

Tall Buildings and the Nordic Context

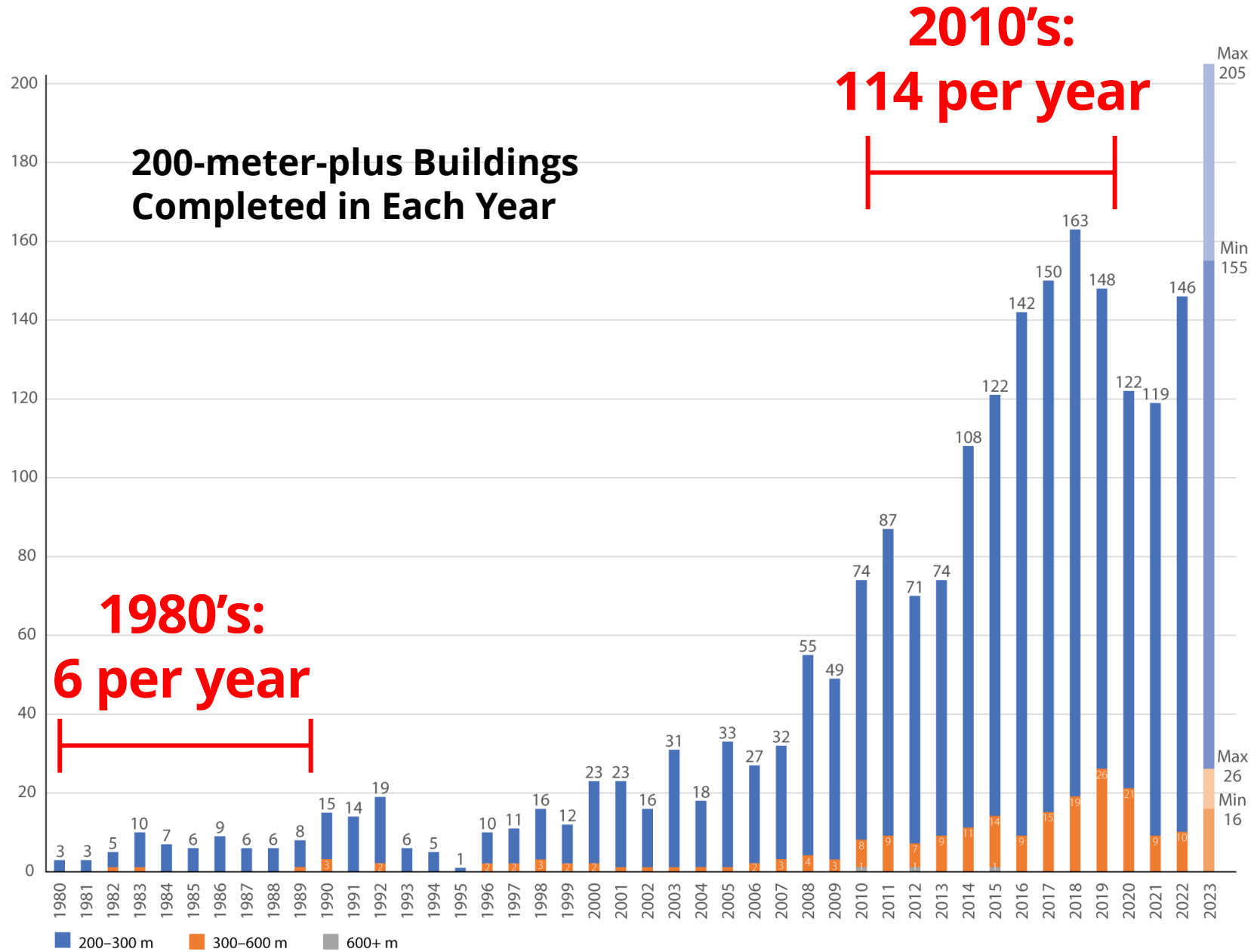
Trends, Drivers, Challenges

Helsinki, 30 January 2024

Dr. Antony Wood, CTBUH President

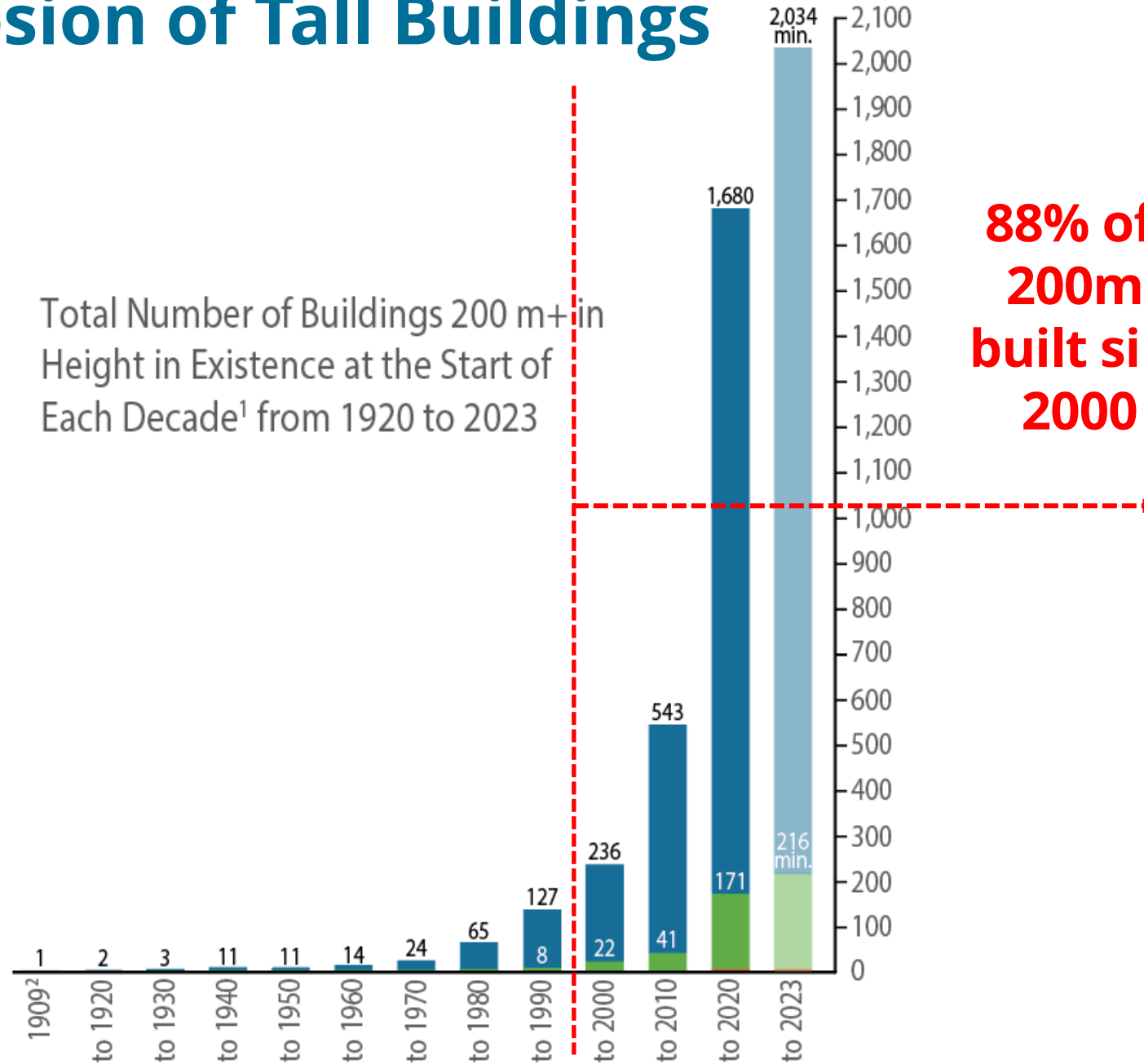


A Global Explosion of Tall Buildings



A Global Explosion of Tall Buildings

Total Number of Buildings 200 m+ in Height in Existence at the Start of Each Decade¹ from 1920 to 2023



