High Rise / Low Carbon: Advanced Ventilation Goes Mainstream

Building Energy Exchange and NYSERDA are pleased to host a High Rise / Low Carbon Series event focused on the advanced technology and benefits of modern ventilation systems used in high performance building retrofits. Join critical leaders in this field as they discuss how these innovative ventilation systems are addressing critical needs across all segments of the building sector, while also providing the foundation for full electrification.

Opening Remarks
Alexander Jahn, Senior Project Manager, NYSERDA

Presenters
Daniel Bersohn, Associate, BuroHappold Engineering
Benjamin Rodney, Vice President, Construction, U.S. East Region, Hines

Moderator
Benjamin Rodney, Vice President, Construction, U.S. East Region, Hines

Panelists:
Vinca Bonde, Sales Director, Energy Machines
Grace Kolb, Mechanical Engineer, AKF Group
Tony Abate, Vice President and Chief Technology Officer, AtmosAir

October 26, 2022 | 9 to 10:30 am | 1.5 AIA LU|HSW
Building Energy Exchange | be-exchange.org

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

be ex building energy exchange

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Air-Water Systems and Ventilation Energy Recovery

October 26, 2022

Efficient HVAC Design Drivers

- Transport energy efficiency
  - Phase change > liquid > air
- Generation efficiency
  - Large temp difference -> good transport efficiency, bad generation efficiency
- If you move air get the best use out of it
- Think before you throw energy away

What Does Decoupling Mean?

