

Passivhaus: Growing Up!

Tomás O'Leary
Managing Director



MosArt

Since 1993

Creatively Cutting Carbon

Energy Consulting

- Passive House Modelling
- Passive House Certification
- SAP and BER
- Thermal bridge analysis

Design

- Architecture
- Urbanism
- Landscape

Training

- Trade-Specific NZEB
- On-Site Coaching
- Passive House Designer
- Passive House Trades

Passive House Social Housing in South East of Ireland

Passive House - Growing Up

- Affordable NZEB and certified Passive Houses
- 1st Passivhaus social housing in Ireland)
- Timber frame construction, with 'compact unit
- Built at no additional cost
- 12 weeks to build per paid of semi-D



Passive House Residential Scheme in Dublin

- 59 affordable Passive Houses
- Masonry construction with external insulation with 'compact unit' for ventilation
- Airtightness provided by cement plaster with membranes & tapes
- Built at no additional cost and taking ~ 12 weeks to build



Tallest Certified Passive House in the World

Cornell Tech
NYC

Certified by Passive House Academy

Handel Architects
Steven Winter Associates
Hudson & Related Companies
Monadnock Construction

Passive House - Growing Up



26 floors

352 units

25,250 m²

87 m to top of wrap



MICRO



STUDIO



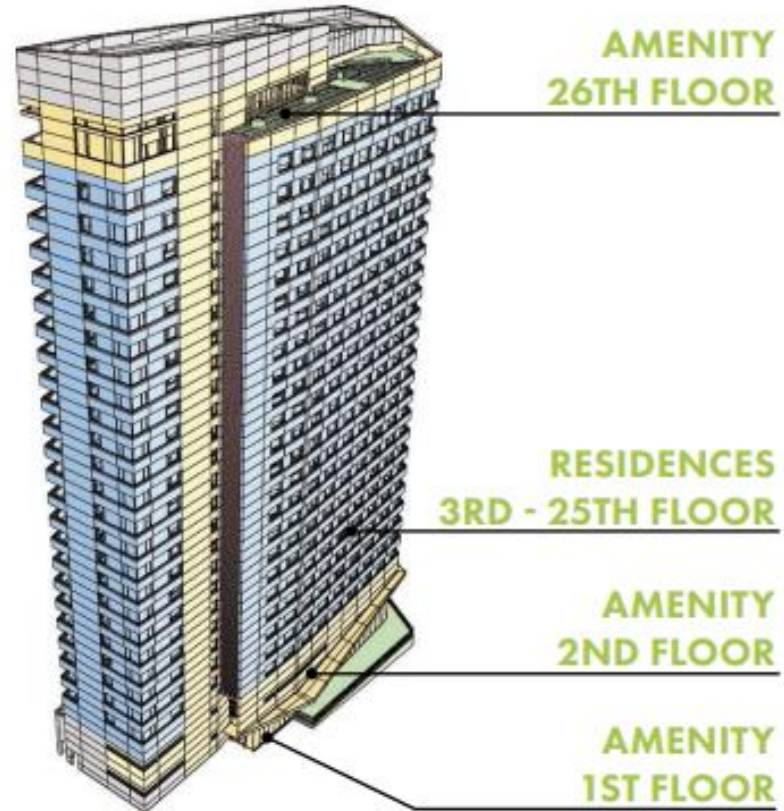
1 BEDROOM



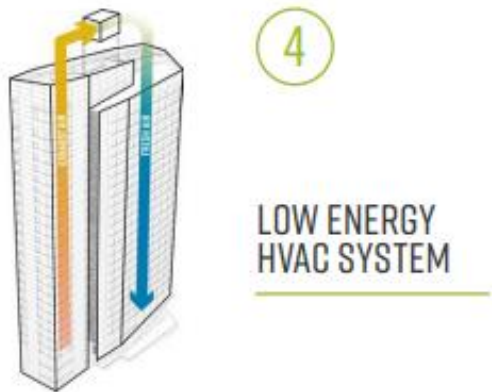
2 BEDROOM



3 BEDROOM



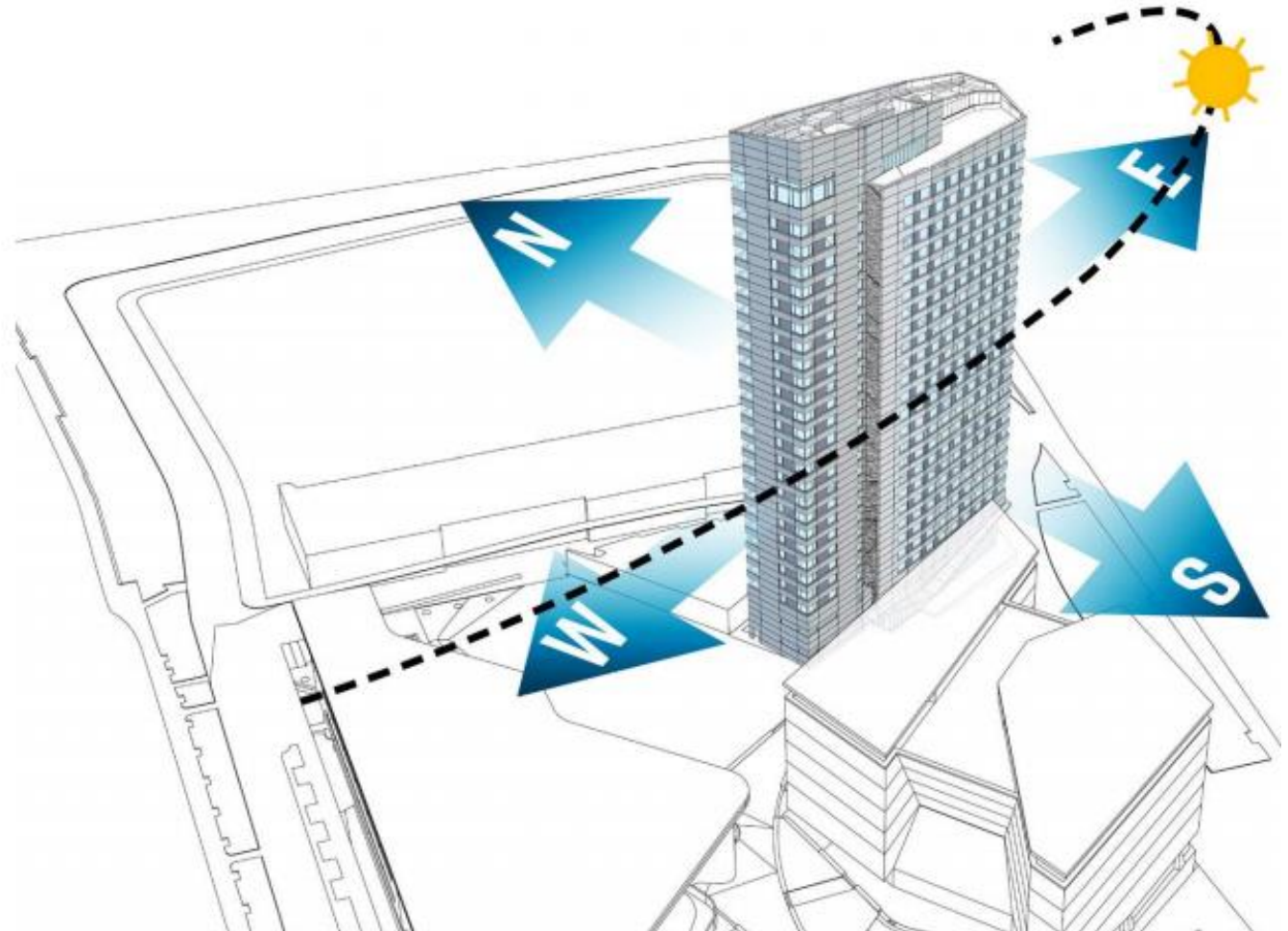
STRATEGIES TO ACHIEVE PASSIVE HOUSE CERTIFICATION





SITING

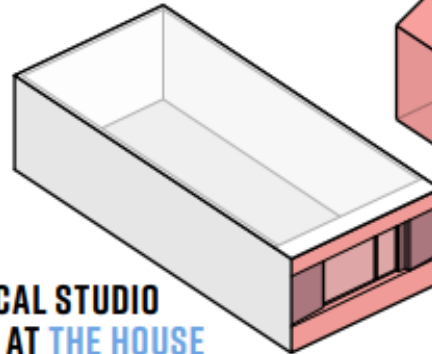
SOLAR ORIENTATION AND SHADING



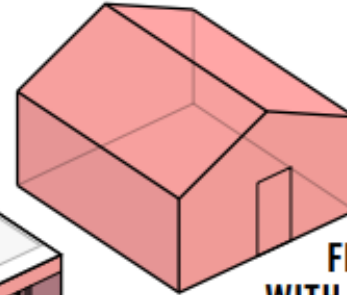
2

COMPACT BUILDING SHAPE

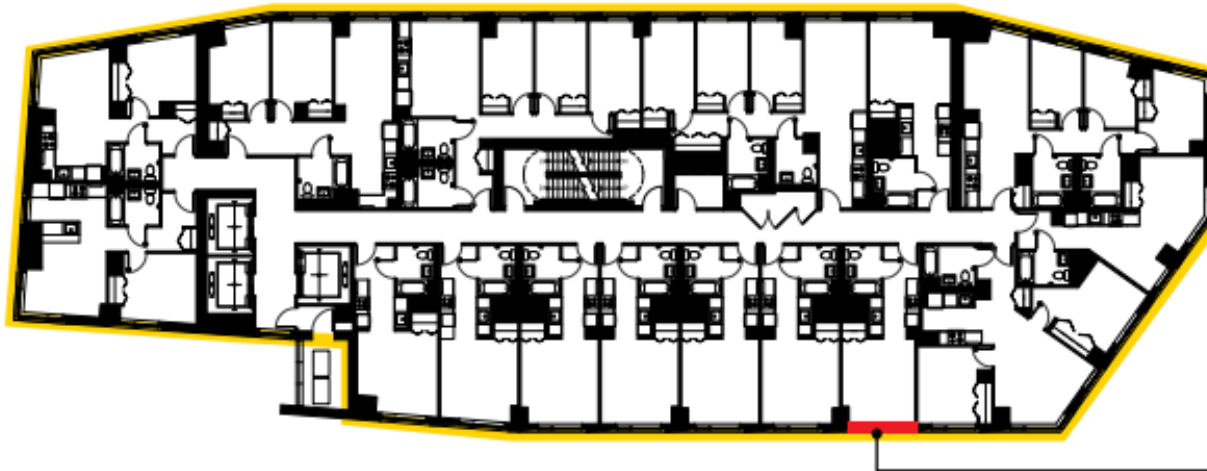
**LOW SURFACE TO
VOLUME RATIO**



**TYPICAL STUDIO
APARTMENT AT THE HOUSE**



**FREESTANDING HOUSE
WITH SAME VOLUME**



Only one surface of this
apartment is exposed.