**88% of all existing
200m+ buildings
built since the year
2000 (1798 No.)**

The Nordic Context ... The First 200m+ Building



Karlatornet

Göteborg, Sweden

Expected Completion: 2024

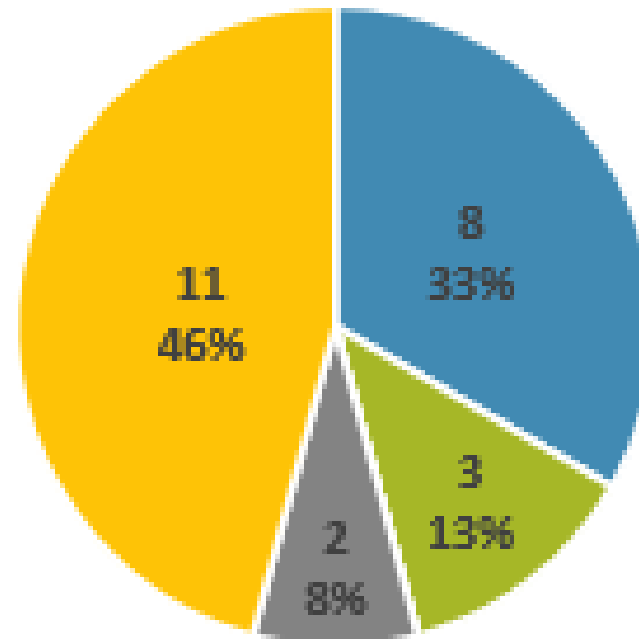
Height: 245 m (804 ft)

Floors: 73

Primary Functions: Residential / Hotel / Office

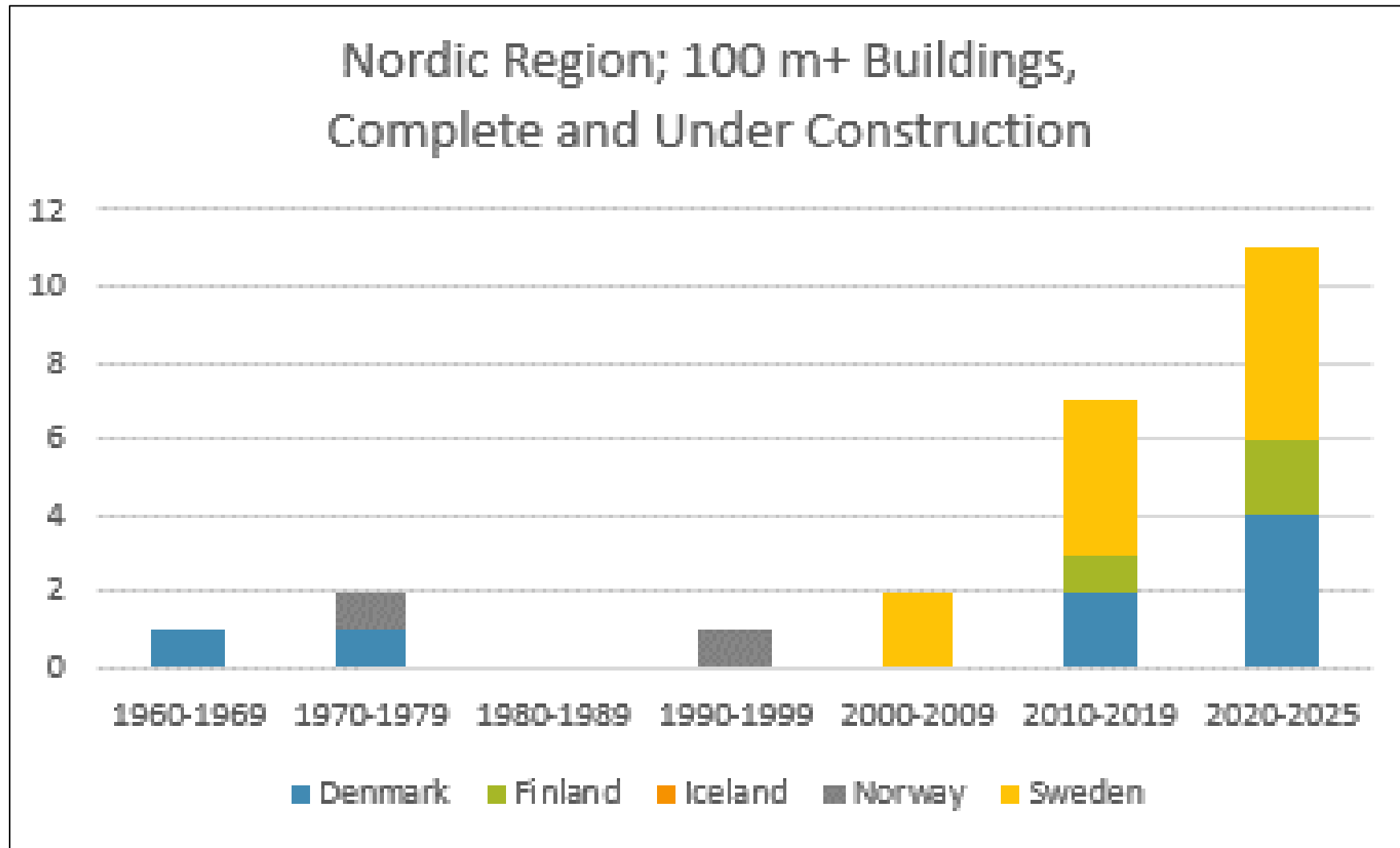
The Nordic Context ... 24 Buildings over 100m+

