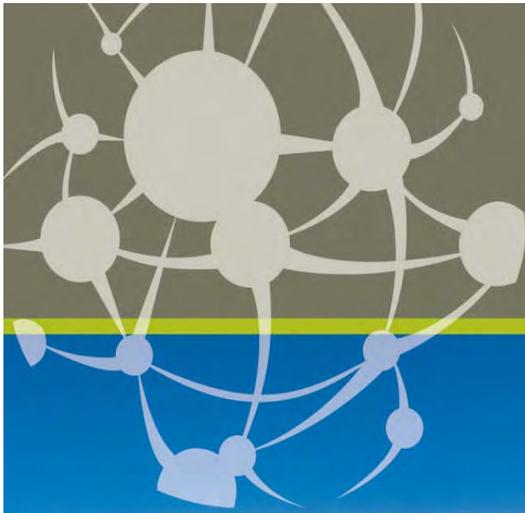


# Net Zero and Beyond



San Francisco | Los Angeles | San Jose | Seattle | New York | Washington, DC | Toronto | Vancouver | Dubai | Manila | Seoul

Andrea Traber  
Dave Ramslie  
Ben Galuza

Integral Group

SPI Roundtable  
Cambridge MA  
November 14, 2013



# Introduction | About Us

**Twenty Nine**

LEED Platinum Certified Projects

**The First**

Certified Net Zero Energy Project (2 total)

**Forty One**

Net Zero Projects in Process or Completed

**Eight**

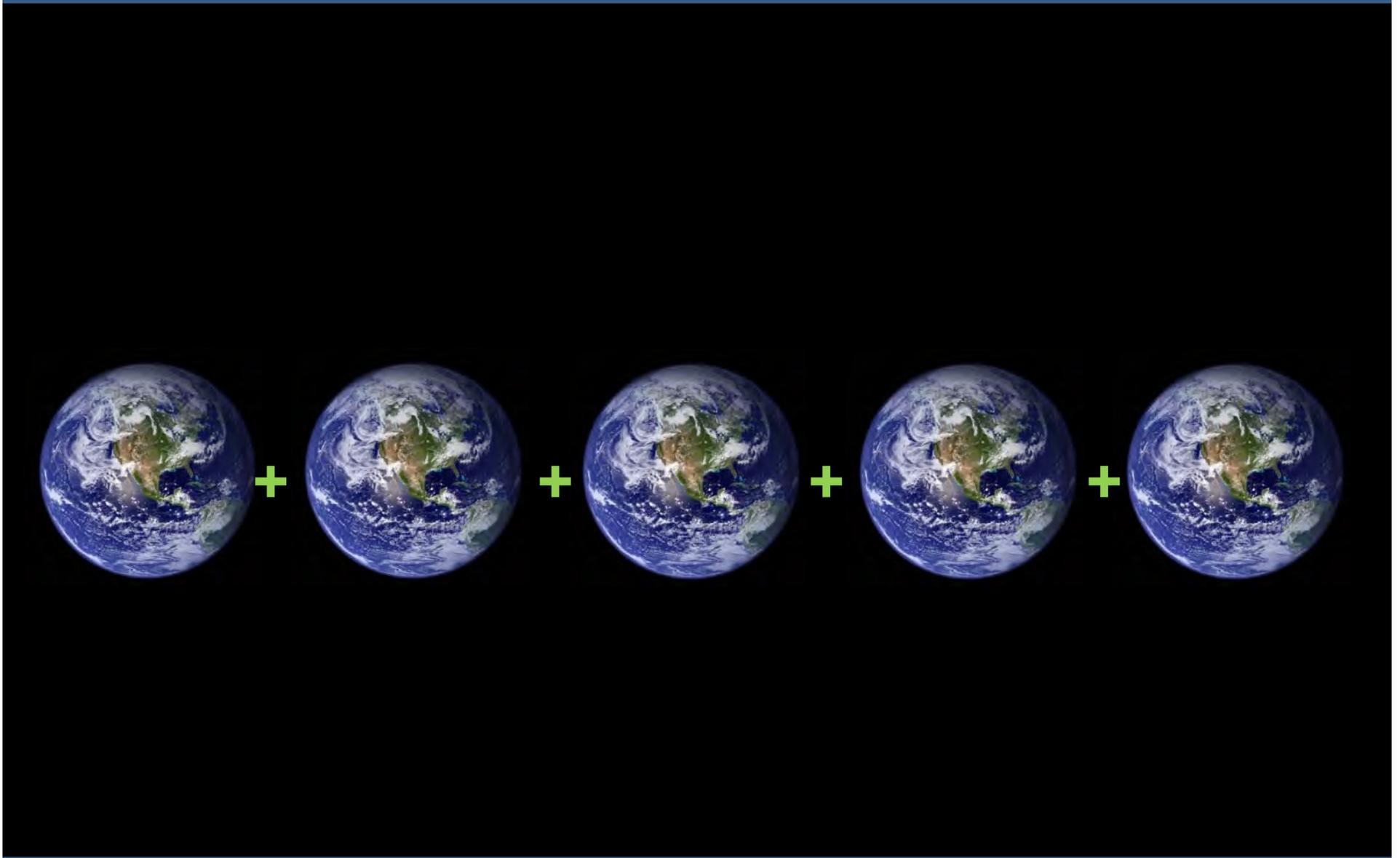
Living Building Challenge Project in Process or Completed