- One sensor
- One setpoint
- One actuator

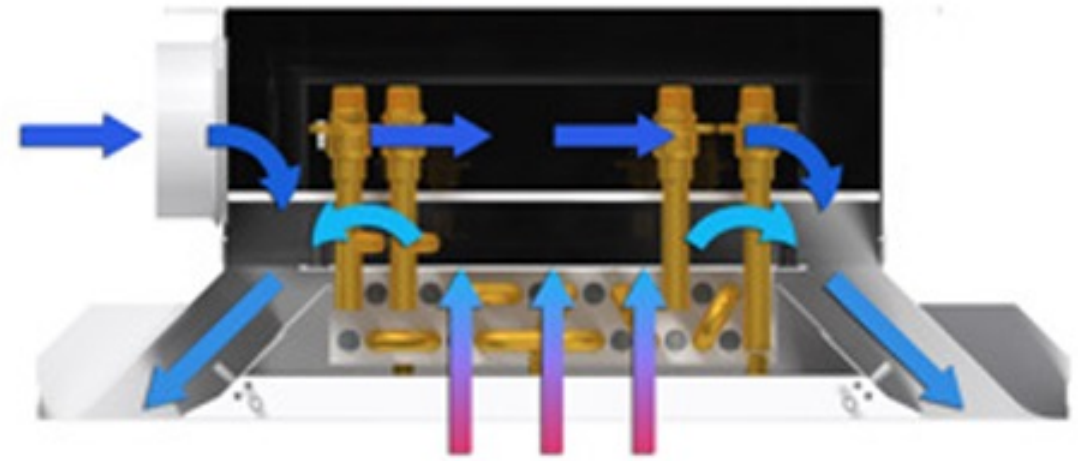
Regulated Airflow – VAV Box

6” inlet with regular (6”) casing

6” inlet with oversized (8”) casing

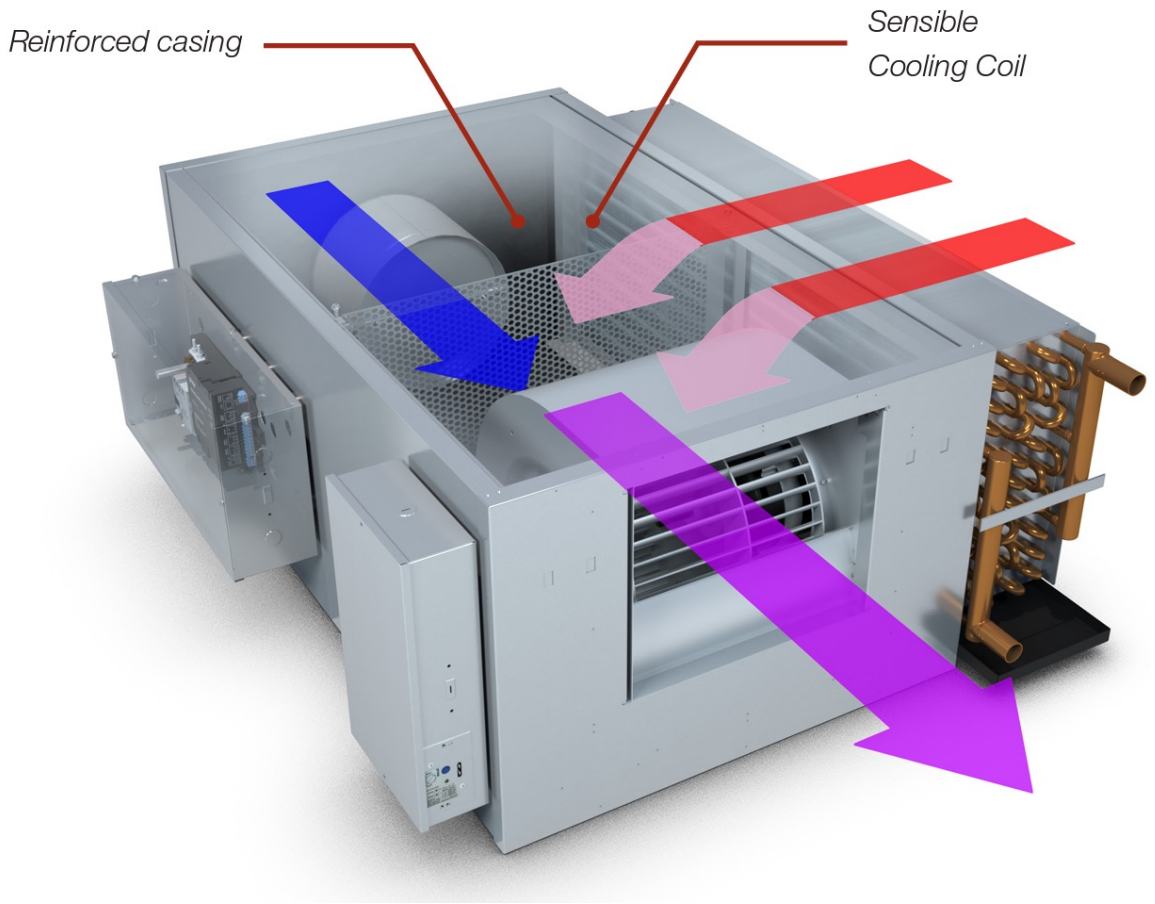
from Price Industries catalog

Induced Airflow – Active Chilled Beams



from Price Industries catalog

Decoupled Airflow – FPB/FCU



from Price Industries catalog

Decoupling

System type	Cooling	Dehum	Ventilation	Heating
VAV	VAV box damper			Reheat valve
FCU	Cooling valve		Vent damper	Heat valve
Induction units/ACB	Primary air + cooling valve*	Primary air		Heat valve*
FPB and Radiant	Cooling valve + primary air	VAV box damper		Heat valve

*No capacity without primary air flowing

Decoupling

System type	Primary Air	CFM/SF *	%OA*	Static	Typical flow %
VAV	Size to cooling load	0.7-1.1	10-15	=	25-100
FCU	Size to vent load	0.1-0.2	100	=	70-100
Induction units/ACB	Size to dehum or induction load	0.3-0.4	30-40	+0.6”	80-100
FPB and Radiant	Size to dehum load	0.25-0.35	30-40	=	75-100

*Typical for office buildings. Please do your load and vent calcs properly for every project.
**Compared to VAV

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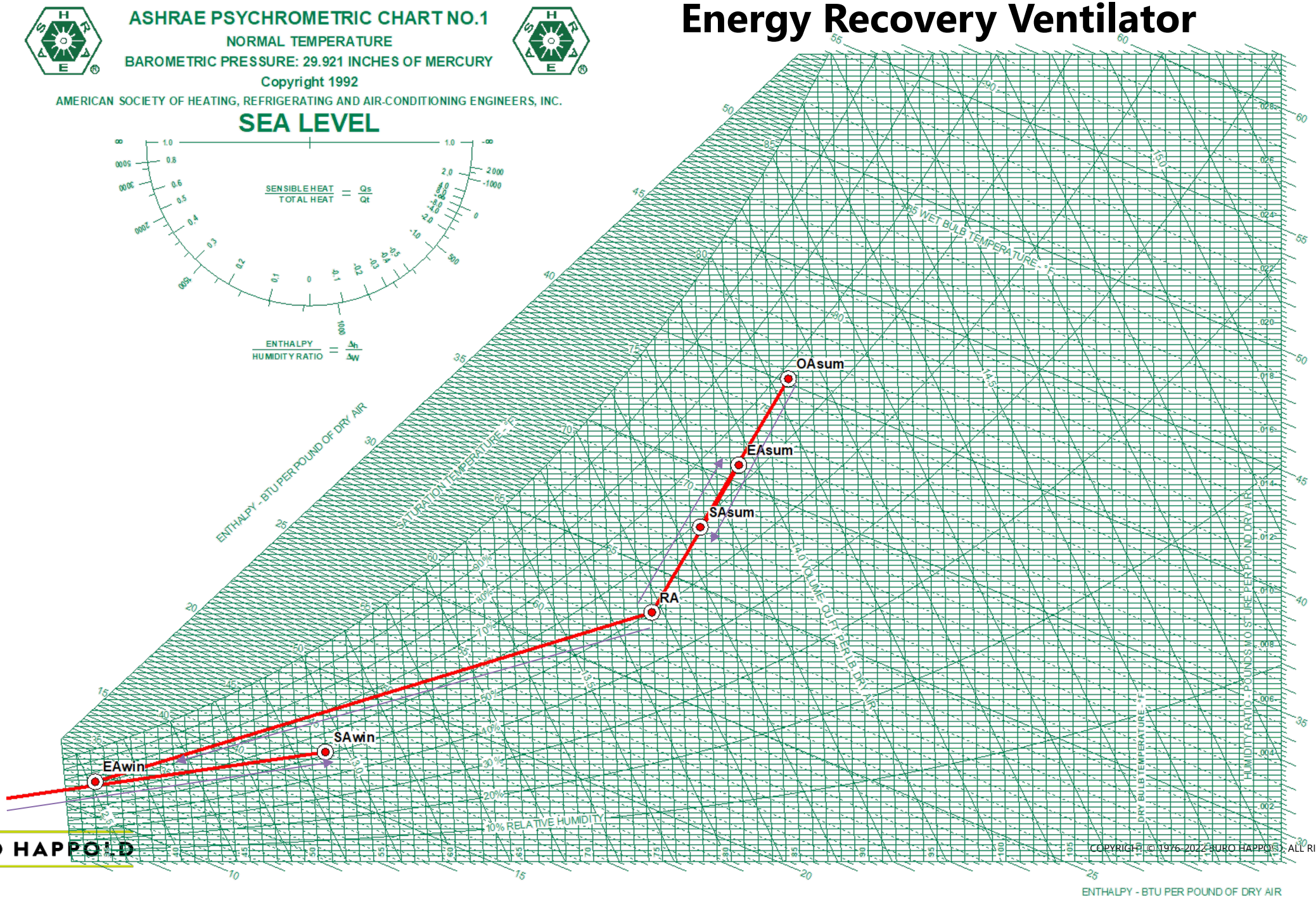
Energy Recovery Ventilator



Energy Recovery Ventilators

Model Chosen: ELT-130

Elite Cooling Performance Cartoon

FläktGroup SEMCO

Order String : ELT-130-A-E-A-C-B-0-A-B-B-A-B-A-B-A-0-0-0

UWCH-74

EA	
Dry bulb (oF)	84.1
Wet bulb (oF)	72.7
Grains	103.3
Enthalpy (BTU/Lb)	36.4
Airflow (scfm)	12,525