Nordic Region; 100 m+ Buildings,
Complete and Under Construction



■ Denmark ■ Finland ■ Iceland ■ Norway ■ Sweden

The Nordic Context ... 24 Buildings over 100m+



Tall Buildings and Place: The Shortfall of Tall?

SHORTFALL ONE

The Commercial Approach

Seagram Building - Global Hijack
New York City, 1958



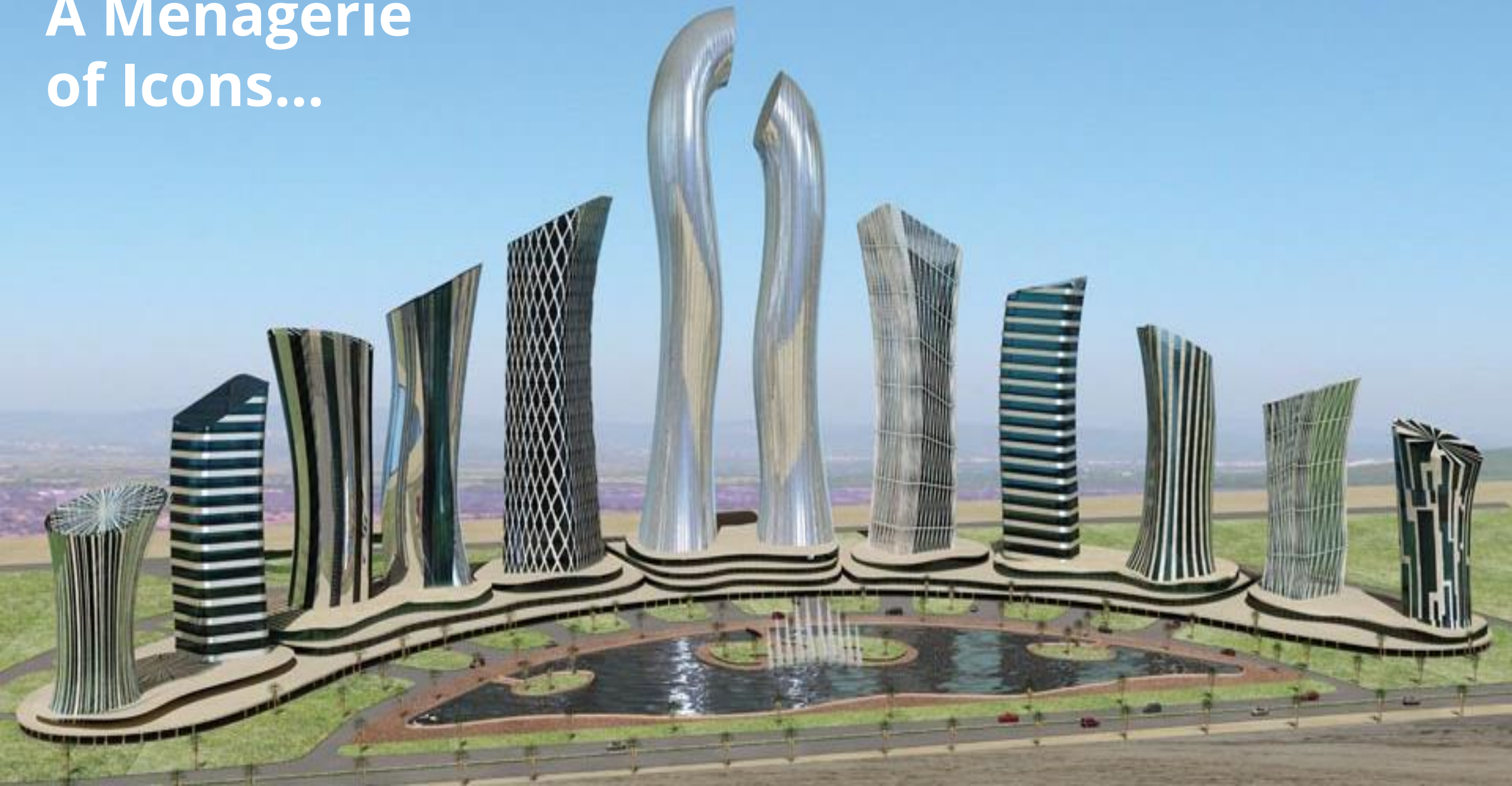
SHORTFALL TWO

The Iconic-Sculptural Approach

RAK Financial City
UAE, 2007



A Menagerie of Icons...





Homogenization of Cities...

