NEW ENGLAND WATER ENVIRONMENT ASSOCIATION
NEWEA
WORKING FOR WATER QUALITY

HUBER TECHNOLOGY
WASTE WATER Solutions

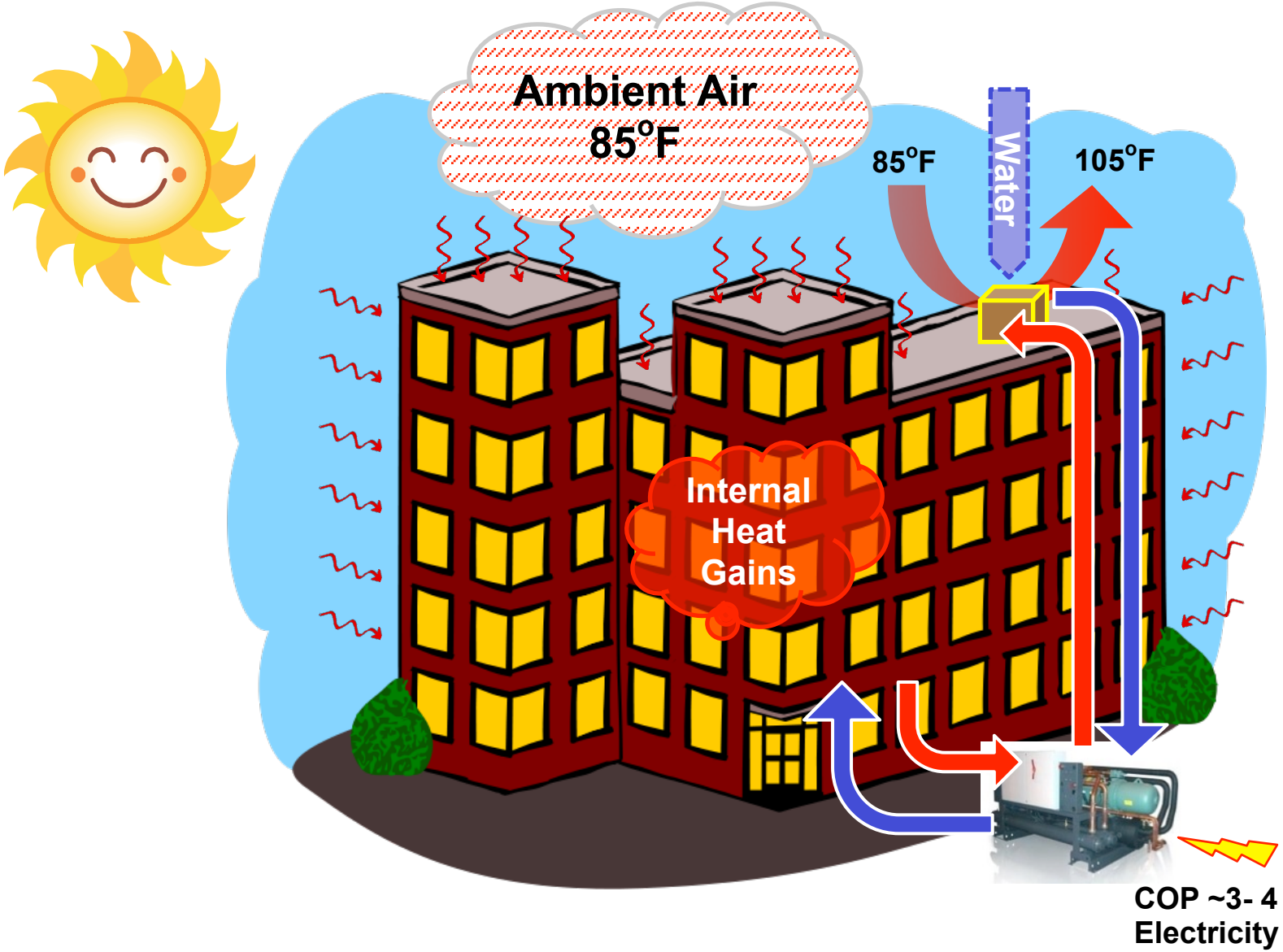
Extracting Energy from Wastewater to Heat and Cool Buildings

Energy Savings and New Income for Water Utilities

Chris Hubbard
Industrial Sales Manager
Huber Technology, Inc.

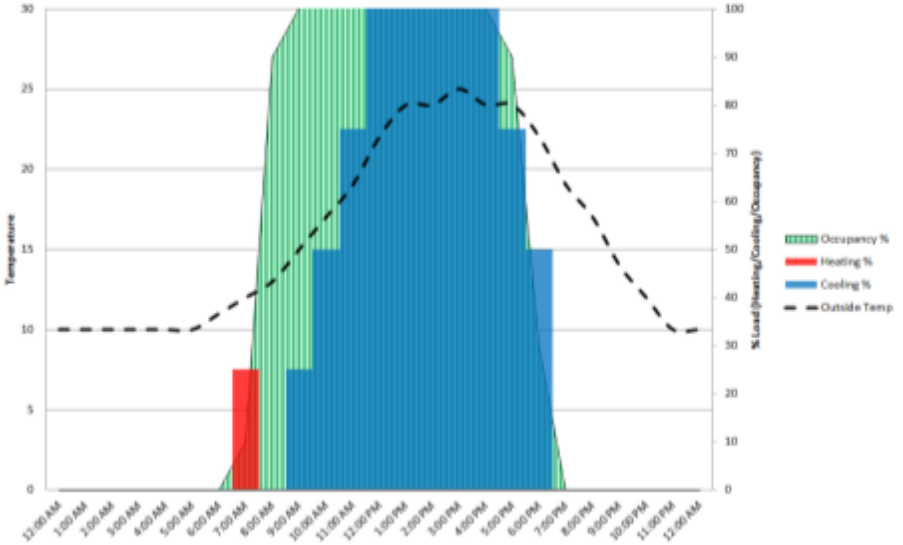
Winter - Conventional HVAC Solutions

Summer – Conventional HVAC Solutions

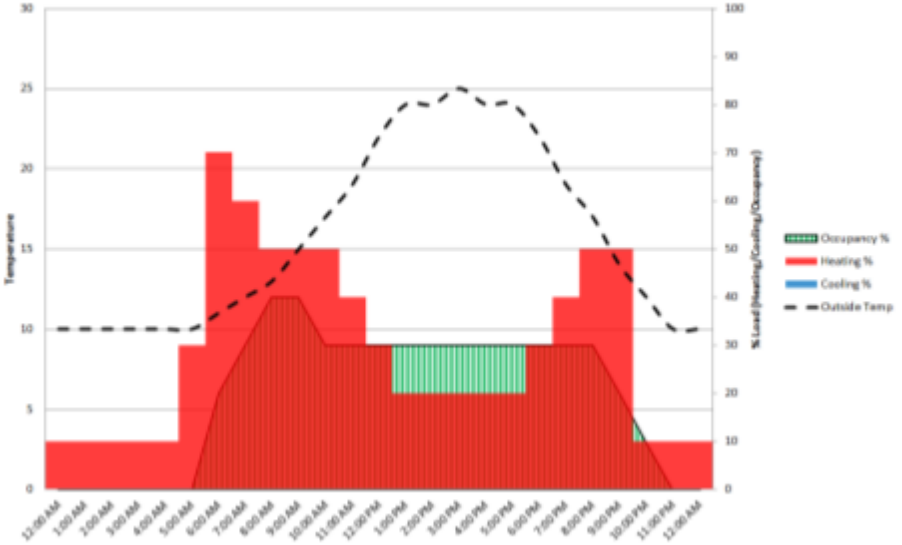


Different Buildings Use Energy Differently

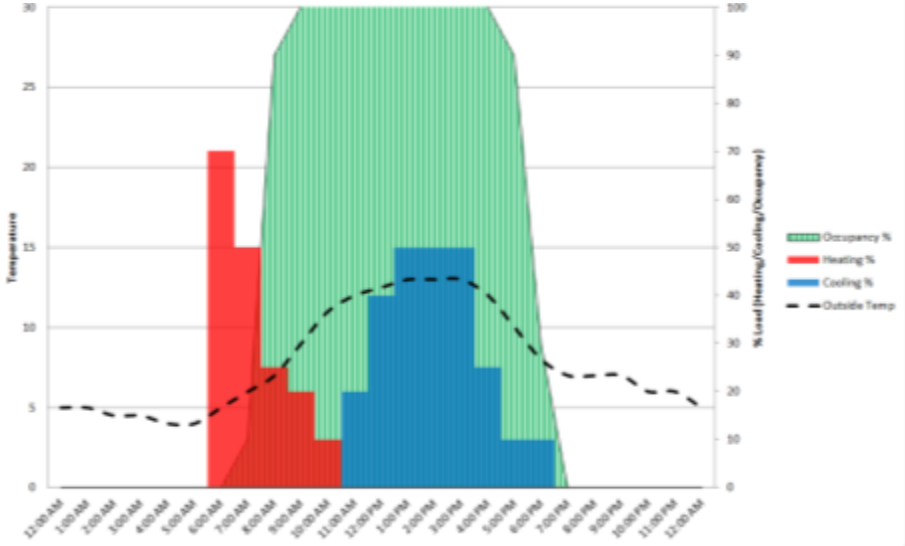
Typical Office Building Summer Energy Profile