3

ENCLOSURE

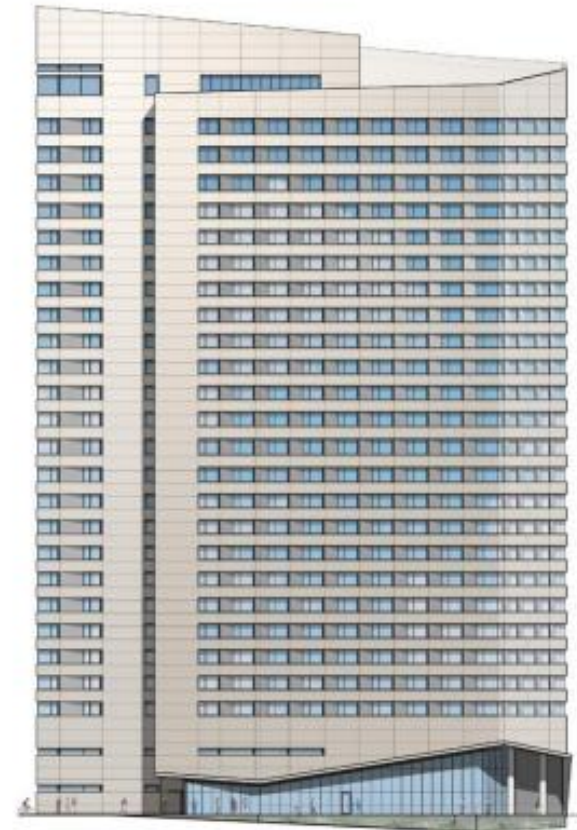
THE WRAP

U-values W/m²K

	Cornell Tower	England Current Part L
Roof	0.10	0.18
Wall	0.22	0.28
Floor	1.49	0.22
Windows	0.95 - 4.7	1.6



WEST



SOUTH





ENCLOSURE

PANELIZED WALL SYSTEM



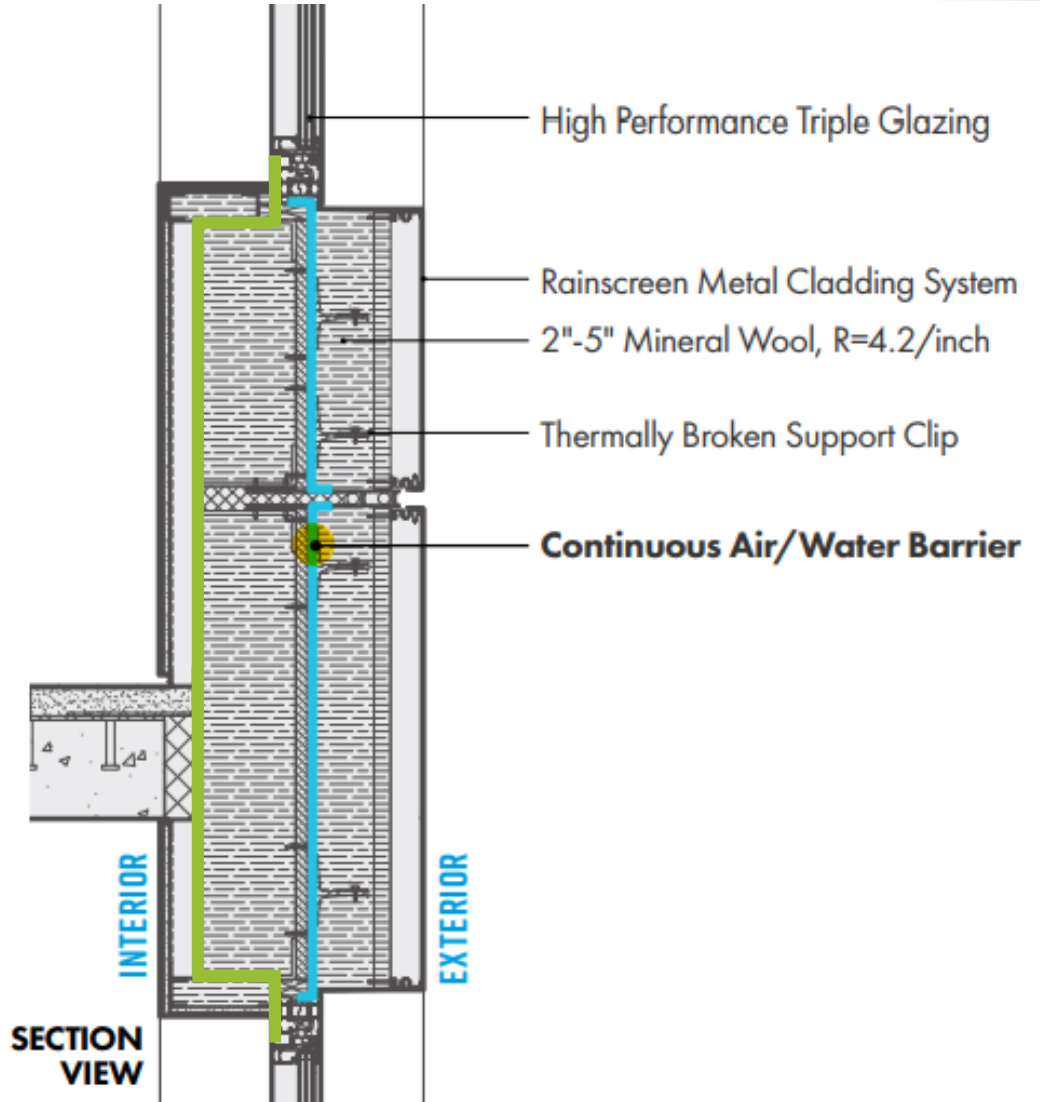
Prefabricated metal wall panel installation

3

ENCLOSURE

EXTERIOR WALL DETAIL

- Thermally broken construction
- Airtight envelope: 0.6ACH@50pa
- Window-to-wall ratio calibrated to maximize performance