RA LW	
Dry bulb (oF)	81.6
Wet bulb (oF)	72.0
Grains	103.3
Enthalpy (BTU/Lb)	35.8
Airflow (scfm)	12,525

RA	
Dry bulb (oF)	75.0
Wet bulb (oF)	62.5
Grains	64.8
Enthalpy (BTU/Lb)	28.1
Airflow (scfm)	12000.0
Return Humidity	50%

OA	
Dry bulb (oF)	85.3
Wet bulb (oF)	76.7
Grains	125.6
Enthalpy (BTU/Lb)	40.2
Airflow (scfm)	12,525

SA LW	
Dry bulb (oF)	78.7
Wet bulb (oF)	68.2
Grains	87.1
Enthalpy (BTU/Lb)	32.5
Airflow (scfm)	12,000

SA LF	
Dry bulb (oF)	81.2
Wet bulb (oF)	69.0
Grains	87.1
Enthalpy (BTU/Lb)	33.1
Airflow (scfm)	12,000

FILTER

Unit Effectivness	64.1%
Supply Sensible Efficiency	64.4%
Supply Latent Efficiency	63.3%
Minimum Cooling Season RER	78

Supply Air Pressure Loss	0.83
Exhaust Air Pressure Loss	0.83

AHRI Certified Rating Point (note 1)

FAN HEAT ADDED: 2.5

Total Cooling Load Delivered	31.8	tons
Wheel	31.8	tons

Elite Heating Performance Cartoon

ELT-130

FläktGroup SEMCO

UWCH-74

EA	
Dry bulb (oF)	36.7
Wet bulb (oF)	32.4
Grains	20.2
Enthalpy (BTU/Lb)	11.9
Airflow (scfm)	12,525

RA LW	
Dry bulb (oF)	34.2
Wet bulb (oF)	30.9
Grains	20.2
Enthalpy (BTU/Lb)	11
Airflow (scfm)	12,525

RA	
Dry bulb (oF)	72.0
Wet bulb (oF)	55.8
Grains	40.7
Enthalpy (BTU/Lb)	23.6
Airflow (scfm)	12000.0
Return Humidity	35%

OA	
Dry bulb (oF)	13.0
Wet bulb (oF)	12.0
Grains	8.6
Enthalpy (BTU/Lb)	4.4
Airflow (scfm)	12,525

SA LW	
Dry bulb (oF)	51.0
Wet bulb (oF)	43.2
Grains	28.9
Enthalpy (BTU/Lb)	17
Airflow (scfm)	12,000

SA LF	
Dry bulb (oF)	53.5
Wet bulb (oF)	44.4
Grains	28.9
Enthalpy (BTU/Lb)	17.3
Airflow (scfm)	12,000

FILTER

Unit Effectiveness	64.1%
Supply Sensible Efficiency	64.4%
Supply Latent Efficiency	63.3%
Minimum Heating Season RER	263

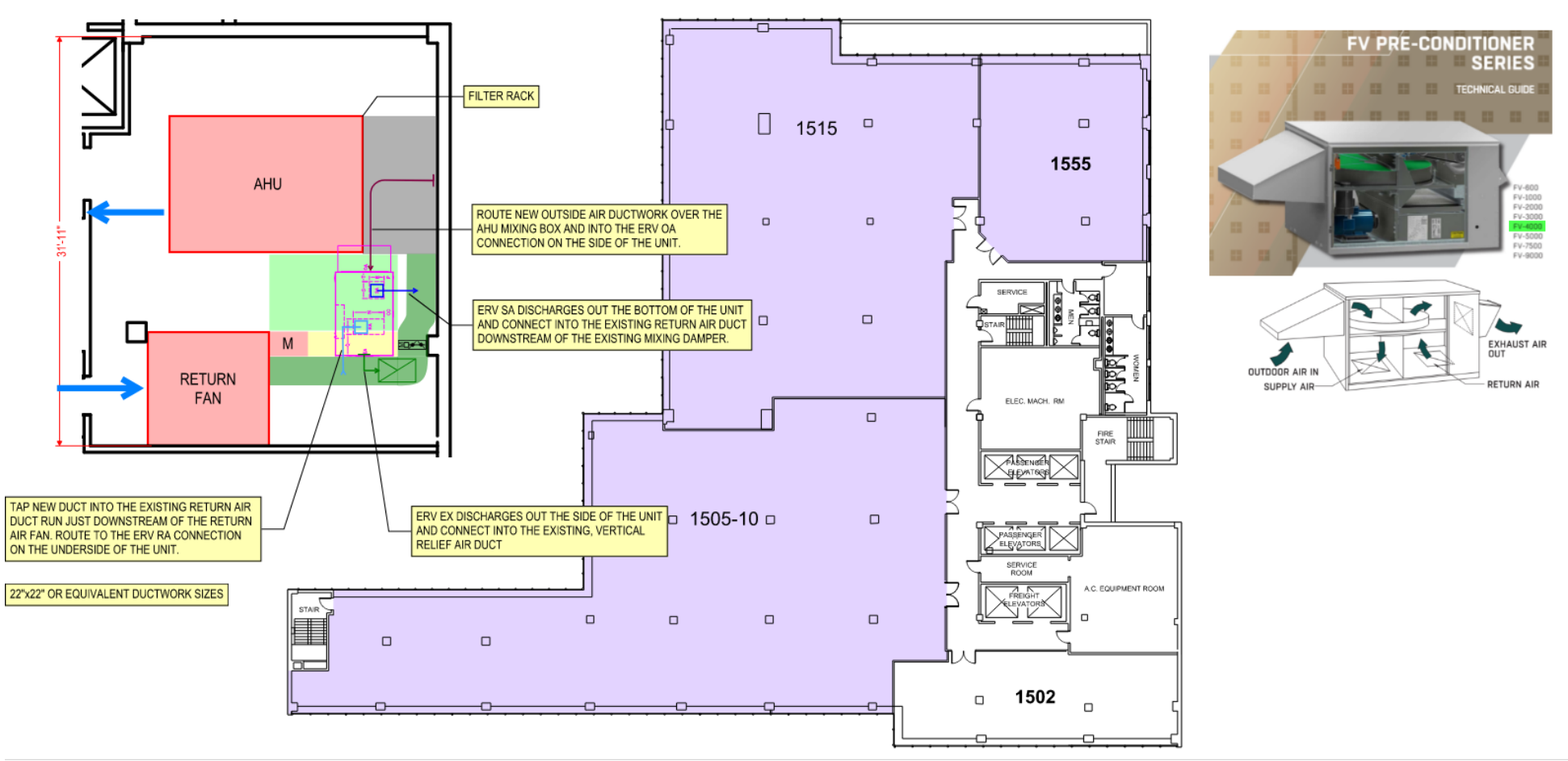
Supply Air Pressure Loss	0.77
Exhaust Air Pressure Loss	0.81