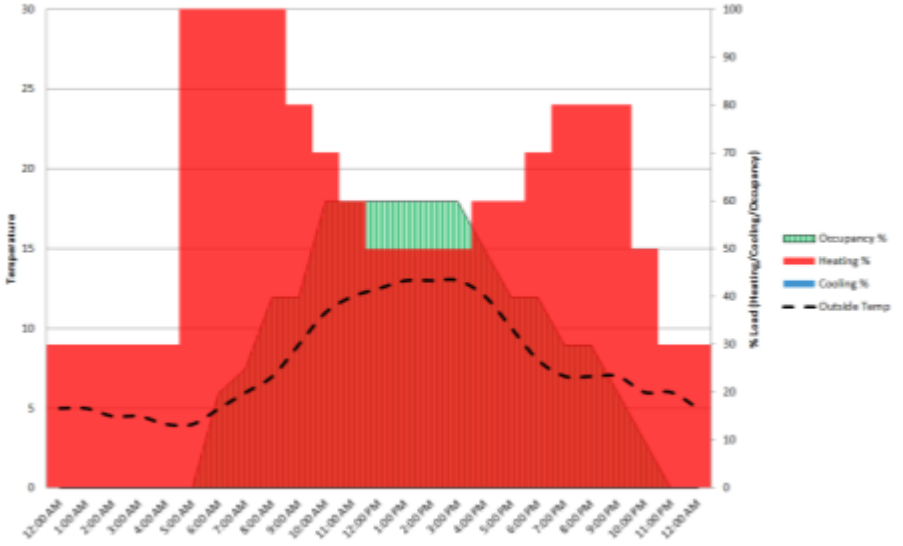
Typical Leisure Centre Summer Energy Profile



Typical Office Building Winter Energy Profile



Typical Leisure Centre Winter Energy Profile



11 Story Office Building - London

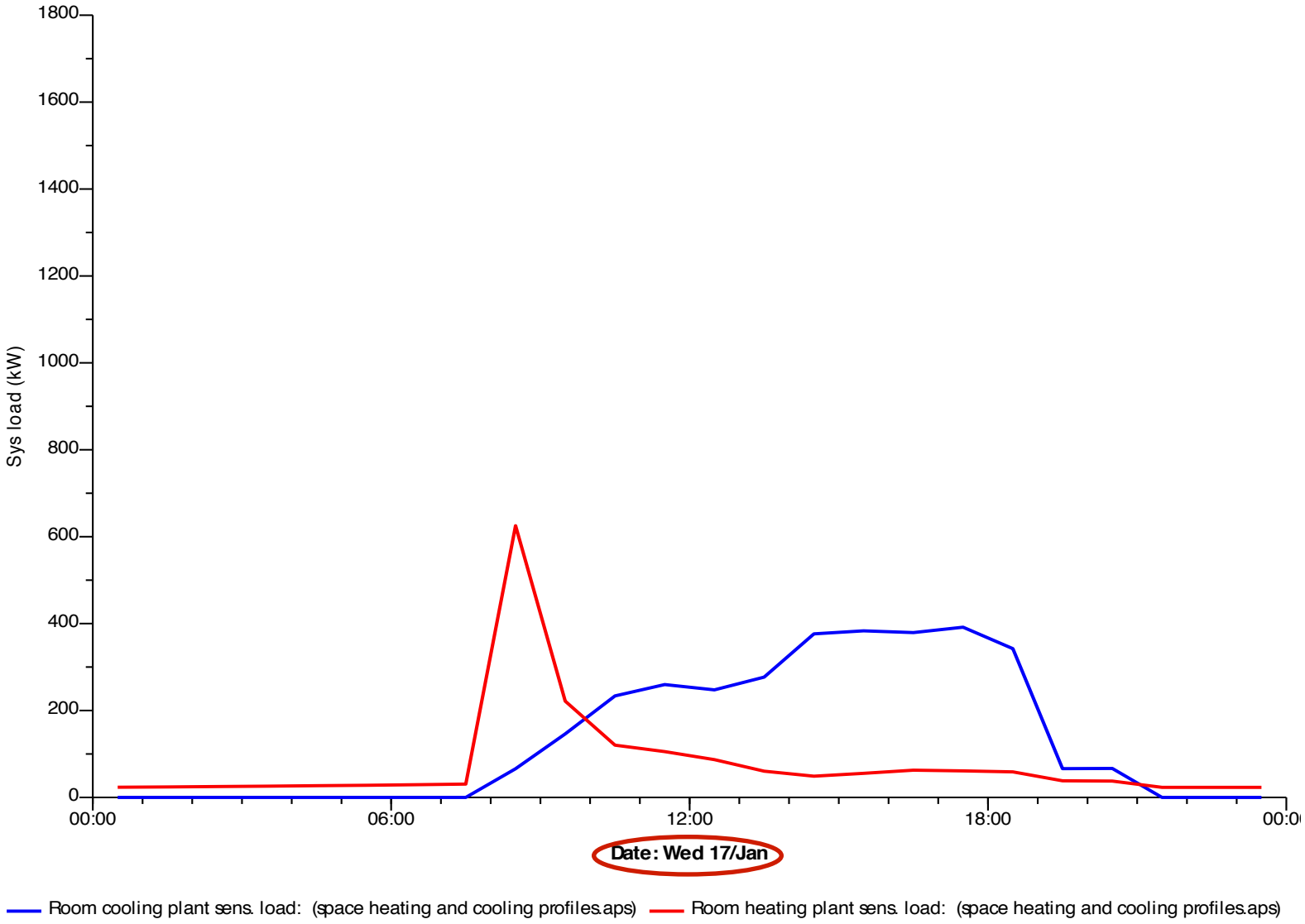
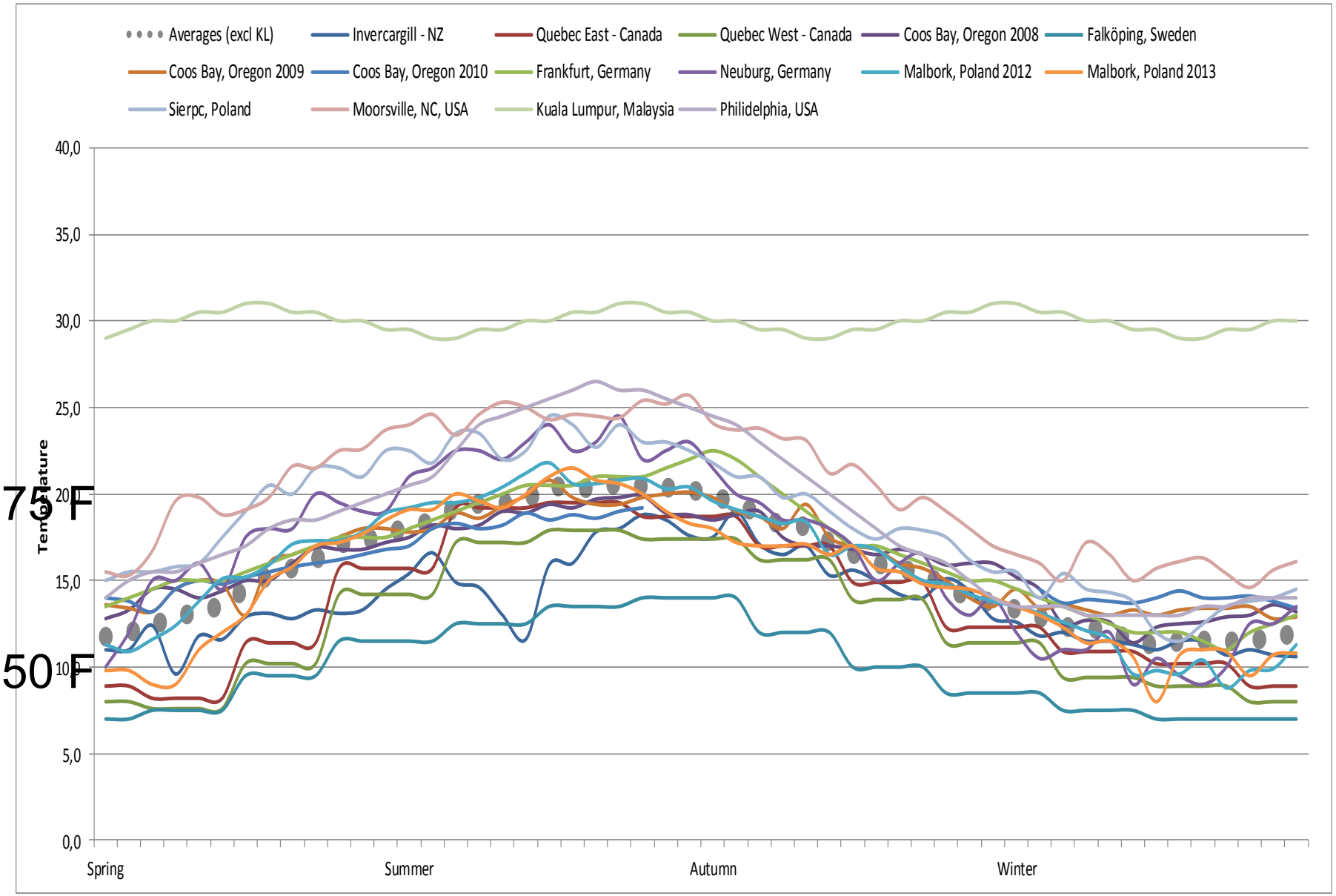
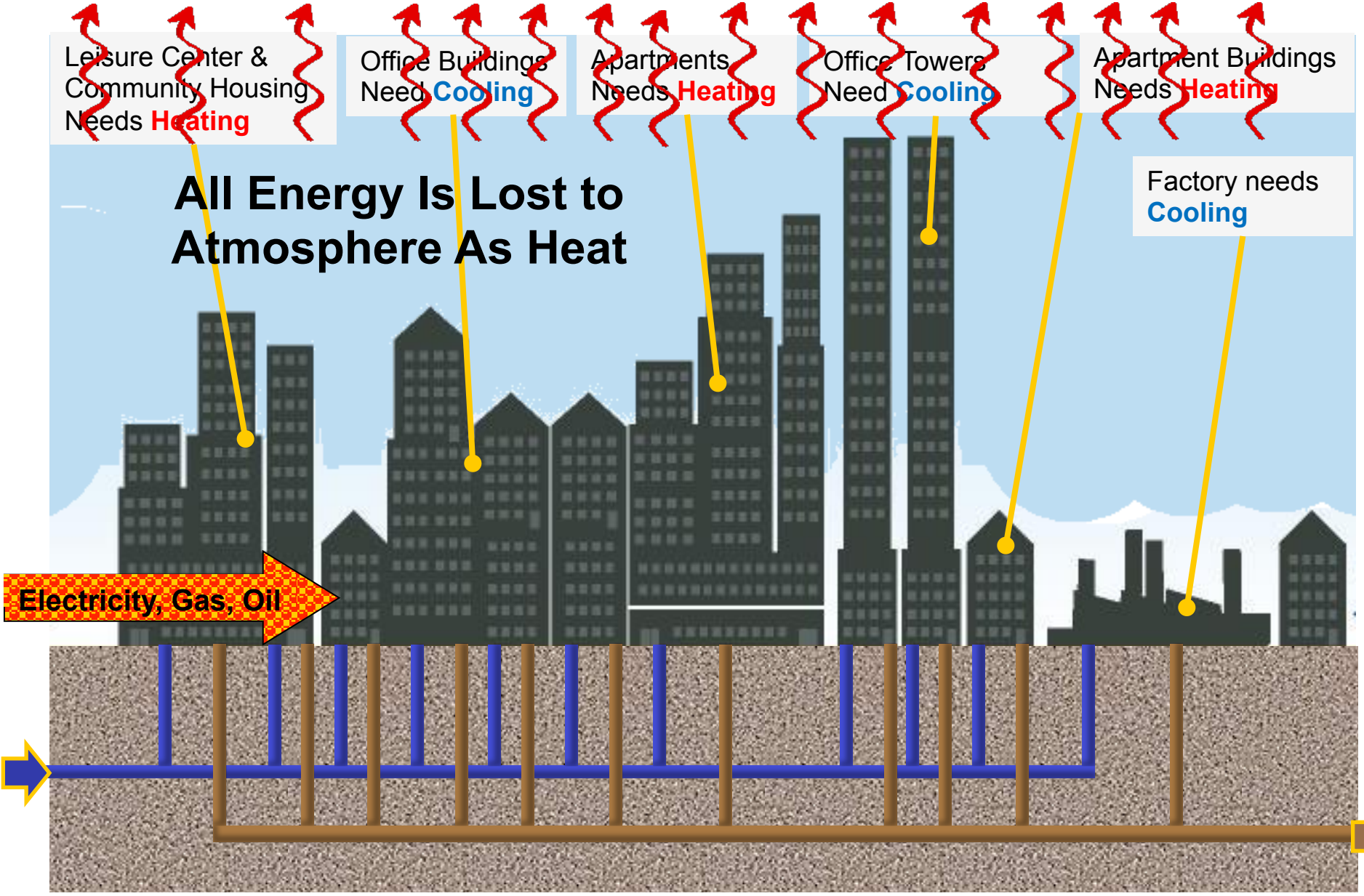