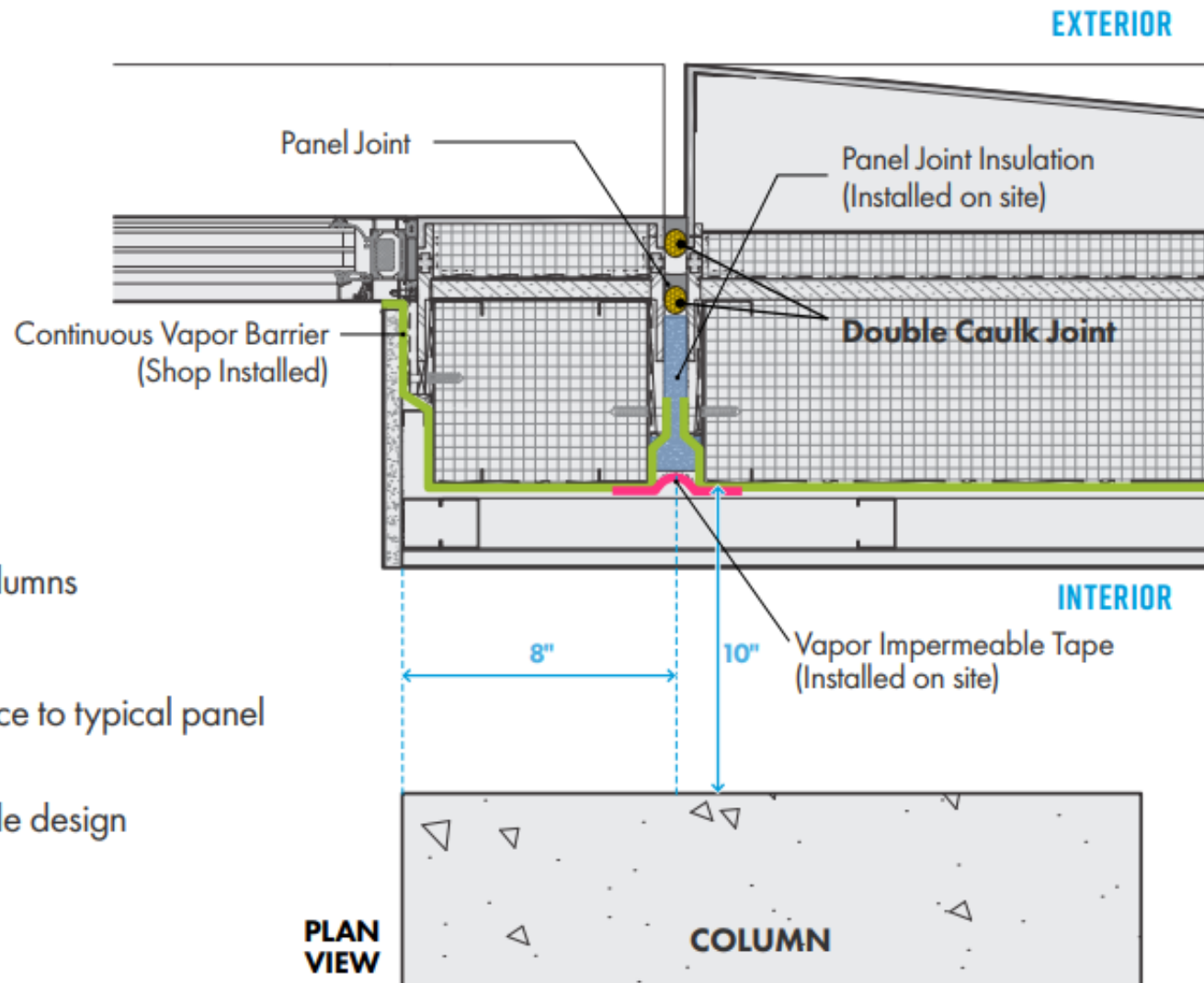


3

ENCLOSURE

AIR SEALING AT FACADE COLUMNS

- Allow for access at columns
- Columns set back 10"
- Max horizontal distance to typical panel joint = 8"
- Coordinate with facade design