AHRI Application Rating Point (note 2)

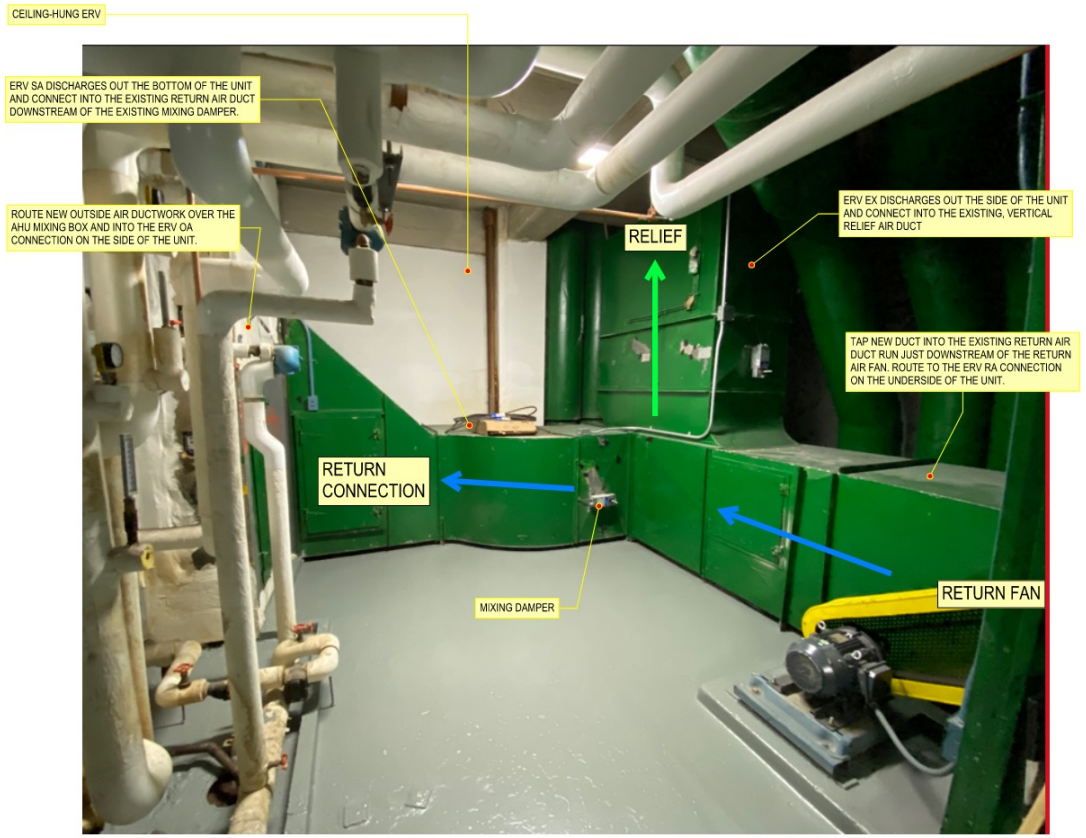
FAN HEAT ADDED: 2.5

Total Heating Load Delivered	58.0	tons
Wheel	58.0	tons

Energy Recovery Ventilators



Energy Recovery Ventilators



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JUMP ON BOARD!

We’d love to hear from you

Daniel Bersohn
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www.burohappold.com