Shibam, Yemen

circa. 16th Century



New Paradigms in High Rise Design

**10 Design Principles for a New
Vernacular for the Skyscraper**

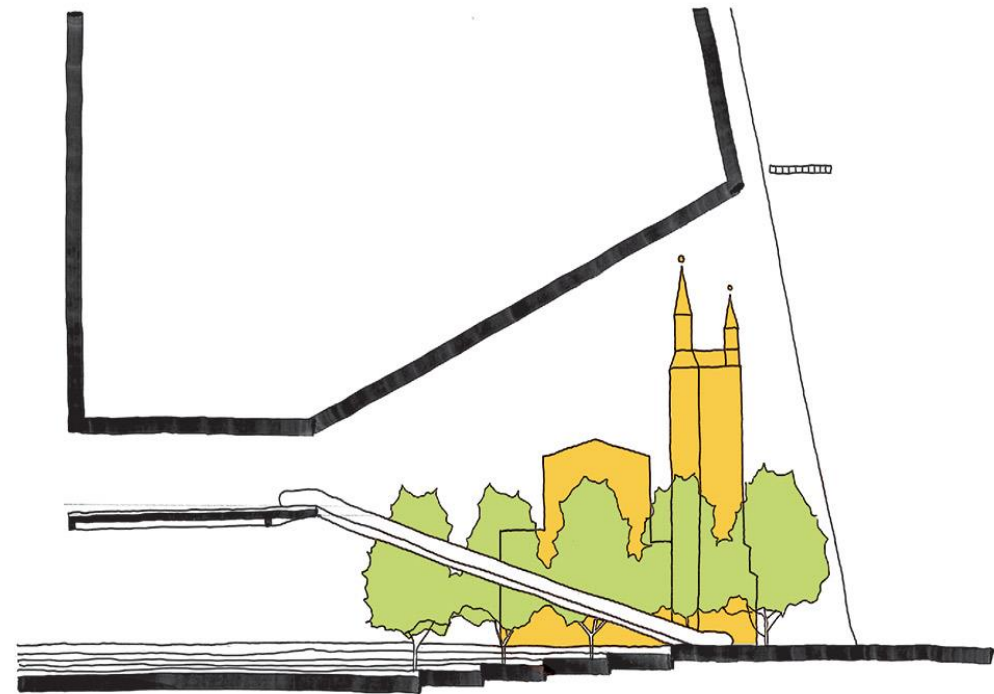
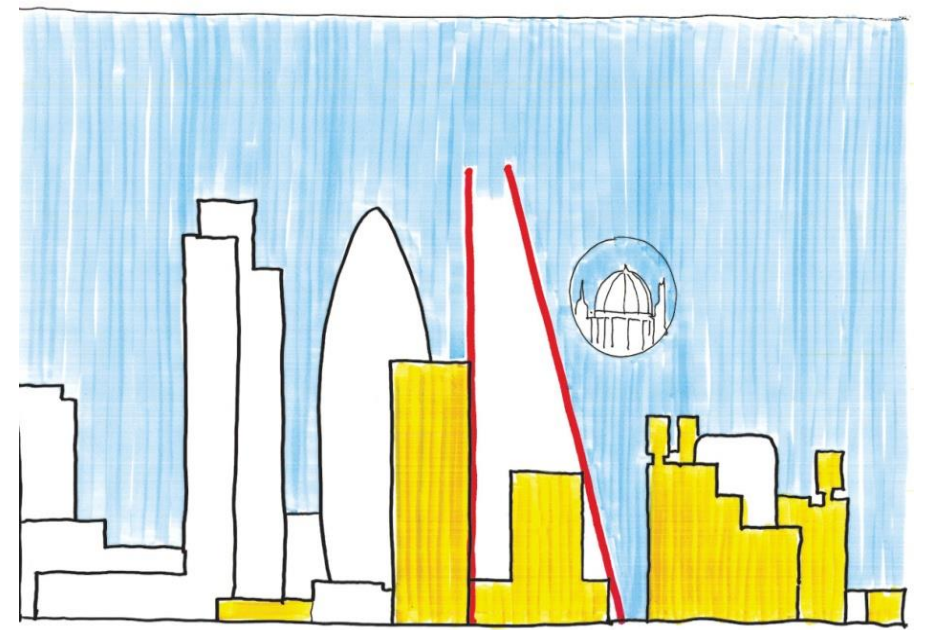
With a Nordic flavour.....