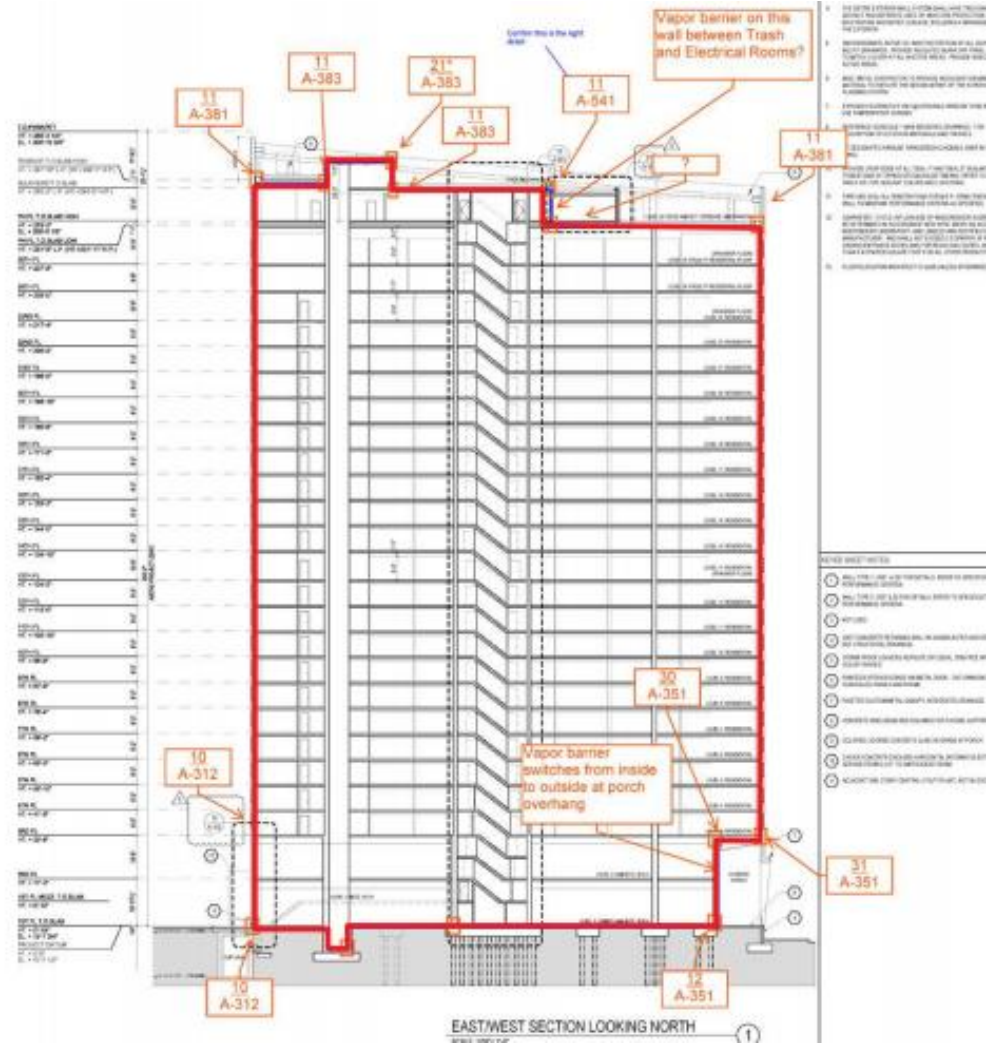




Passive House - Growing Up



CONTINUITY OF AIR BARRIER

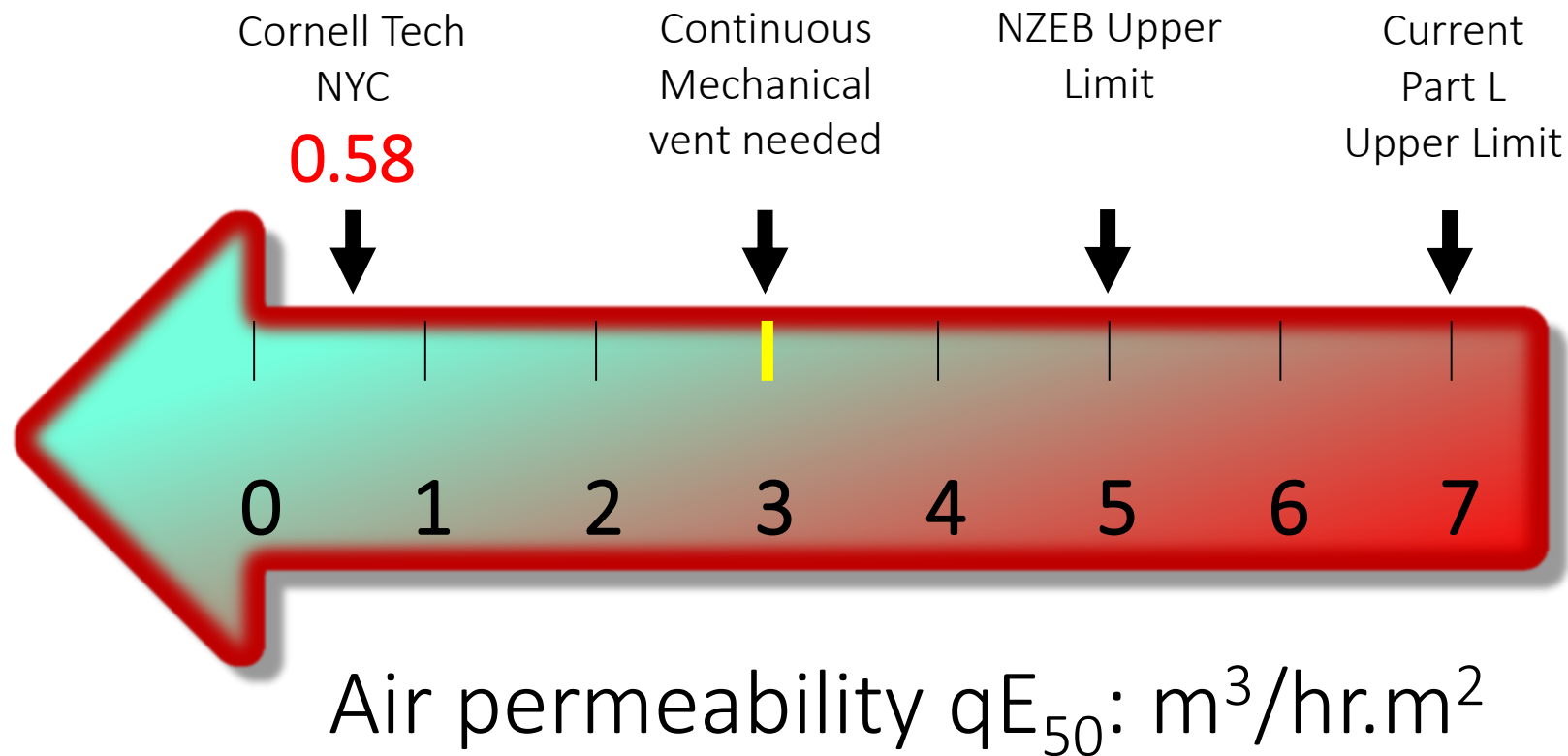


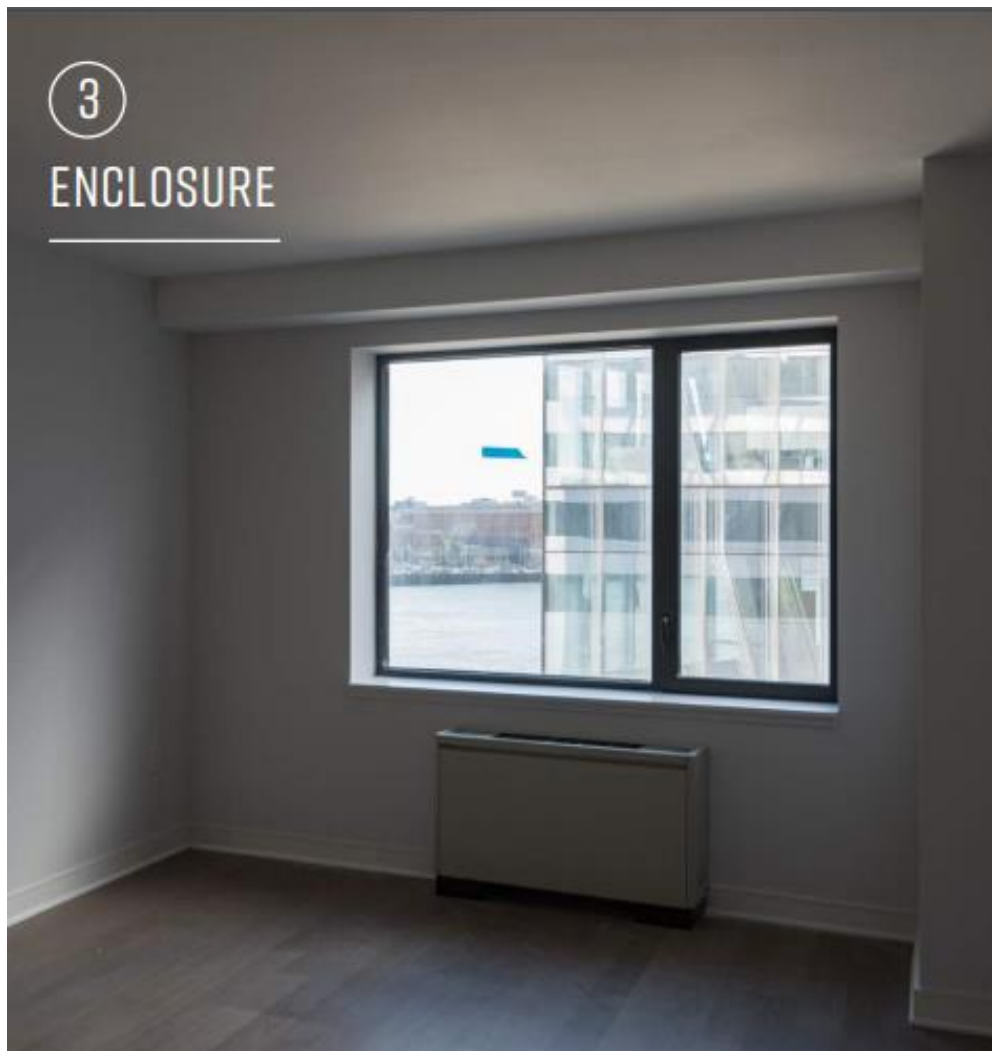
Hands-on Airtightness Training On-Site

Passive House - Growing Up



The Result – 0.14 ACH @ 50 Pa







3

ENCLOSURE

ELIMINATE THERMAL BRIDGING BUILDING CANOPY DETAIL

Steel Embed