**Most Points**

LEED CI (102) and LEED NC (95) Certified Projects



# Why?



Trust | Nurture | Inspire

# What?

# 07

NET ZERO  
ENERGY



- **One Building at a time?**
  - **Yes AND....**
  - **Zero Net Energy....is it enough?**
  - **Low and No Carbon....how?**

100% of the project's energy needs must be supplied by on-site renewable energy on a net annual basis.

# SCALE UP!

- Policy, stretch goals, energy codes
- EXISTING BUILDINGS
- Neighborhoods, communities, districts, towns, cities

imagine    perform    accelerate    sustain

# EcoDistricts

## 1. Equitable Development

- Goal: Promote equity and opportunity and ensure fair distribution of benefits and burdens of investment and development.

## 2. Health & Wellbeing

- Goal: Promote human health and community well being.

## 3. Community Identity

- Goal: Create cohesive neighborhood identity through the built environment and a culture of community.

## 4. Access & Mobility

- Goal: Provide access to clean and affordable transportation options

## 5. Energy

- Goal: Achieve net zero energy usage annually

# Fort Collins Zero Energy District

- Goal: FortZED, Zero Energy District, 2 sq. mi., including downtown and CSU
- 7,000 customers—residential and commercial
- 8 distribution feeders
- Approximately 45 MW peak demand, with goal to reduce this peak demand by 20%-30%
- Over 200,000 MWh/year usage in the area
- FortZED represents about 10% - 15% of Fort Collins Utilities' distribution system



# Fort Collins Zero Energy District

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- Partnerships
  - Colorado Clean Energy Cluster: Economic development incubator for clean energy
  - Fort Collins Utilities, municipal utility
  - UniverCity Connections, CSU
- DOE Renewables and Distributed Systems Integration (RDSI)  
\$6.3M grant
- Technology Partners
  - Spirae
  - Advanced Energy
  - Eaton