Chart data supplied by atelier ten

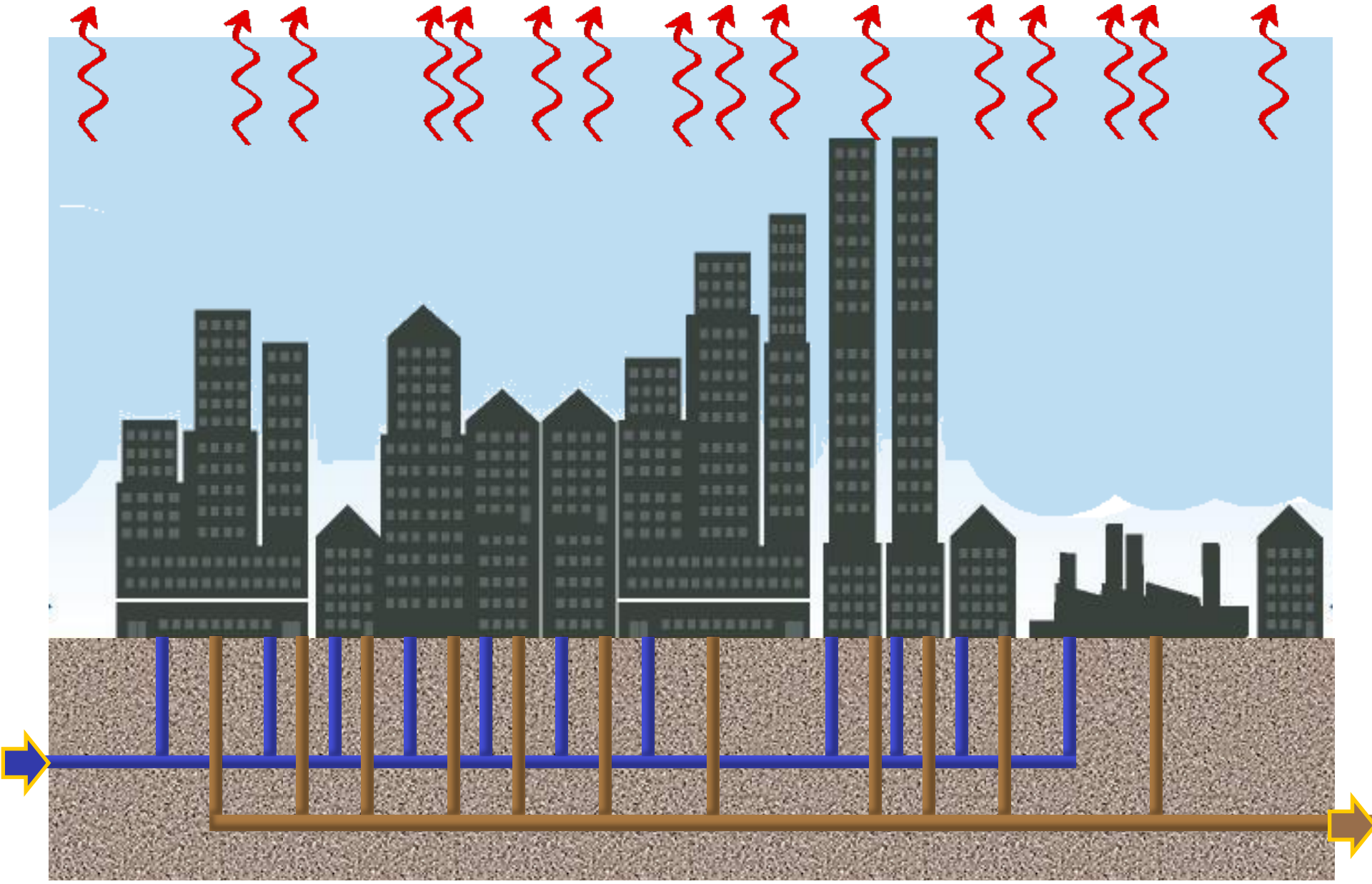
Wastewater Temperatures



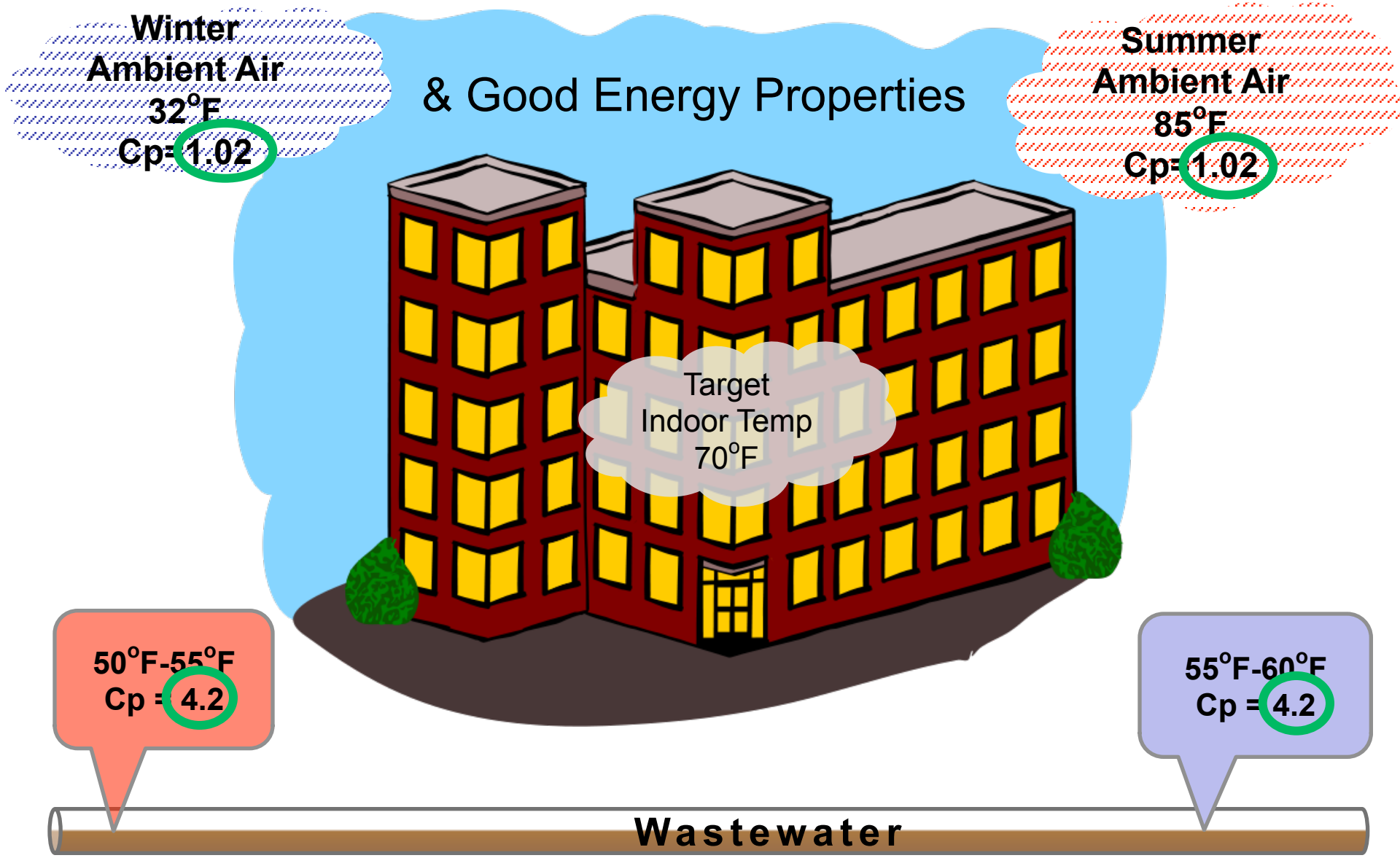
Typical City of Today - Energy



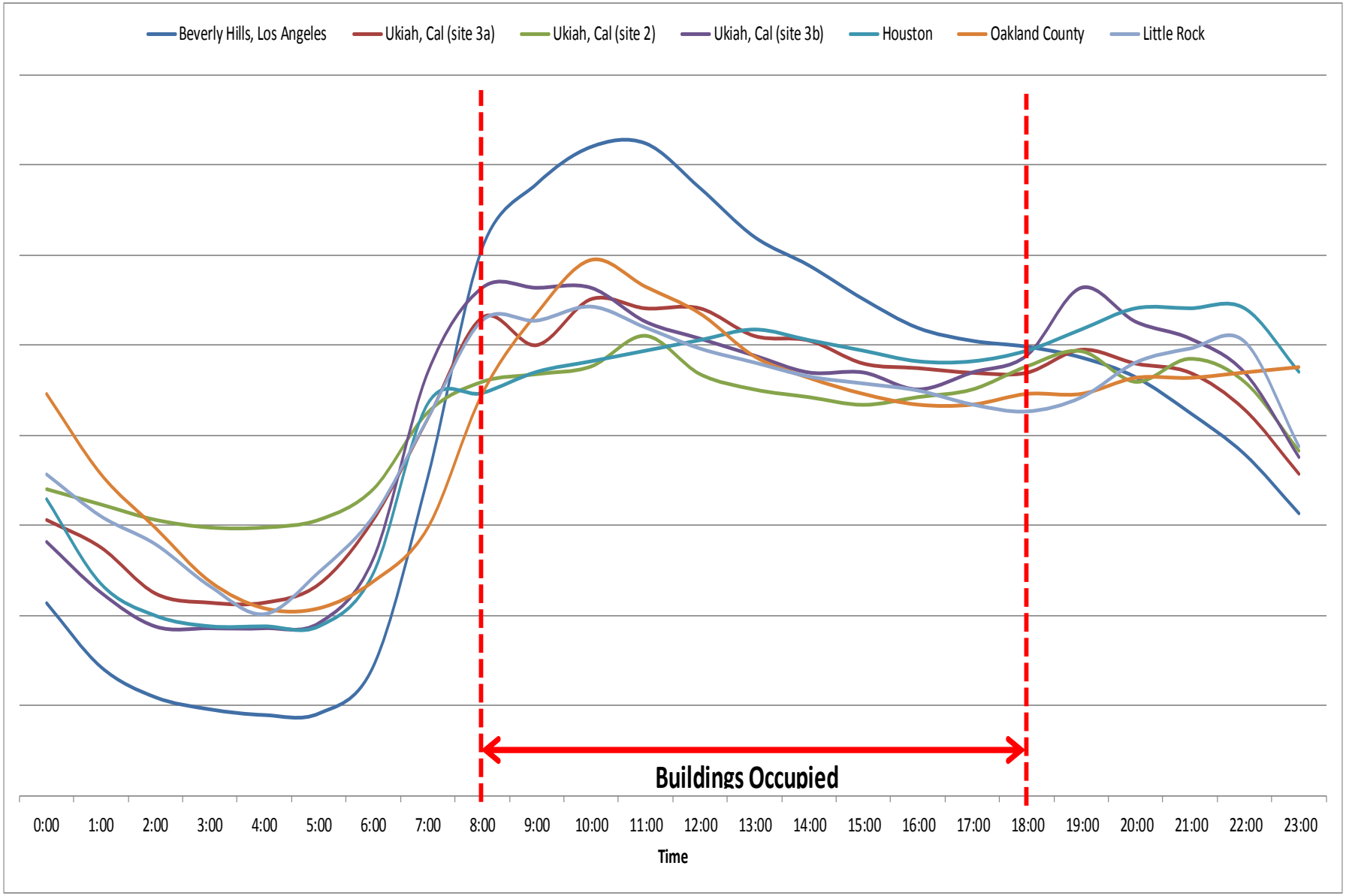
The Idea – Capture Energy & Move Into Wastewater