INTERIOR

EXTERIOR

Insulation

Continuous Air/Water Barrier

Continuous Vapor Barrier

KEY PLAN

Steel Structure

Structural Thermal
Break

Storefront

SECTION
DETAIL



3

ENCLOSURE

EXTERIOR WALL

23% Window to Wall Ratio

Angled Metal Spanrel

Rainscreen Cladding System

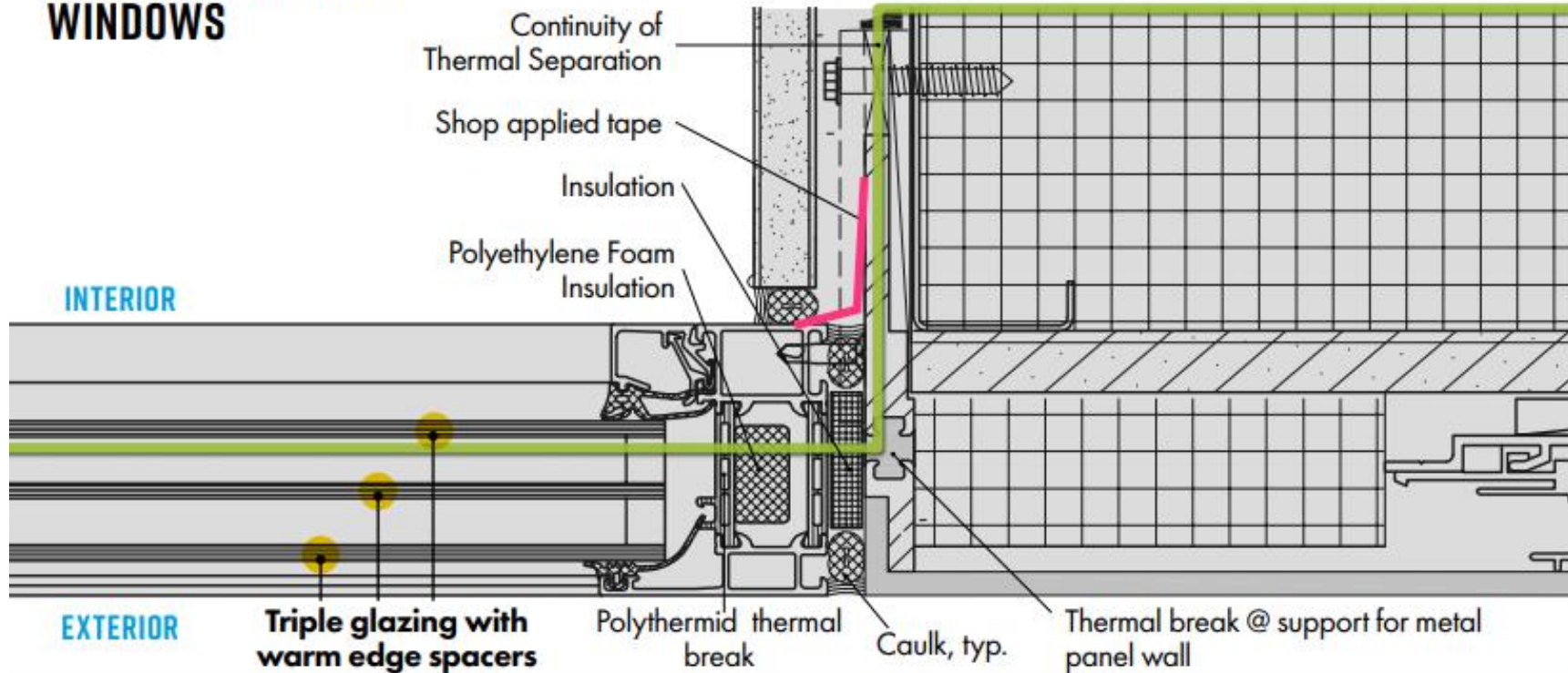
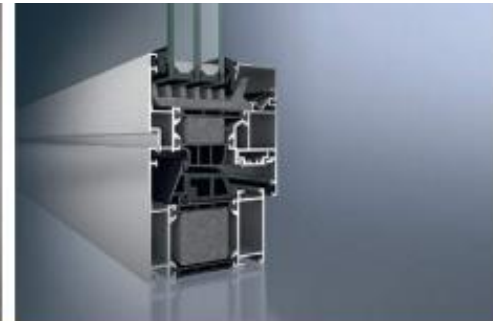
Triple Pane IGU's