HUDSON SQUARE PROPERTIES

October 26, 2022

Hudson Square Sustainable Development

High Rise/Low Carbon:
Advanced Ventilation Goes Mainstream

345 Hudson Street
Empire Building Challenge

NEW YORK STATE OF OPPORTUNITY. NYSERDA

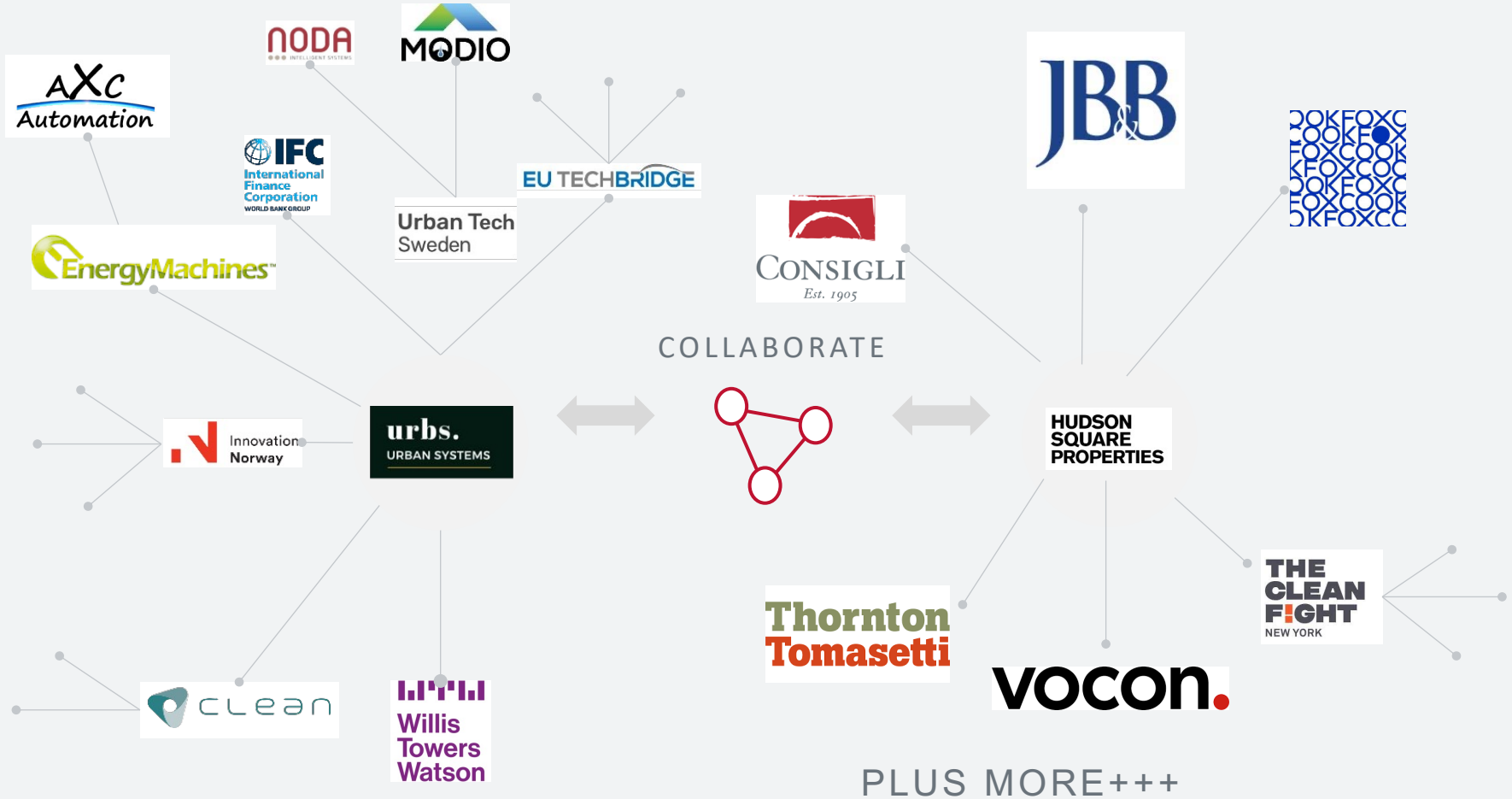
Empire Building Challenge PARTNER
Reimagining Low-carbon Buildings

be ex

Hines

TEAM

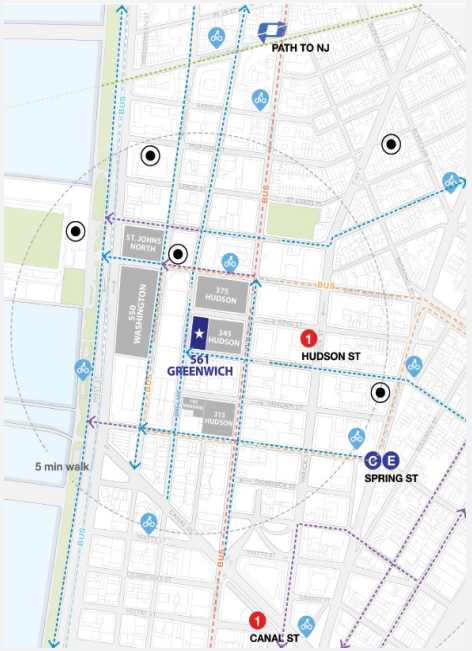
HUDSON SQUARE PROPERTIES



PLUS MORE+++

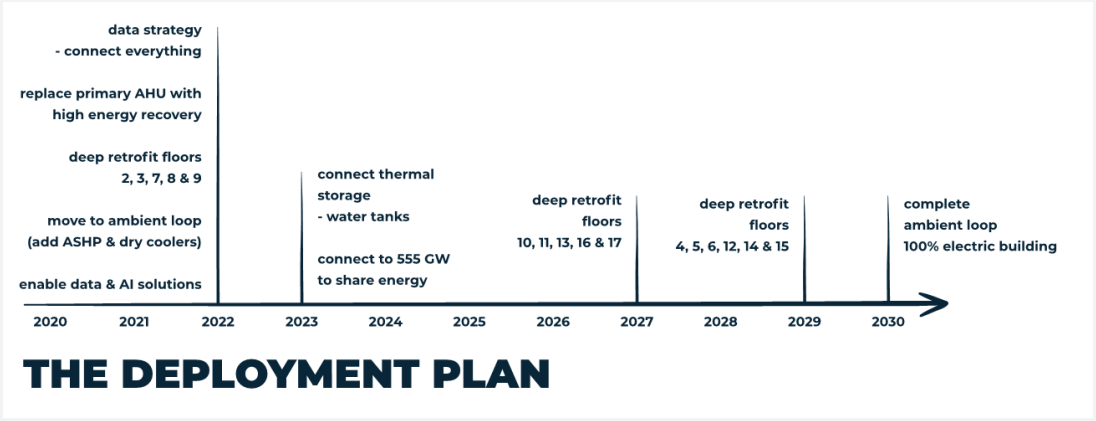
How do we marry a new development up to an existing 1930's building?