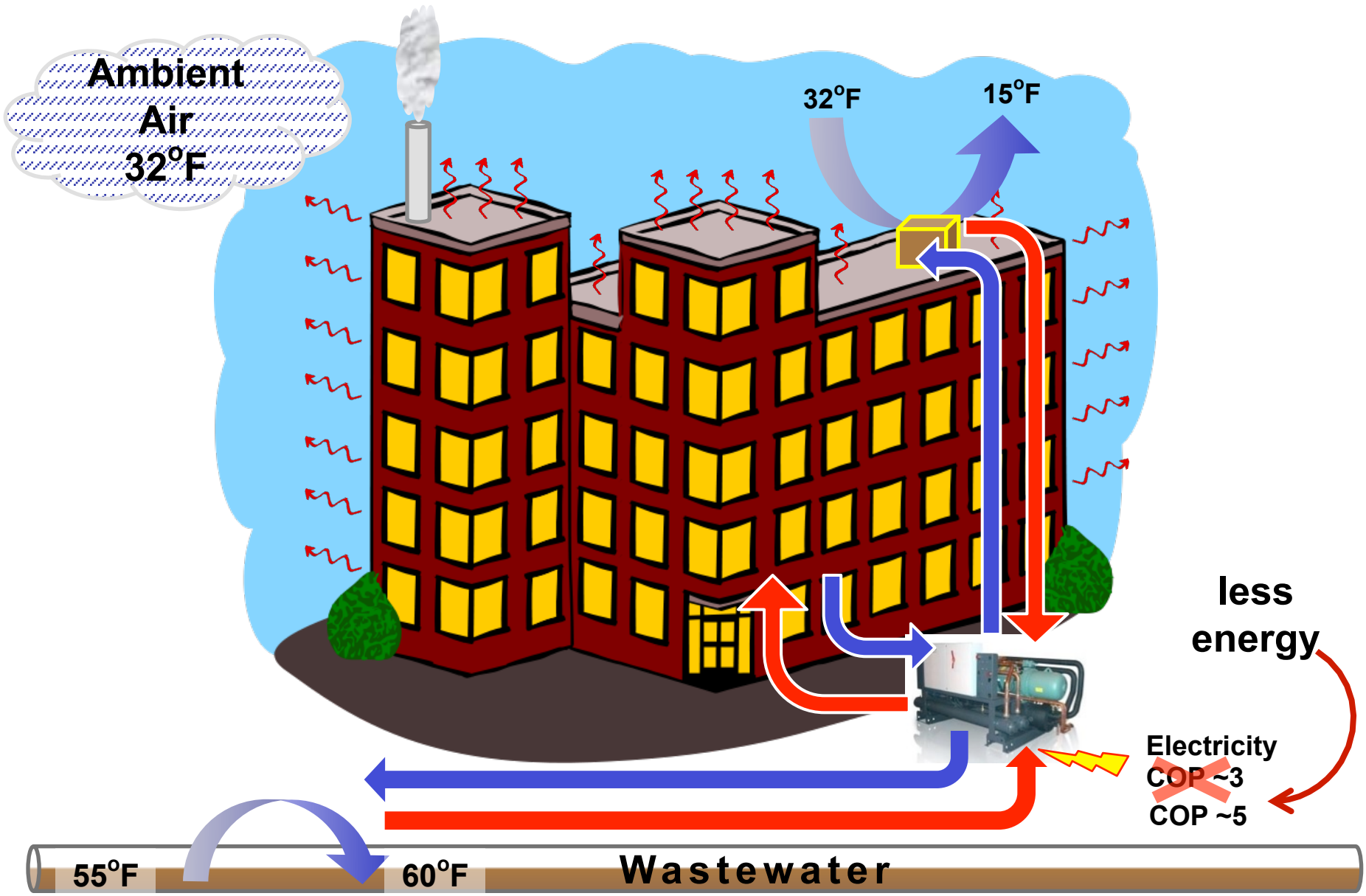
Wastewater Has Neutral Temperatures



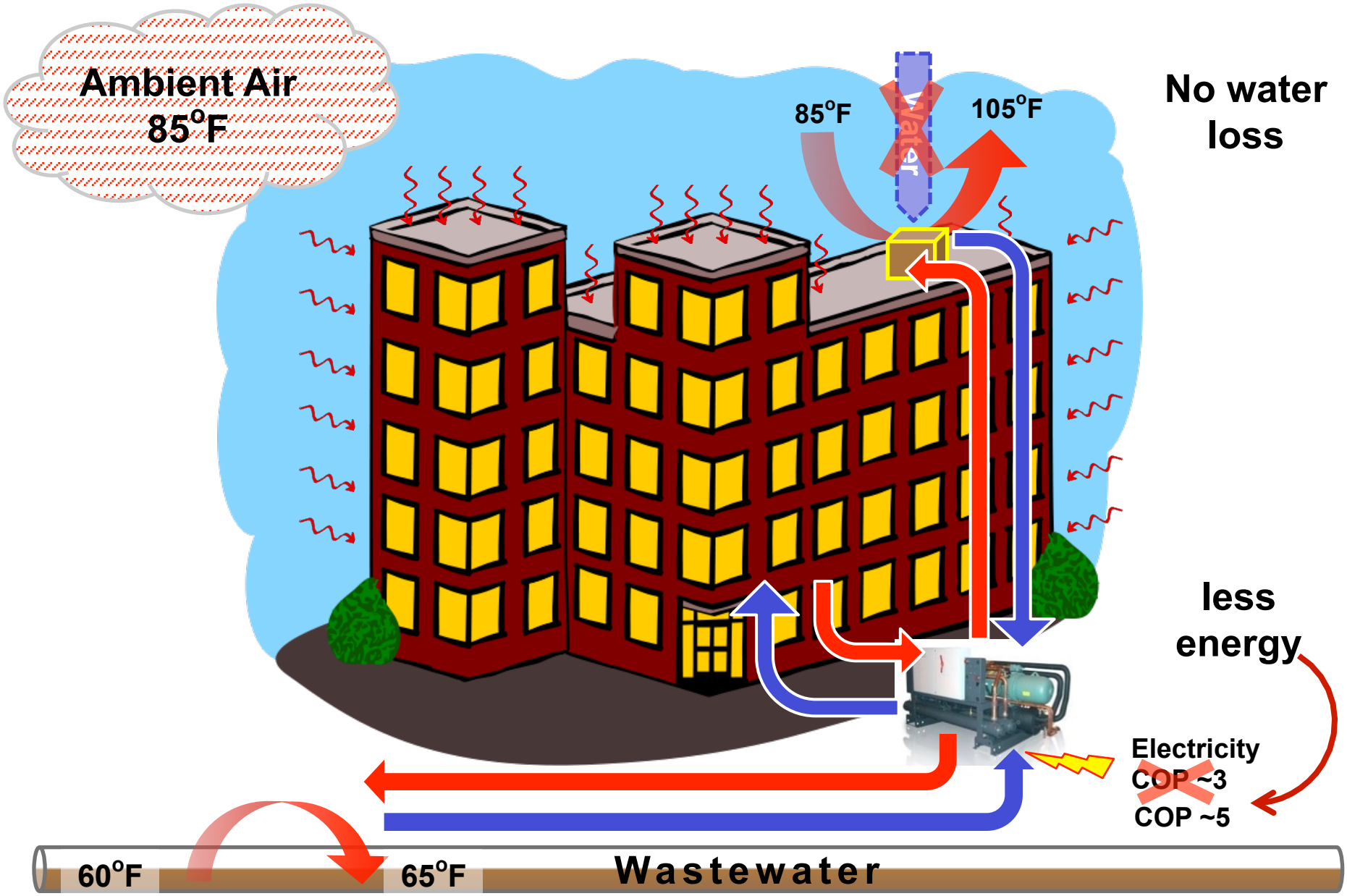
Wastewater Daily Flow Profiles



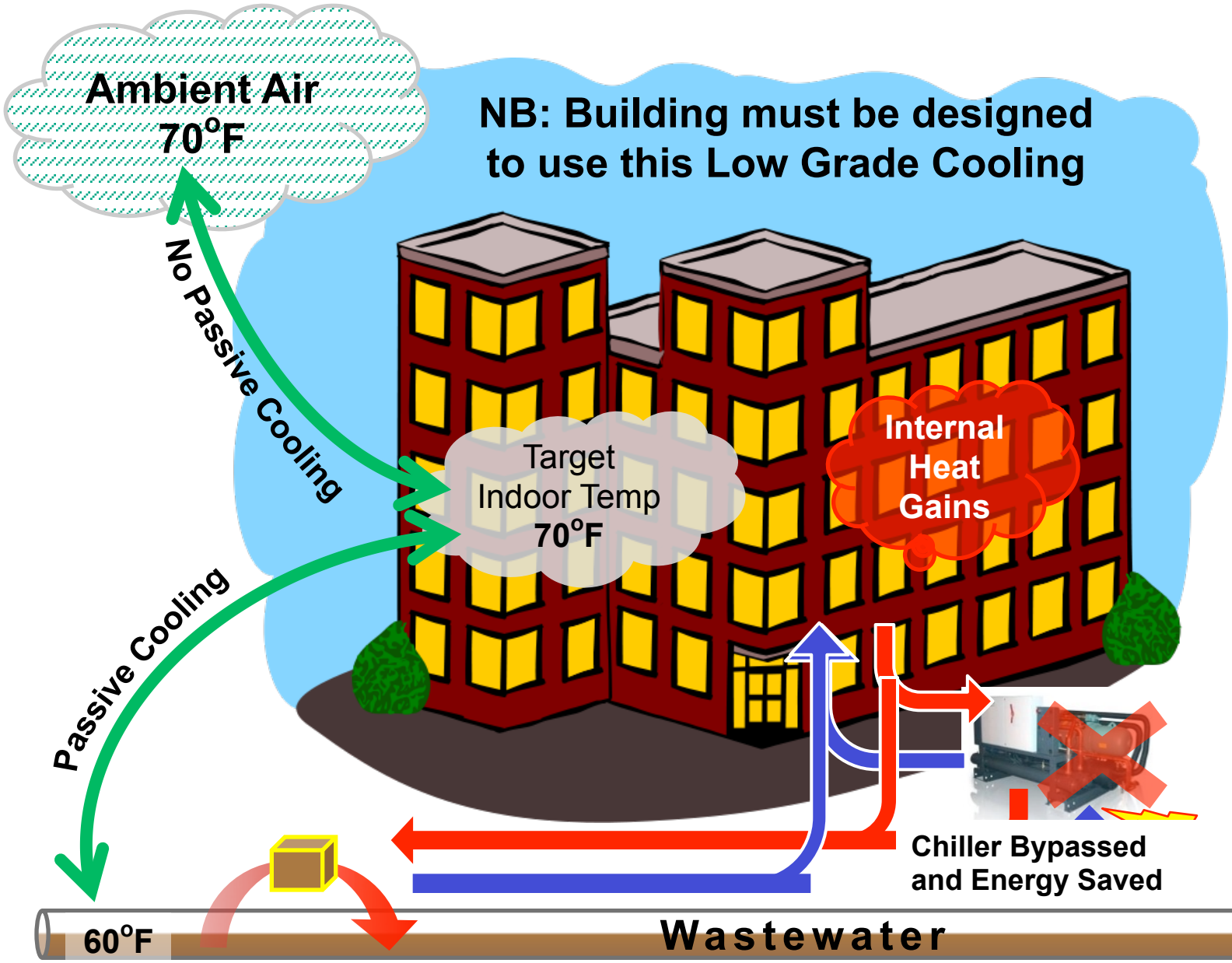
Winter Example



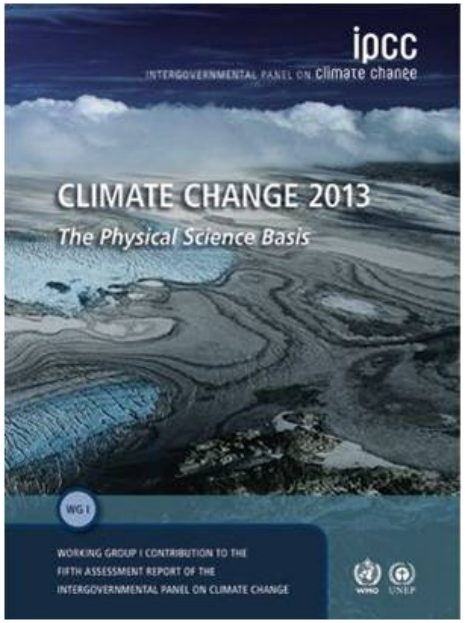
Summer Example