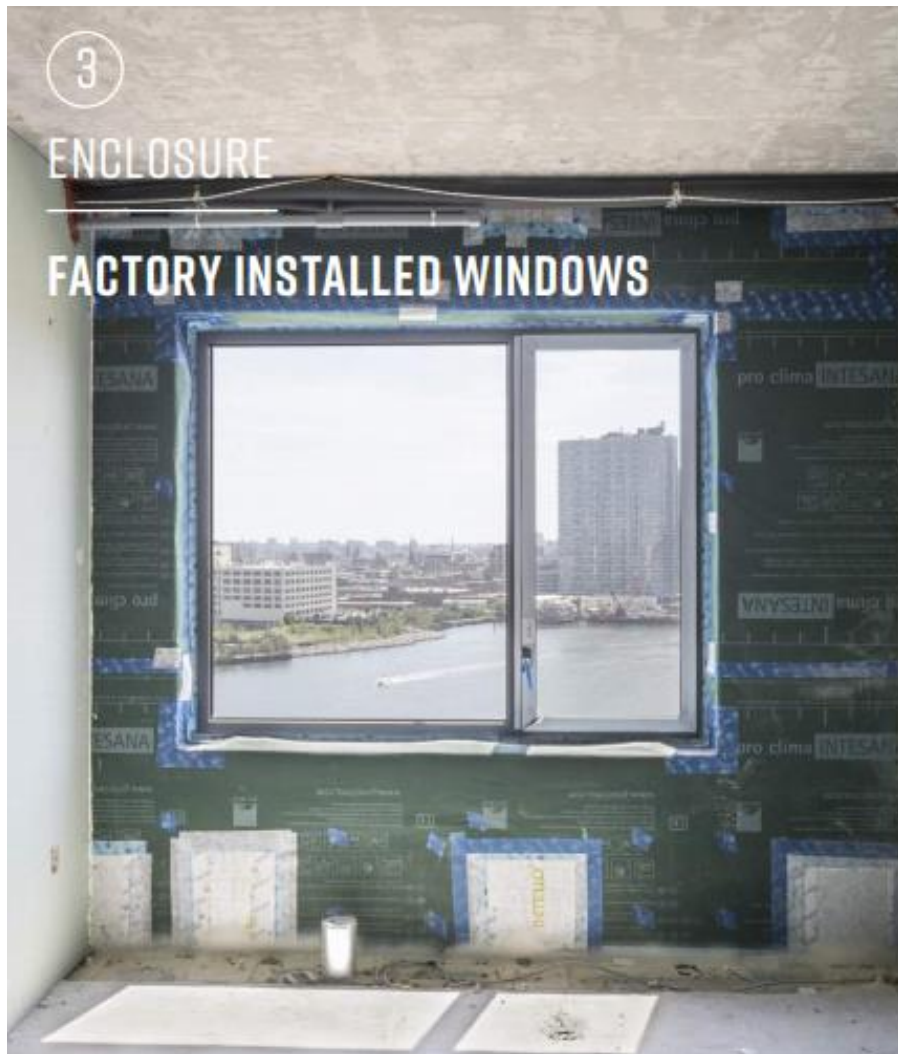


3

ENCLOSURE

FACTORY INSTALLED WINDOWS





U-value of glass: $0.62 \text{ W/m}^2\text{K}$

U-value of punch window frames: $1.30 - 1.70 \text{ W/m}^2\text{K}$

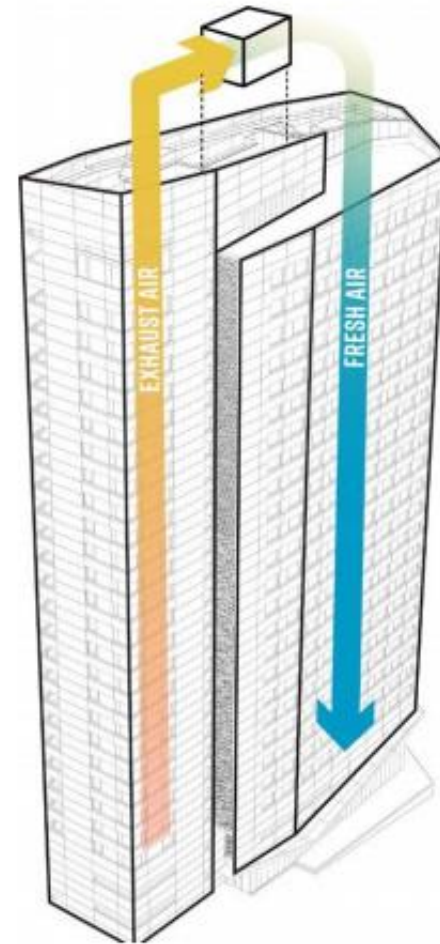
Solar heat gain coefficient: 0.22

Length of window thermal bridge connections: 5.9 km



LOW ENERGY HVAC SYSTEM

LOW ENERGY HVAC SYSTEM





ventilation units = 4

occupants = 526

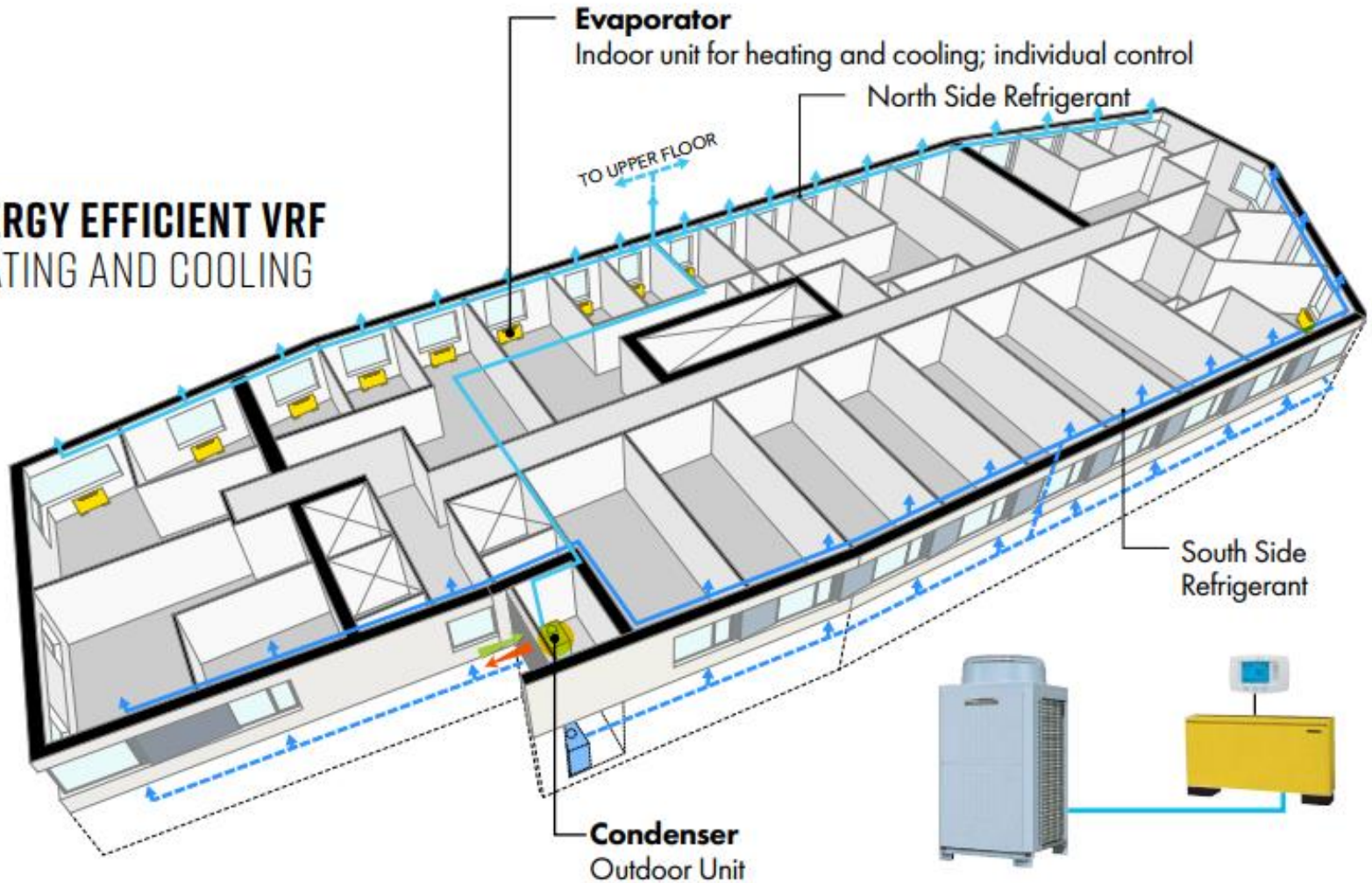
Total air flow rate =
 $31,340 \text{ m}^3/\text{hour}$

Heat recovery efficiency
= 61%, 65% and 75%

Average air change rate
 $= 0.68 \text{ h}^{-1}$

Air-Source Heat Pump for Heating & Cooling

