shared with neighbouring district energy systems, reducing volatility in the overall network.

In refurbishment citics, significant energy

Our Work





City Wastewater Network

Energy Mapping

As Planning Tool





Vancouver

Blenheim Christchurch Dunedin

Christchurch, Population 375,000







70,000kW – 80,000kW Available

Enough for heating 10,000 – 12,000 houses

Christchurch, Population 375,000







Christchurch, Population 375,000







Planning Use - Christchurch





Former Christchurch City Council nursery site proposed for new \$21 million Linwood pool

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THEFLOW Last updates 18-46, Kennery 20 2019



The Christmann Gry Devel has introduce a site on the construct Lewant Ave and Smith Stim Lewand as its favoural age for a new point company.



The Hardware







Wastewater





- Worldwide ~700 1000 systems installed
- Some Examples Follow.....







False Creek - Vancouver







False Creek - Vancouver







Hobart Aquatic Centre







3x Aquatic Centres in France







Marseille



Paris



Paris

MOM Cultural Centre – Budapest







Hospital – Budapest, Hungary







Straubing - Germany







DC Water – Washington DC







Magenta Business Park – Scotland







Many Thanks & Questions





The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.

ALBERT EINSTEIN



"HOW WONDERFUL IT IS THAT NOBODY NEED WAIT A SINGLE MOMENT BEFORE STARTING TO IMPROVE THE WORLD."

> - ANNE FRANK (DIARY OF A YOUNG GIRL)