# Fort Collins Zero Energy District

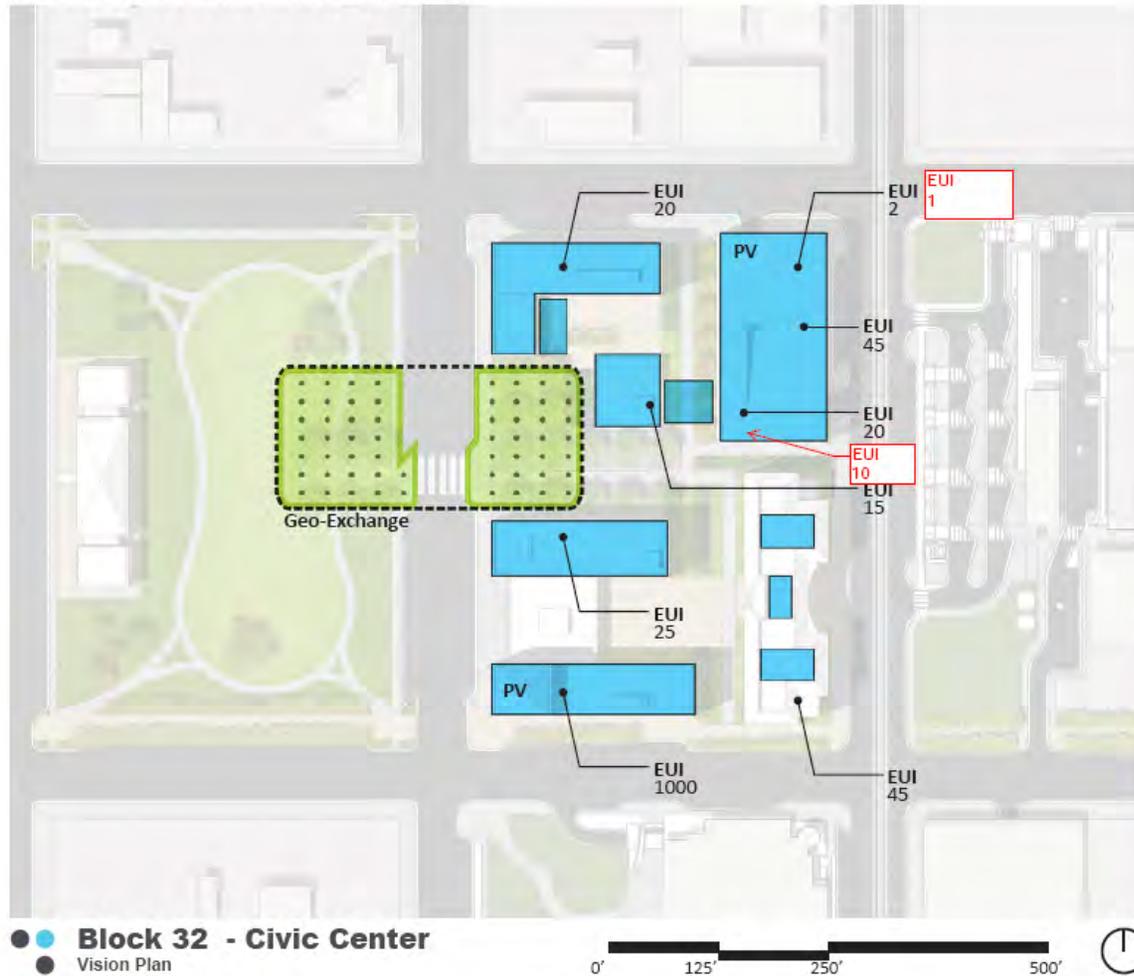
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- Distributed Energy Resources:
  - Energy generation will come from renewable sources within a 50-mile radius of FortZED
  - renewable and conventional distributed sources within the district
  - demand reduction and response within the district
- Current Planning:
  - Resilient Design strategies: passive survivability, distributed energy, infrastructure locations, emergency supplies
  - District Energy, heating, cooling and power
  - Microgrids at key facilities