ENERGY EFFICIENT VRF HEATING AND COOLING



Cornell Tech in an Irish Context

90 metres



Liberty Hall:
16 story
59m high



Google Docks:
14 story
67m high



The Elysian:
17 story
71m high



Obel Tower:
28 story
85m high



Cornell Tech:
26 story
87m high



Dublin, Ireland

November 13th – 14th 2019

Climate Action through nearly zero energy buildings

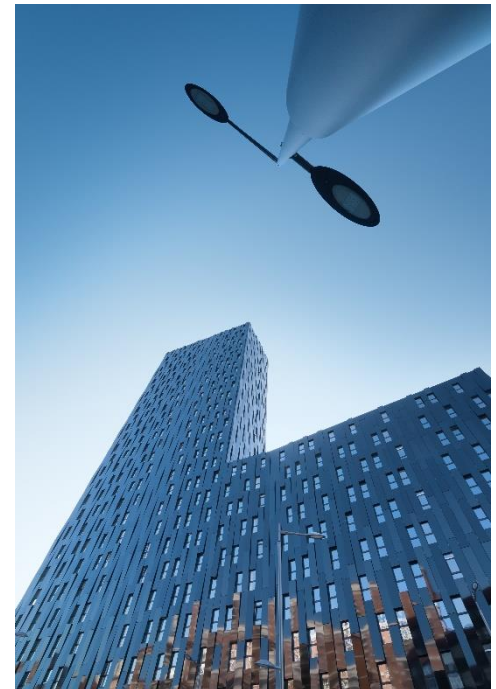


Tomás O'Leary
MosArt

Come and meet the Experts in Dublin...



Bilbao Tower
Architect:
Germán Valázquez
Arizmendi





Thank You!

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MosArt Since 1993

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