345 Hudson | 900k SF | 17 Floors | 1930's Vintage



555 Greenwich New Development

Hudson Square



345 FEATURES

Natural Gas Boilers

Steam Heating

Floor Level Packaged Units

555 FEATURES

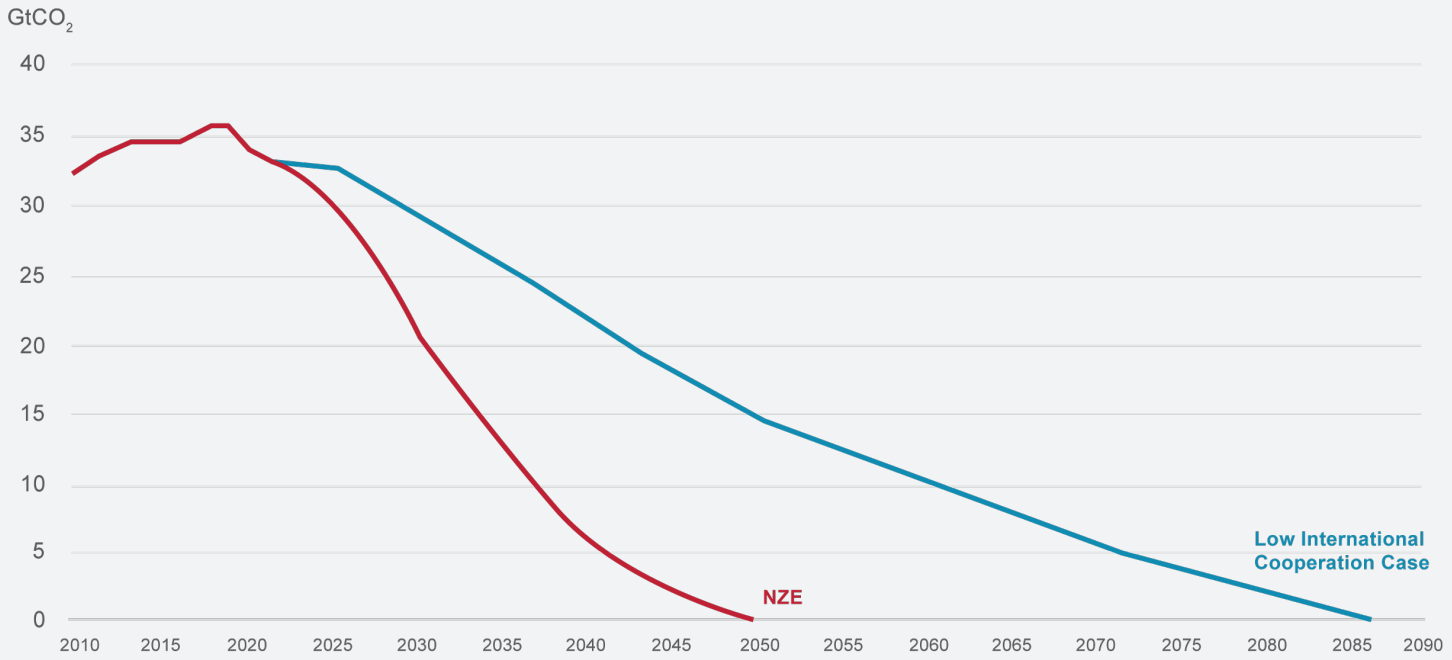
All Electric

HIGH RISE/LOW CARBON SERIES: ADVANCED VENTILATION | OCTOBER 26, 2022

GLOBAL COLLABORATION

Without global collaboration we will fall short of our goals by 40 years. Hines has taken a position to collaborate with sustainability leaders in the industry to pave the path forward for real estate.