Shoulder Seasons (Spring/Autumn) Example



Many Things Coinciding = Now Is The Right Time



Climate Change + G20 Agreement on HFC's.

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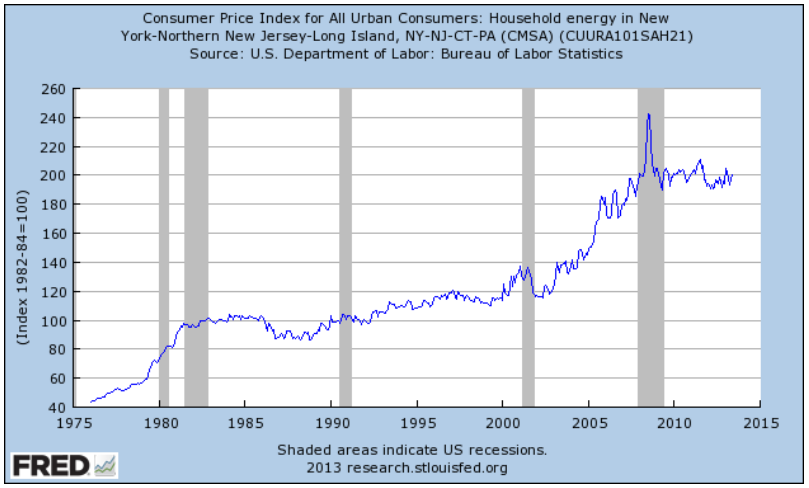
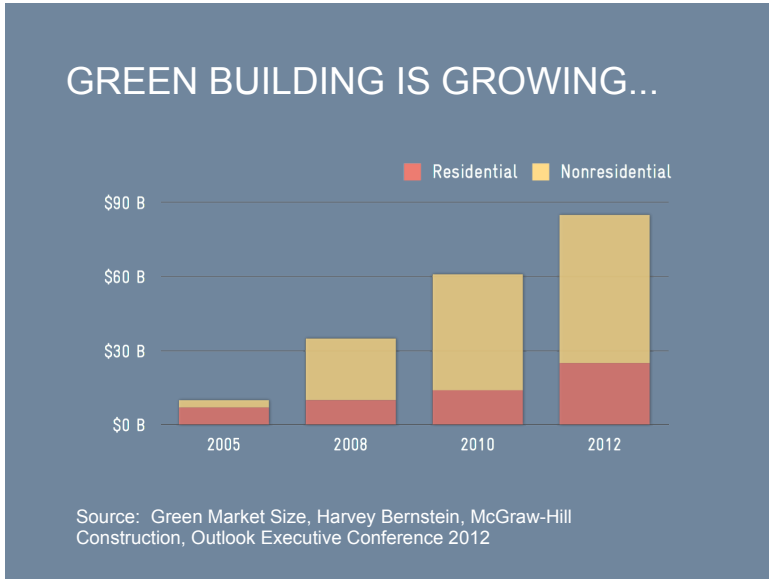
Climate Friendly Solutions Must Be Found

