High Rise / Low Carbon: Sharing Heat

In this latest event in the High Rise / Low Carbon Series, NYSERDA and BE-Ex have gathered industry experts that will feature projects utilizing hydronic systems, thermal networks, and waste heat recovery across the commercial sector. Developed in support of the Empire Building Challenge (EBC) this event will feature innovative strategies for heat recovery deployed by the award-winning partners in this flagship New York State program.

Intro Remarks
Susanne DesRoches, Vice President, Clean and Resilient Buildings, NYSERDA

Moderator
Molly Dee Ramasamy, Head of Deep Carbon Reduction, Jaros, Baum & Bolles

Presenters:
Mike Izzo, Vice President, Carbon Strategy, Hines
Elizabeth Moronta, Senior Vice President of Development, Omni New York LLC

Panelists:
Mike Izzo, Vice President, Carbon Strategy, Hines
Samuel Long, Innovation Specialist, Danfoss
Adam Friedberg, Principal, Buro Happold
Miguel Gaspar, Vice President/Group Leader, Loring Consulting Engineers

September 14, 2022 | 9 to 10:30 am | 1.5 AIA LU|HSW
Building Energy Exchange | be-exchange.org
High Rise / Low Carbon

BE-EX

September 14th, 2022

Hudson Square Properties

Trinity Church Wall Street

Hines
Real Estate’s Responsibility
REAL ESTATE HAS ONE OF THE HIGHEST GLOBAL FOOTPRINTS

73% of Global GHG is from Energy

38% of total Energy is from Real Estate

70% of total GHG in Center Business Districts (NYC Data)

Sources: Our World in Data, World Green Building Council, Global Status Report 2017, NYC 2017 GHG Emissions Inventory
Wasted Energy
THERE IS NOT AN ENERGY PROBLEM, IT IS AN ENERGY WASTE PROBLEM

Sources: Lawrence Livermore National Laboratory and the Department of Energy
Science Based Pathways

THE PATH IS UNCERTAIN HOWEVER THE FUTURE IS CLEAR

All pathways lead to an electrified future, no matter the geography

Sources: CRREM US 1.5C Pathways
Energy Efficiency is Still the Cheapest Form of Energy

ENERGY EFFICIENCY MAXIMIZES RENEWABLE ENERGY UPTAKE AND REDUCES ENERGY COSTS

For every 50% demand reduction we can serve 2x the number of buildings, reducing the cost of renewable infrastructure.

Sources: ACEEE Utility Scorecard 2020, Lazard 2020
The Problem Statement
TRANSFORMING THE BUILT ENVIRONMENT, STARTING WITH 345 HUDSON

- **900k Square Feet**
- **17 Floors**
- **1930’s Vintage**
- **Natural Gas Boilers**
- **Steam Heating**
- **Floor Level Packaged Units**
- **80 kbtu/SF**
- **54% Energy Waste**
- **5k Tons CO₂e**
- **3.6 MW Electrical Peak**
Decarbonizing Real Estate
WHAT IF A SIMPLE SOLUTION CAN SOLVE A COMPLEX PROBLEM

Decarbonize the grid + Decarbonize Heating = NET ZERO

Redefine the status quo
System Boundaries

DISSECTING THE ENERGY FLOWS WITHIN THE CURRENT INFRASTRUCTURE

Scope 1 Emissions: 5237 tCO₂e/Y

Scope 2 Emissions:

SB1: energy supplied
- conditioned air
- electricity
- hot water
- steam

SB2: tenant/floor equipment
- water cooled air conditioner
- 4x38 ton
- electric boiler for DHW
- condenser water loop with multiple cooling towers
- primary air handling units
- electricity 68.9 MBTU/Y

SB3: building

THE WEAKEST LINK

existing supply efficiency 200-300%
proposed supply efficiency 500-600%

Sources: NYSERDA Empire Building Challenge Submission - URBS
Existing Building Approach

RELY ON FOSSIL FUELS, LINEAR ENERGY SYSTEMS WITH NO ENERGY RECOVERY

1. Outside Air Unit
   DX/Steam Central OA unit

2. Condenser Water Loop
   Heat rejection system

3. DX Packaged Units
   Floor by floor All Air Systems

4. Exhaust System
   Constant exhaust, tied to OA flow

5. Gas Fired Steam Boiler
   Fossil fuel heating
Circular System Approach

ELECTRIFY HEATING, MOVE TO HYDRONIC BASED SYSTEMS AND REDUCE THE AMOUNT OF WASTE ENERGY

1. Air-Air Energy Recovery
2. Transition to DOAS Floor by floor WSHP
3. Ambient Loop Convert existing condenser water system
4. Waste Energy Transport Connect buildings for waste energy utilization
5. Thermal Storage Capture energy waste
6. Electrify Heating Air-Source Heat Pumps
Its Possible in an Existing Building

REIMAGINING THE NEW NORMAL WITHIN THE EXISTING BUILDING SECTOR

52% energy reduction
66% emission reduction
92% peak heating reduction

Sources: CRREM US 1.5C Pathways
Thank you
WHITNEY YOUNG MANOR
354 AND 358 NEPPERHAN AVE, YONKERS, NY

• 195 apartments originally built in 1973
• Apartments are contained within two 12-story buildings
• Concrete superstructure, brick façade on CMU back-up wall
• Original rehab in 2006 under the LIHTC program was completed by Omni New York LLC
• Original LIHTC compliance period ended in 2021, and Omni New York LLC is pursuing a LIHTC resyndication to complete a $22 million comprehensive retrofit
• Project was awarded $5 million by NYSERDA as a part of Empire State Building Challenge
• Comprehensive retrofit to include:
  • Full envelope retrofit—including new EIFS exterior, UPVC casement windows and roof
  • Overhaul of the existing electrical resistance heating system and window ACs to a new centralized electric heat pump plant with backup gas-fired condensing boilers
  • Full interior upgrades, including new flooring, bathrooms, kitchens, elevators, etc.
EXISTING CONDITIONS
POTENTIAL SCOPE ANALYSIS

• Bright Power – Cost/Benefit Analysis
• Loring – Mechanical Design Options
• Curtis Ginsberg – Envelope Analysis

• Decision between Electric and Gas
  • Increased implementation cost
  • Increased operating cost
  • Reducing greenhouse gases/Meeting new regulations
The ASHP uses an air-cooled condenser to provide dual temperature water to the building fan coil units (FCU).

Increased efficiency over existing system. Existing building used electric baseboard and window AC.

Some ASHPs have the option to provide a domestic hot water connection for simultaneous heating and cooling during the summer.
ENERGY RECOVERY VENTILATOR (ERV)

- An ERV exchanges energy from the return air and supply air.
- Use kitchen and bathroom exhaust for return air which is normally exhausted out with no energy recovery.
- Outside air is supplied to each apartment which is tempered by the ERV. This reduces the load or the FCUs.
- The existing building had no outside air to the apartments causing additional infiltration from the outside. The reduced infiltration from pressurizing the building helps reduce the total load of the building.
SHARC SYSTEM

- SHARC System uses wastewater as a source to reject heat.
- Wastewater is pumped through a Macerator to break down solids.
- SHARC system will filter out larger particles and send filtered water through heat exchanged.
- Average water temperature through the heat exchanger is 70°F.
- Water to Water heat pump is used after heat pump to help increase the temperature of the water.
discuss.

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Scan to access our first High Rise / Low Carbon Partner Profile, showcasing Hudson Square Properties' 345 Hudson retrofit.