GLOBAL ENERGY-RELATED CO_2 EMISSIONS



Sources : IEA, Net Zero by 2050, July 2021

EU TECHBRIDGE

Urban Tech Sweden

urbs. URBAN SYSTEMS

IFC International Finance Corporation WORLD BANK GROUP

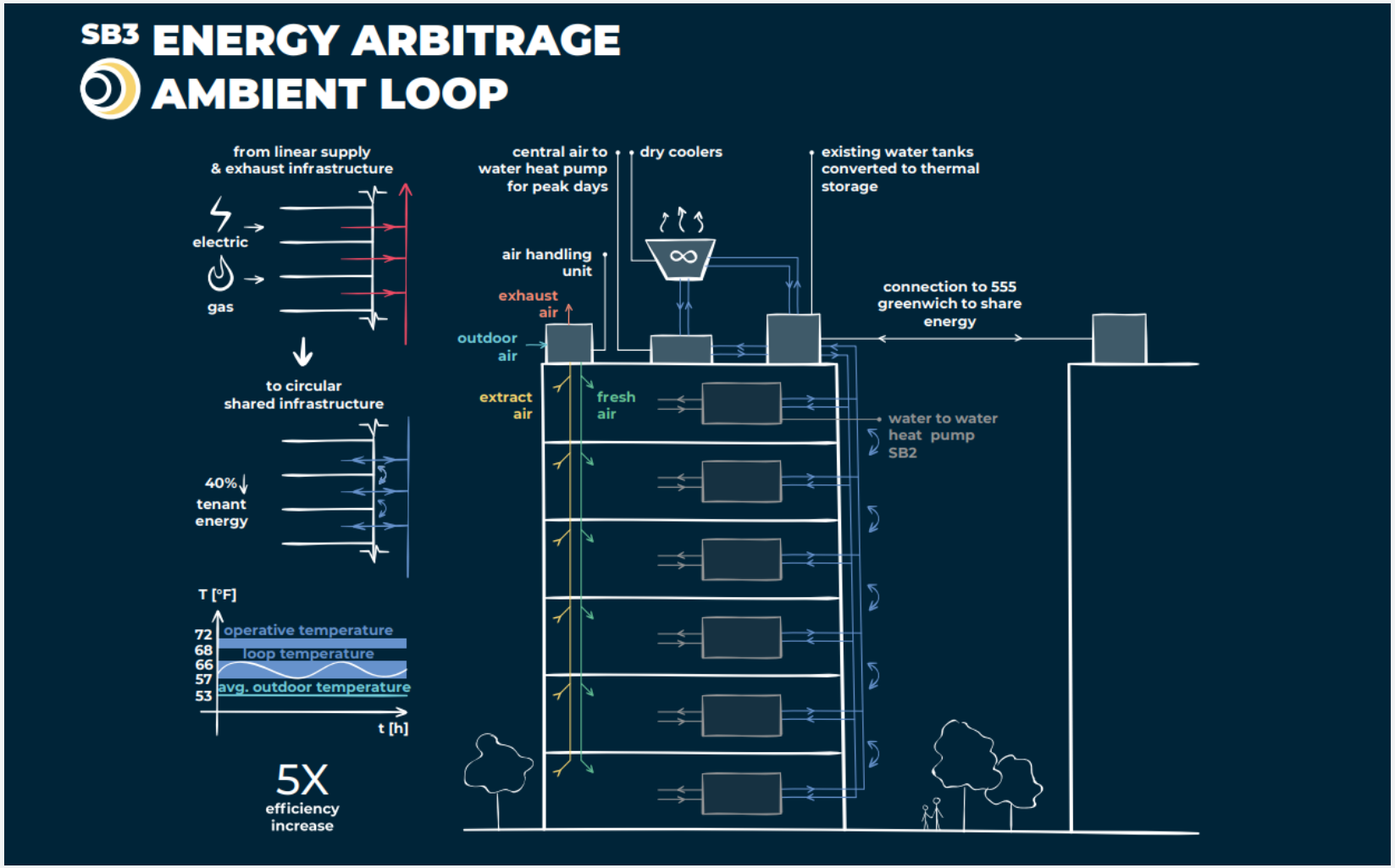
Innovation Norway

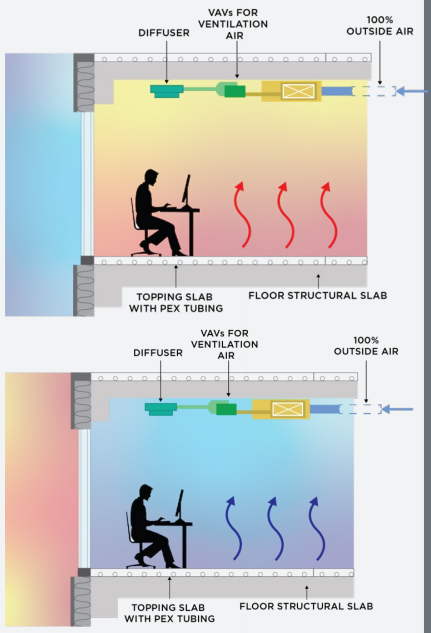
clean

345 HUDSON CIRCULAR SYSTEM APPROACH

Electrify heating, eliminate economizer and move to hydronic based systems

Energy Arbitrage Loop





Remove on site fossil fuels and use the natural diversity and thermal storage within a building

345 CURRENTLY FEATURES

Natural Gas Boilers

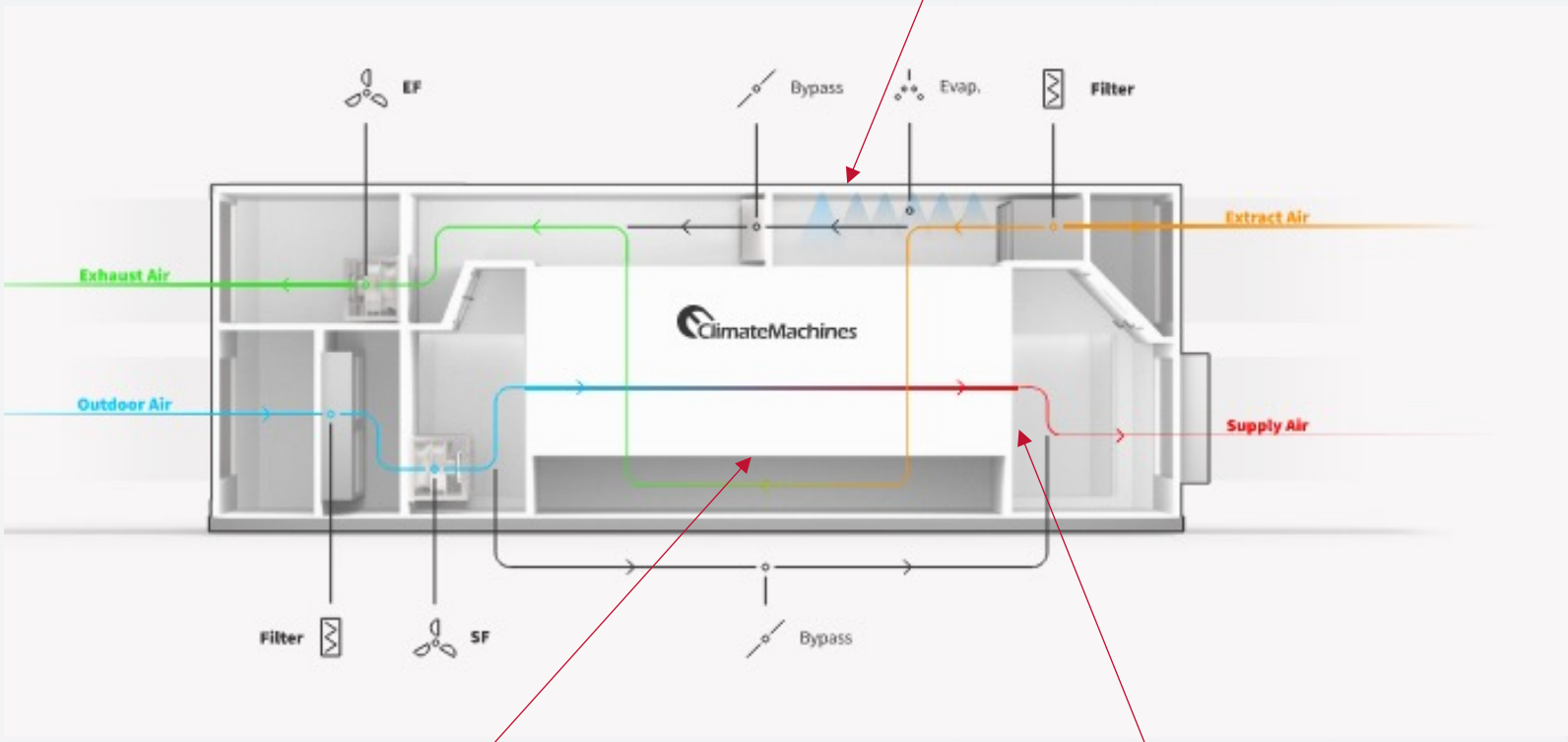
Steam Heating

Floor Level Packaged Units

HIGH RISE/LOW CARBON SERIES: ADVANCED VENTILATION | OCTOBER 26, 2022

DOAS/Heat Recovery

- Capable of delivering about 70% more OA than code minimum (assuming 1 person/150 sqft)
- Replaces single pass H&V steam fed unit served by natural gas boiler
- Heat exchanger about 85% efficient
- Reusing and sealing existing OA riser. Adding new GX riser. Bringing TX/GX back to unit
- Converting on floor CAV's to VAV's