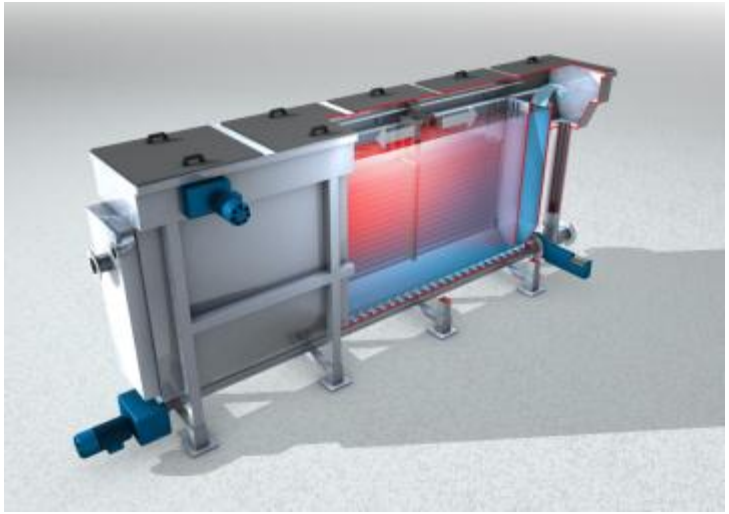
Rising Energy Prices



More Energy Efficient Buildings



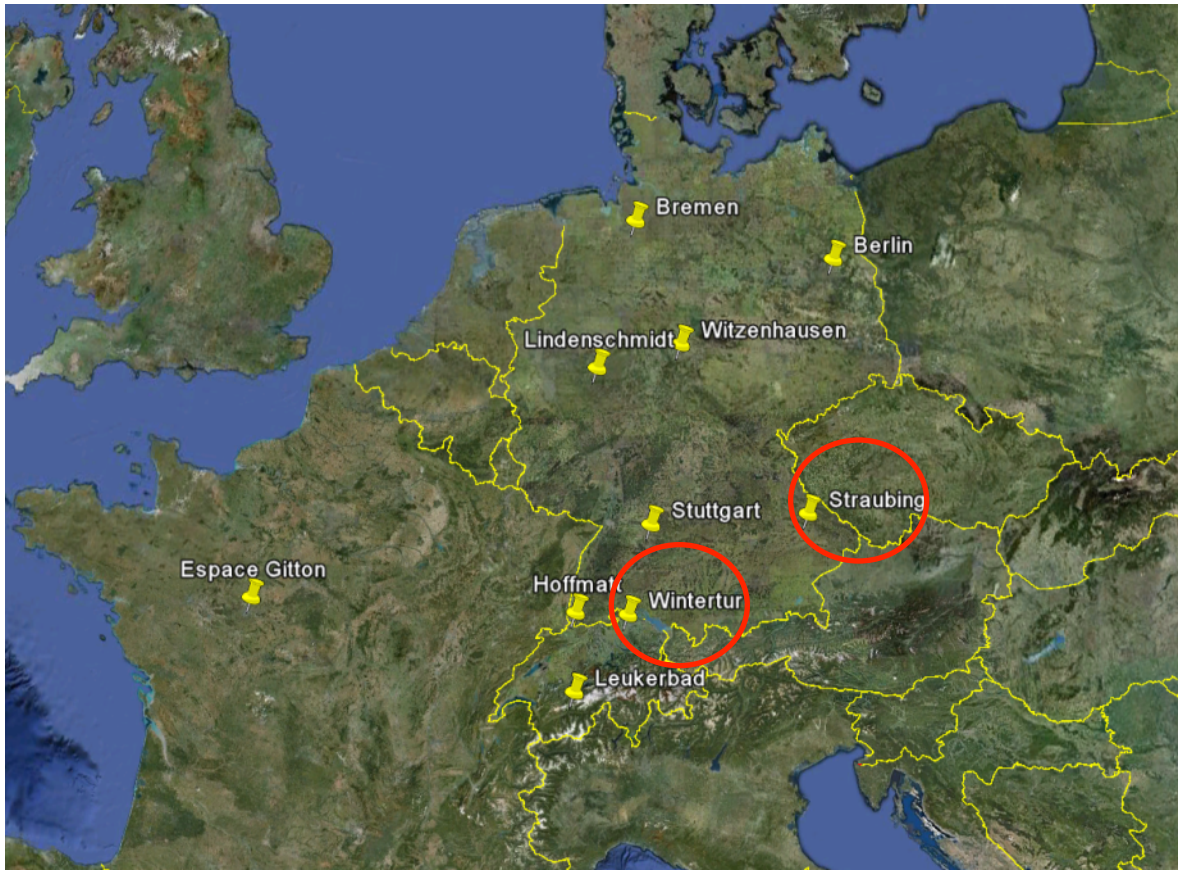
New Technology Available



Wastewater Energy Installations

- Worldwide ~400 – 500 systems installed
- China's Tianjin City, (pop 10 million) building code requires building designers to evaluate this system for all new developments.
- Some Projects Already Installed by HUBER Follow…..

HUBER Installations



Germany: 6
Switzerland: 3
France: 1

Canada: 1
(startup 3/2015)

Straubing – Germany

Straubing – Germany

Straubing - Germany

102 Apartments in Total, spread over 5 buildings
ThermWin system in operation since October 2010

Straubing - Germany

Winterthur – Switzerland

Winterthur – Switzerland

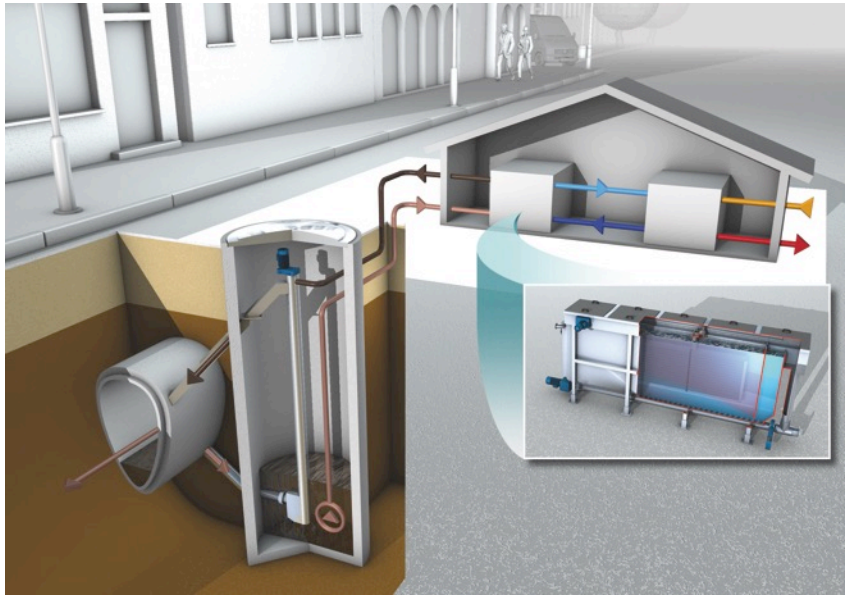
Winterthur - Switzerland

99m high with 28 levels.

The system provides 480kW of heating & 840kW of cooling.

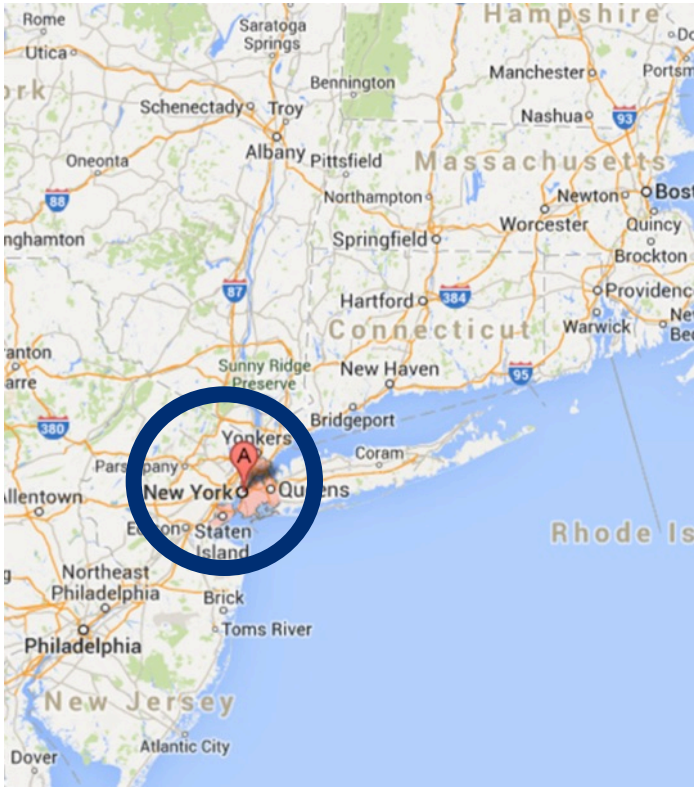
Coefficient of Performance (COP) of approximately 5-6.