  - Net Zero Water

# Fort Collins Zero Energy District

## Scenario 1 Energy Use & Generation Profile EUI Basis

### ENERGY USE AND GENERATION



|                          |       |     |
|--------------------------|-------|-----|
| <b>Net Generation</b>    |       |     |
| Energy Use               | -3175 | MWh |
| Energy Generation        | 2476  | MWh |
|                          | -699  | MWh |
| Mason Parking Generation | 938   | MWh |
| Net Generation           | 239   | MWh |

# Fort Collins Zero Energy District

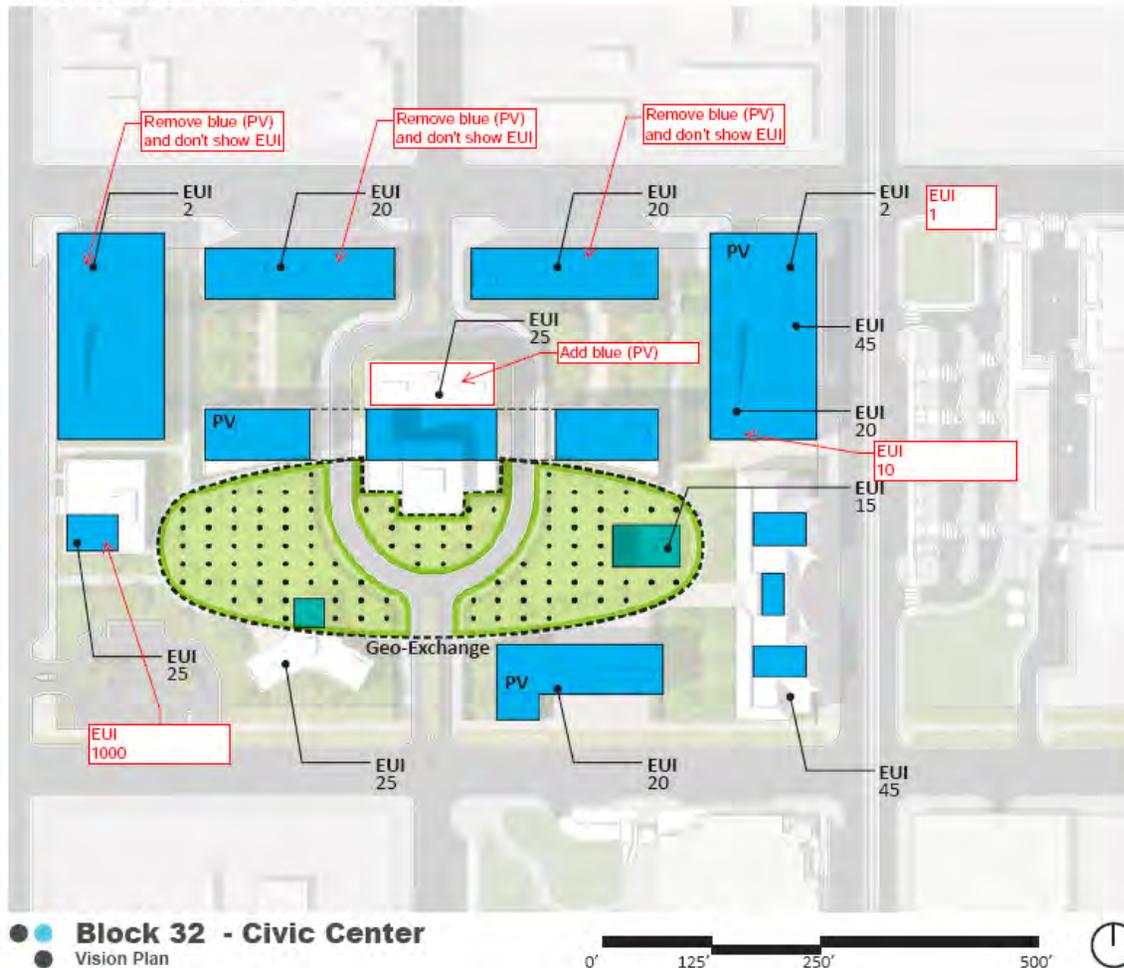
## Scenario 1 Storm and Water Treatment System