Adiabatic Cooling on Exhaust Air

Replace Existing H&V

Cross Flow Two Pass Plate Heat Exchanger

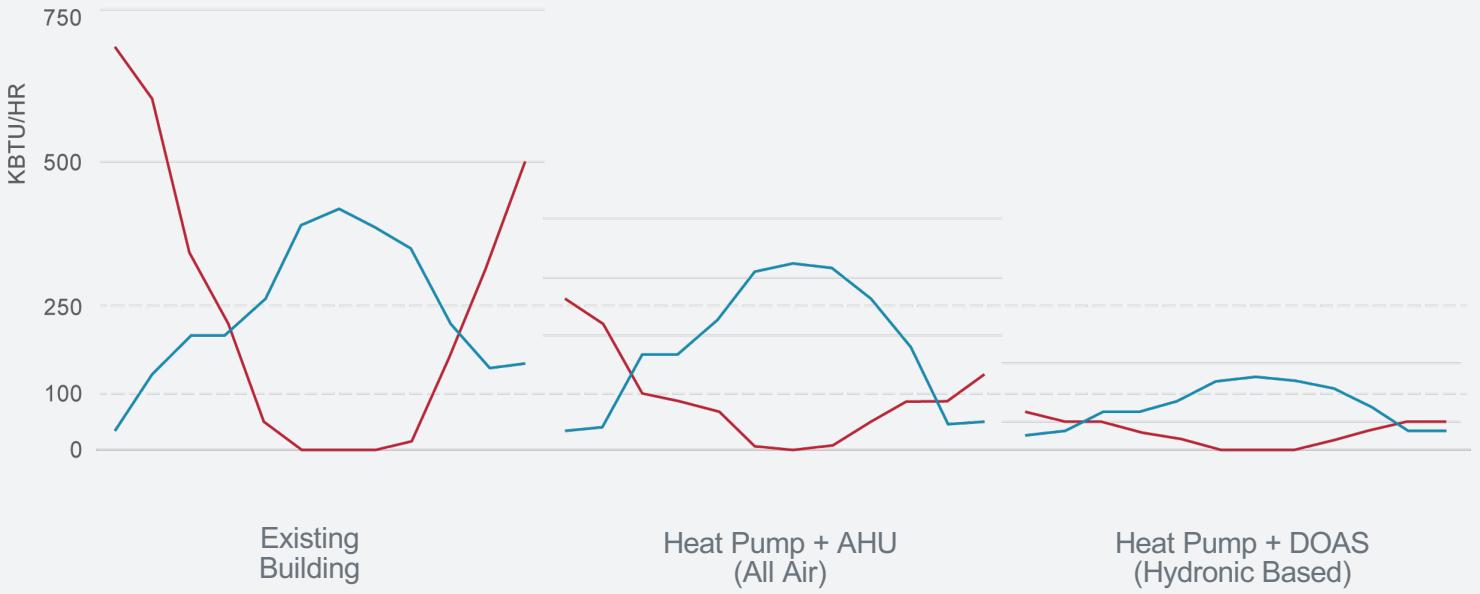
Cooling Coil Fed from WSHP's

345 HUDSON SYSTEM BOUNDARIES

Electrify heating, eliminate economizer and move to hydronic based systems

Potential energy reductions

HEATING ENERGY REDUCTION	71%	84%
COOLING ENERGY REDUCTION	30%	65%
COOLING LOAD REDUCTION	14%	69%



Eliminating fossil fuels

immediately reduces demand, by moving towards hydronic based systems we can reduce heating and cooling energy by

60% – 80%

discuss.

Moderator:

Benjamin Rodney, Vice President, Construction, U.S. East Region, Hines

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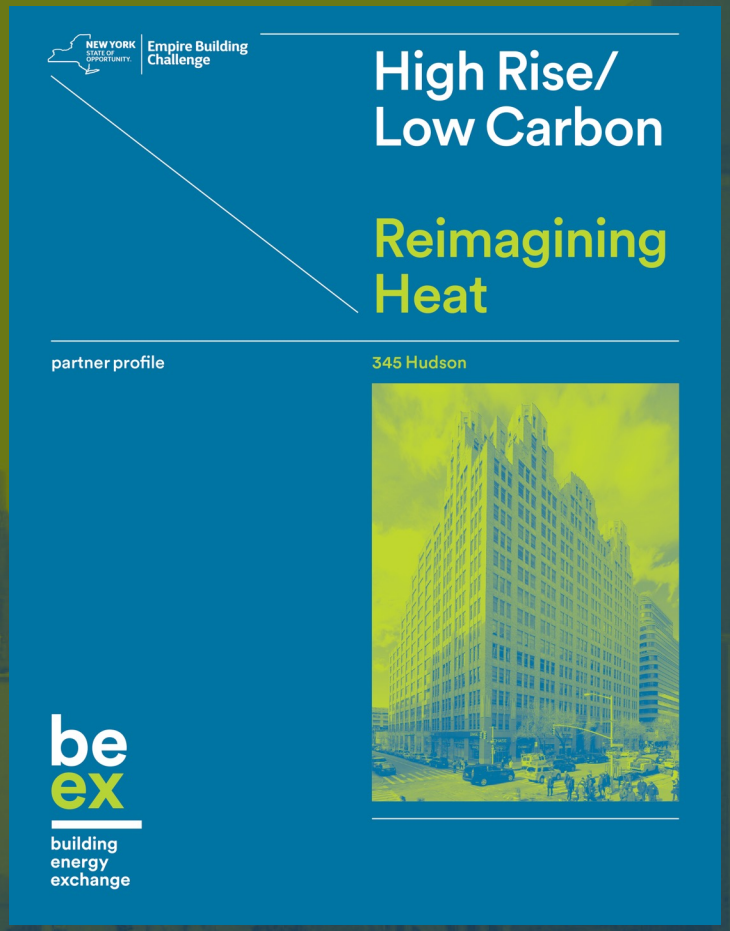
thank you.



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