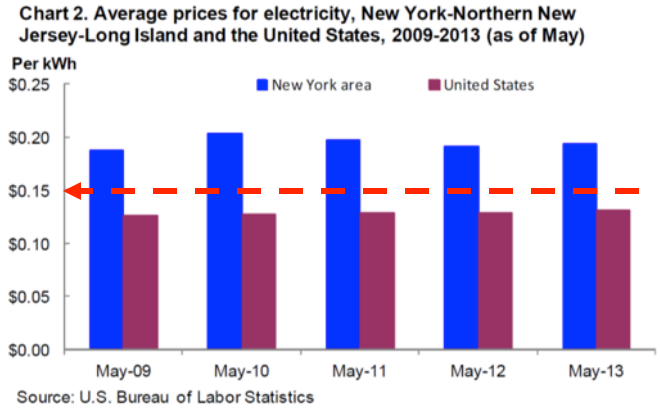
In operation since February 2011



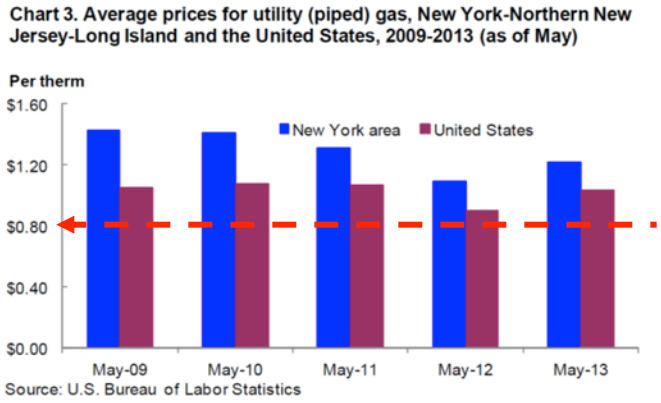
The Untapped Potential

Example: New York City





$0.15/kWh
(commercial users)



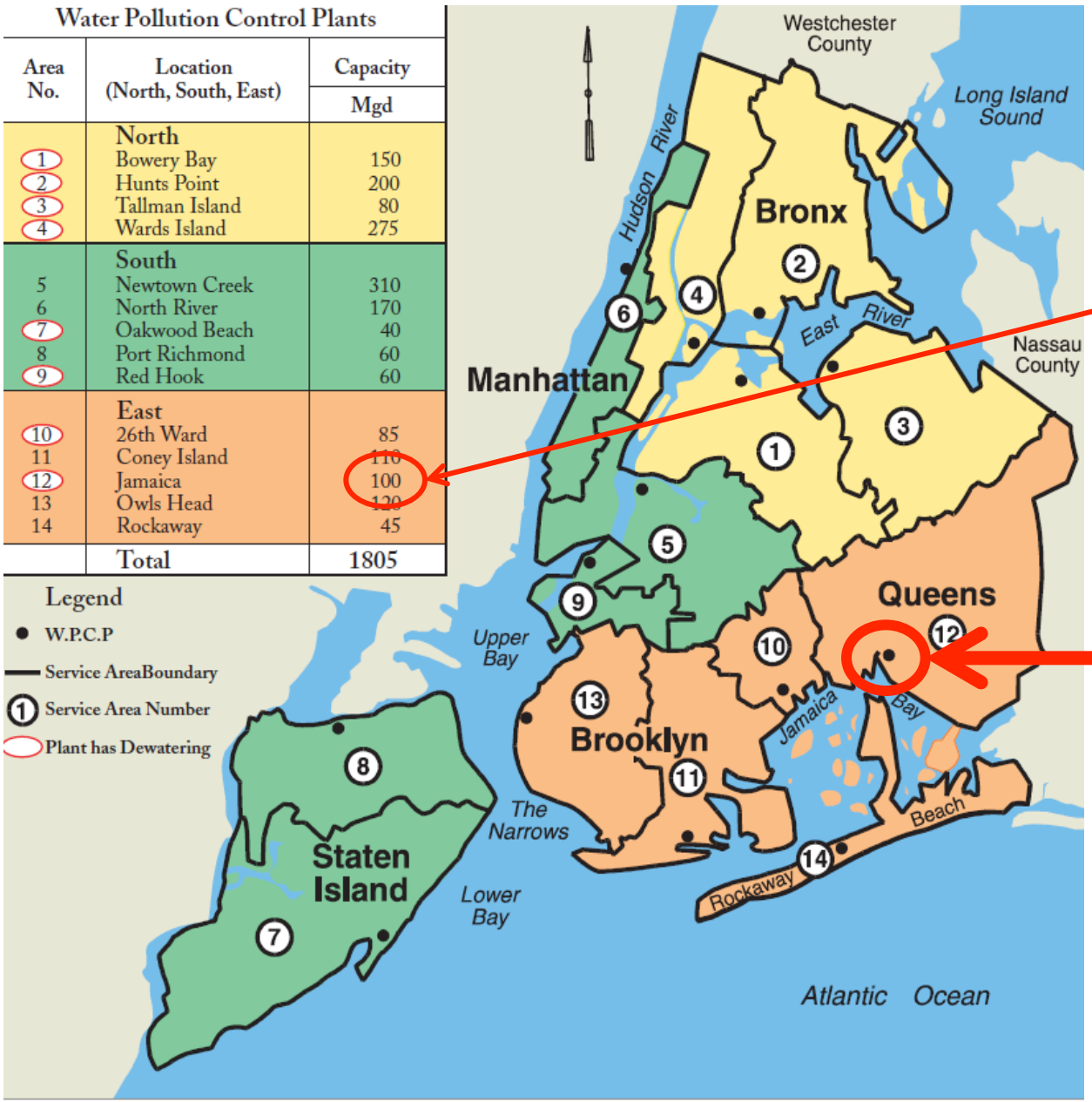
$0.80/therm
(commercial users)
~ $0.03/kWh

Daily Water Handled	Change Temp By:	Energy Released	% Commercial Buildings Energy	Value of Energy @Electricity @Gas
1,300 MGD	10^{O}F	10,500 GWh/year	15%	$1.6 Billion $315 million

New York WWTP's

Water Pollution Control Plants

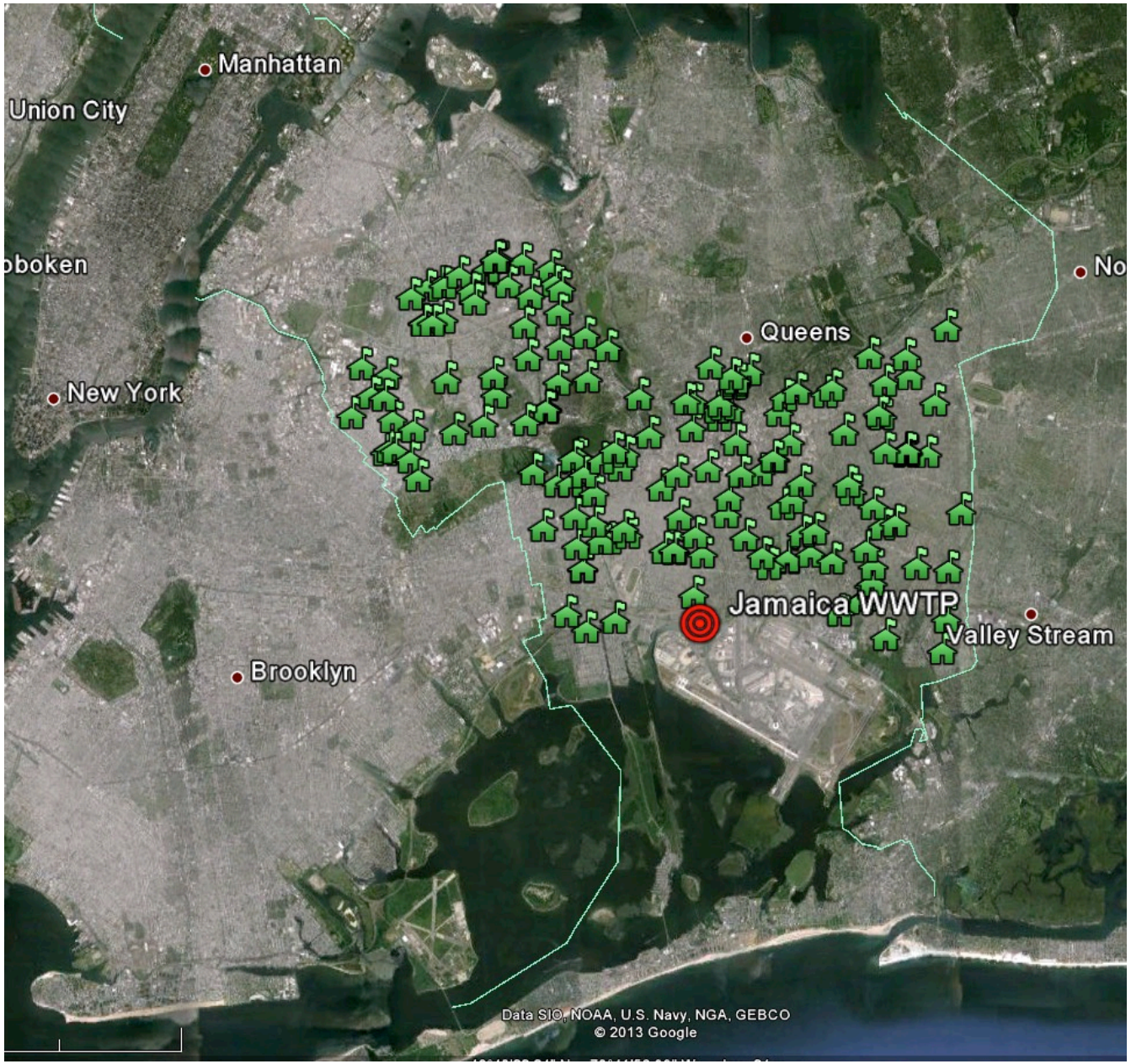
Area No.	Location (North, South, East)	Capacity Mgd
	North	
1	Bowery Bay	150
2	Hunts Point	200
3	Tallman Island	80
4	Wards Island	275
	South	
5	Newtown Creek	310
6	North River	170
7	Oakwood Beach	40
8	Port Richmond	60
9	Red Hook	60
	East	
10	26th Ward	85
11	Coney Island	110
12	Jamaica	100
13	Owls Head	120
14	Rockaway	45
	Total	1805



100Mgd @ 10°F temp change provides 60,000kW energy

Jamaica WWTP

Schools in the Queens Borough



~160 schools in Queens are close(ish) to Jamaica WWTP within districts 24, 27, 28 & 29

60,000 kW is enough energy to heat and cool ~120-150 of these schools That is an $120 Million dollar PER YEAR opportunity for DEP

Implementation

Massachusetts on the leading edge

Department of Energy Resources (DOER)

- PON ON-ENE-2014-025 has grant money available for implementing this exact technology (@ 2 Grants still Available!)