# Fort Collins Zero Energy District

## Scenario 2 Energy Use & Generation Profile EUI Basis

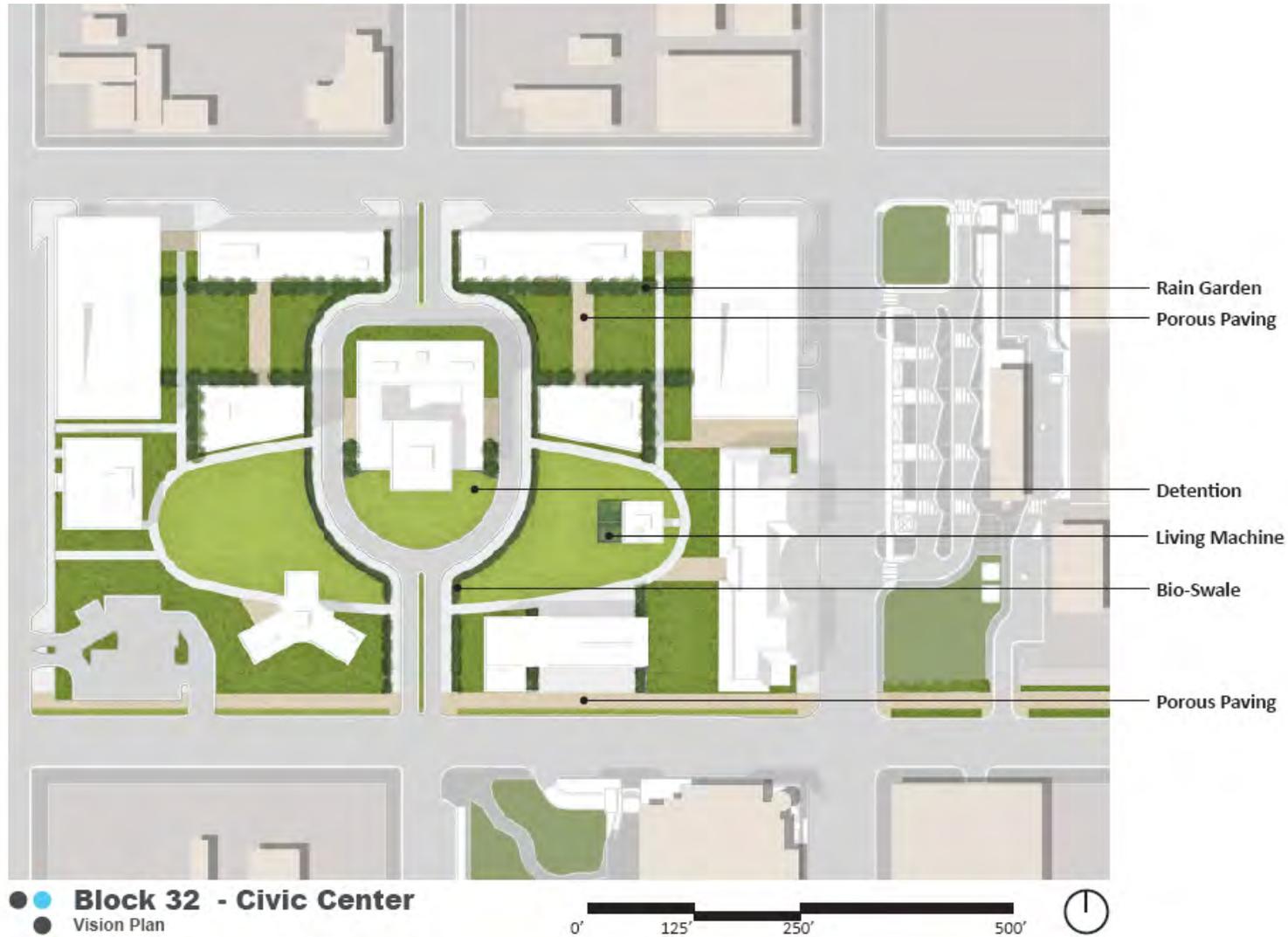
### ENERGY USE AND GENERATION



|                          |            |            |
|--------------------------|------------|------------|
| <b>Net Generation</b>    |            |            |
| Energy Use               | -2896      | MWh        |
| Energy Generation        | 2213       | MWh        |
|                          | -683       | MWh        |
| Mason Parking Generation | 938        | MWh        |
| <b>Net Generation</b>    | <b>255</b> | <b>MWh</b> |

# Fort Collins Zero Energy District

## Scenario 2 Storm and Water Treatment System



# Projects | Master Plan

## Walter Reed Medical Center Master Plan

Washington, DC

Office: : Washington, DC

Services: Infrastructure Master Plan



- 2M sqft over 62.5 A
- 2030 Net Zero Energy Target
- 2040 Carbon Neutral
- Establish Building Type Energy Budgets
- Phased infrastructure Development
- “Future Proofing” to incorporate new distributed energy generation



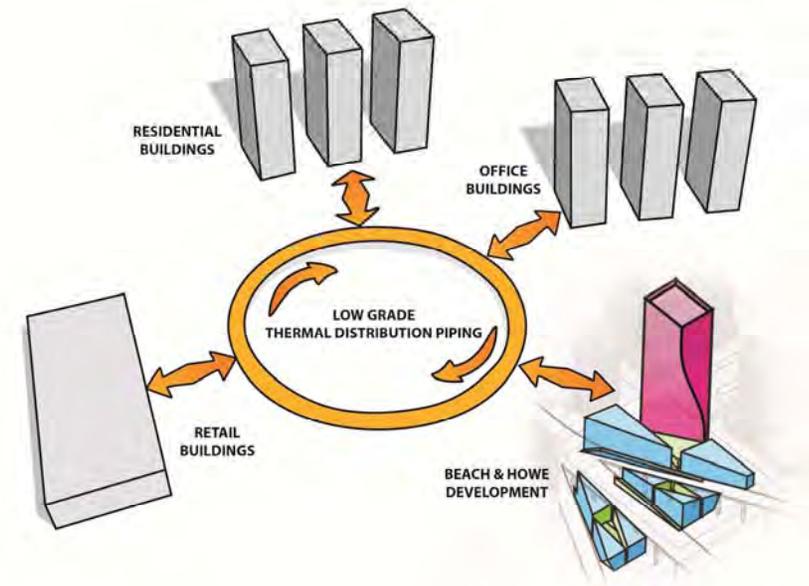
# Stage 1 – B&H Site Connected to ATDFPS



- Convert DFPS into Ambient Temp DES or "ATDFPS"
- Build Central Plant on adjacent site
- Connect B&H to ATDFPS
- B&H peak heating demand 2.5MW
- ATDFPS intrinsic geo-exchange heating capacity 1.6MW with heat pump
- Supplemental heating by condensing Nat. Gas boilers

# “Ambient Loop” District Energy Concept

- DFPS converted into “Ambient Temperature” (5 -15C) district energy system serving majority of Downtown
- New Energy Centre pump station converts existing stagnant DFPS loop into thermal distribution system
- Combined with distributed building level heat pump H&C plants
- Combined with distributed “low-grade” thermal energy sources



# Cambie Street Corridor

- ❑ “DE Ready” requirements
  - ❑ “Hydronic” heating and cooling
- ❑ DE feasibility requirements
  - ❑ Required for “up-zoning”
- ❑ DE “Franchise Areas”
  - ❑ Creates market certainty