- Barnstable has been awarded a grant to pilot the Huber ThermWin technology, with GHD as the engineering consultant.
- Replacing/ supplementing cooling towers on the City Hall cooling (Chillers) system
- Using water at a PS across the street

- Walker Wellington (Huber Representative) very hands-on in identifying and vetting applications

The Good Points

1. In Developed Cities the Infrastructure is there.
   Modifications required are relatively modest.

   In Developing Cities, where infrastructure is not yet there, it should be easier than in Developed Cities & the cost penalty is likely to be relatively small.

2. The Water is there!
   Water will flow irrespective of seasons/wind/sun.

3. The Value is Easy to Establish.
   Energy prices are well known.

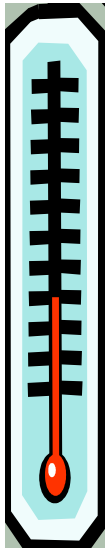
4. Customer Acceptance is Good.
   Everyone expects to pay for energy!

The Limitations

The Wastewater flow is one way.

The Energy available is variable. It is limited by available flows and acceptable temperature limits.

The heating energy available is relatively low grade (~60^{o}F max).

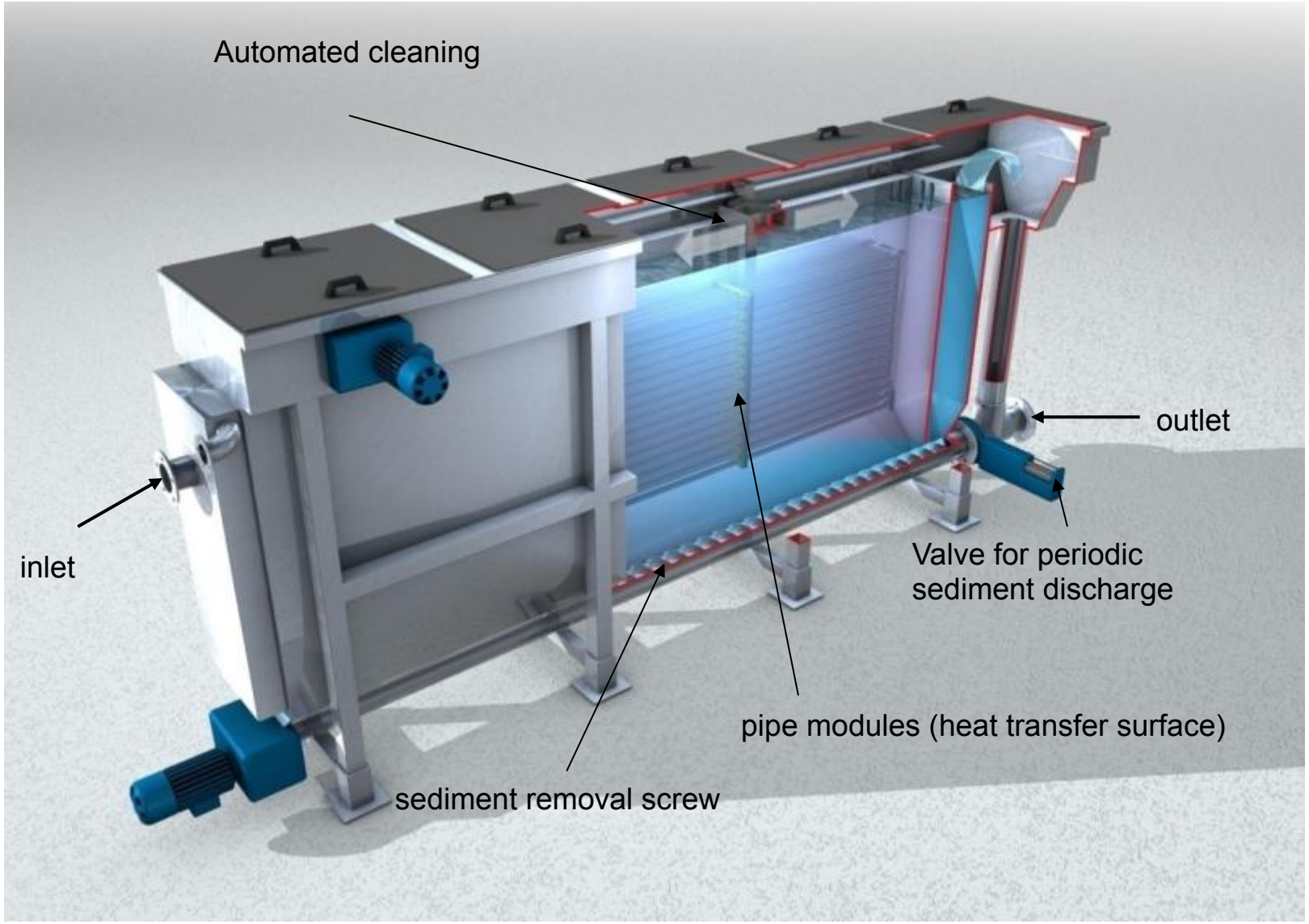


Potential Opportunities- Municipal

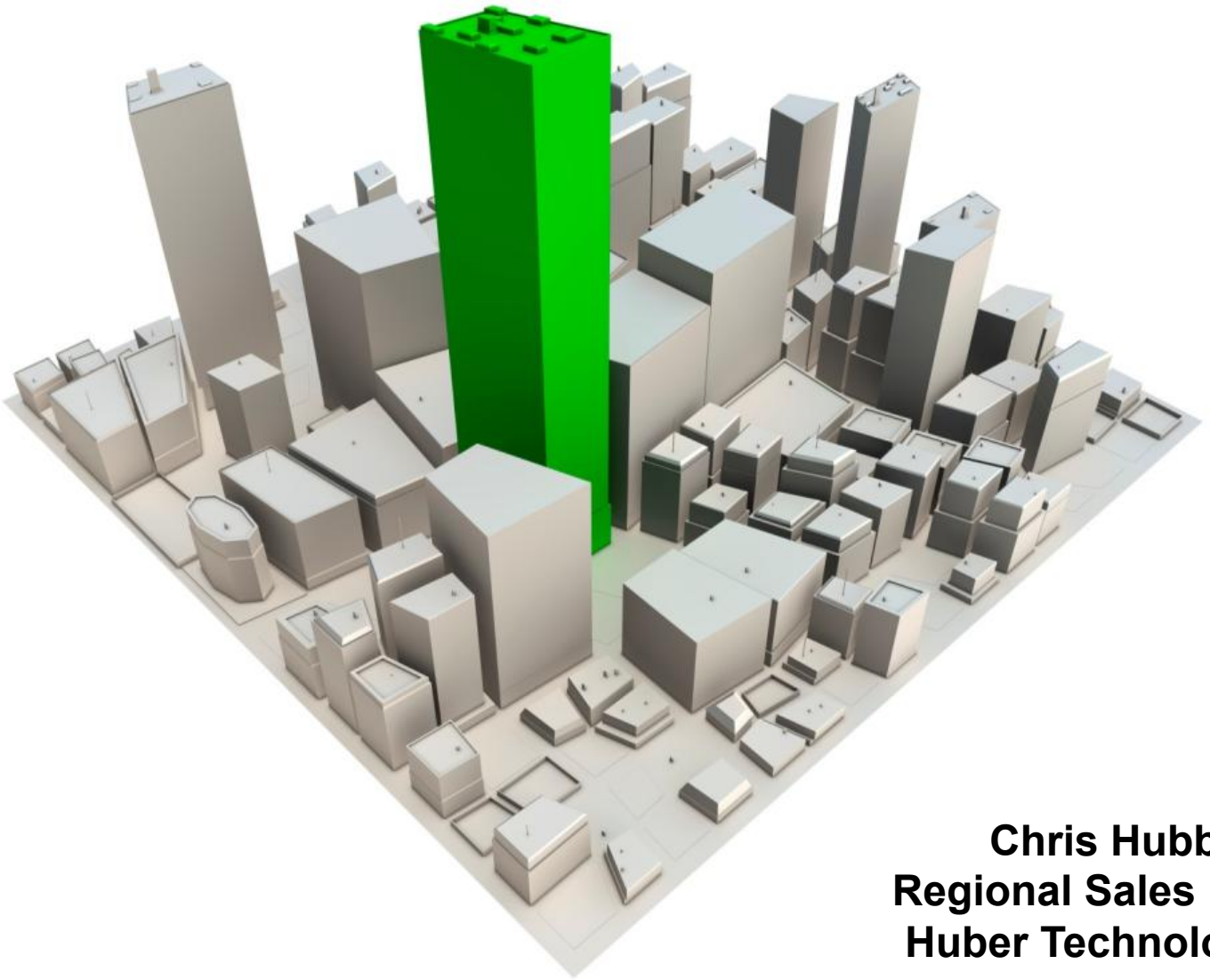
- Heating and Cooling applications at WWTP
  - Admin buildings/ comfort HVAC
  - Biosolids drying
  - Green Technology showcase
- Problem‘ Customers
  - Customers with hot waste water and/or must quench their waste water to meet temp limits
- Potential Revenue Stream
  - Energy for heating and cooling, especially in a district system.
  - Being explored by Washington DC, Boise, ID, others.

Wastewater Heat Exchanger

HUBER RoWin Heat Exchanger



Many Thanks & Questions?



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