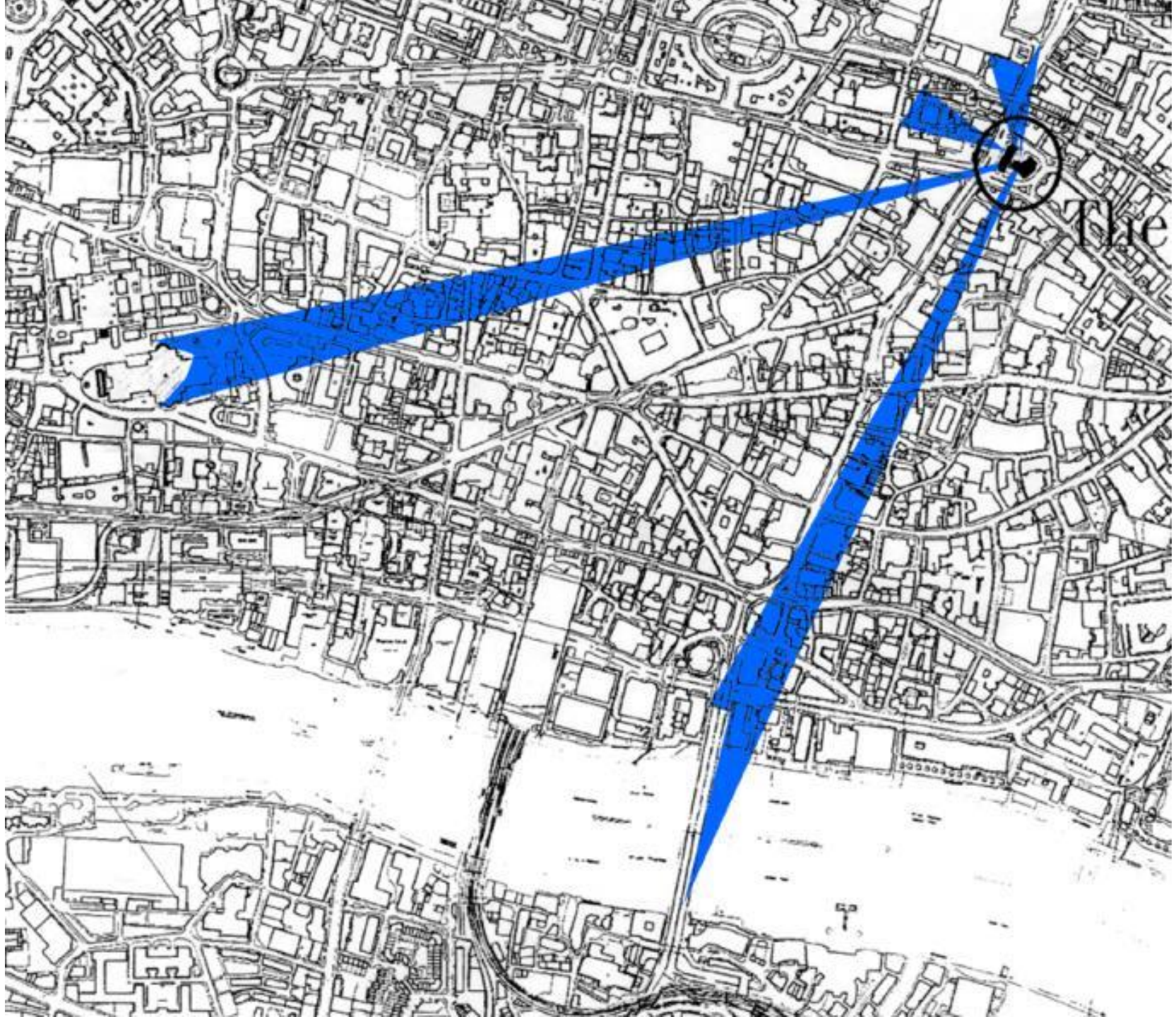
Design Principle 1:

Tall Buildings should relate to the **specific characteristics of place**; physically, environmentally and culturally



The Leadenhall
Building, *London*,
2014





Pearl River Tower, *Guangzhou*
2013



Design Principle 2:

Tall Buildings should **vary with height** – in form, texture, scale (and program) – not be just vertical extrusions of an efficient floor plan



Turning Torso, *Malmö*, 2005



VIA 57 WEST, *New York City*, 2016





Kaktus Tower, Copenhagen, 2022



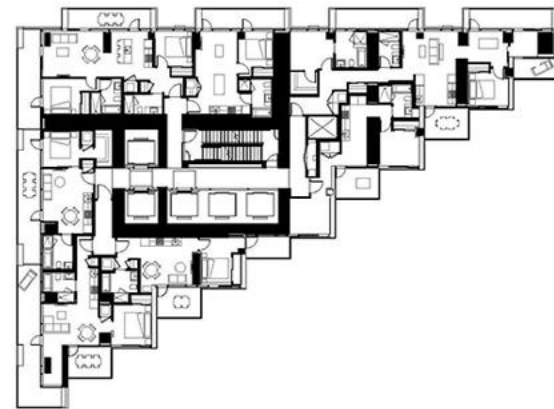
The Wave, Vejle, 2009



In other words.....

we need to think about tall
buildings in **Horizons** or **Strata**

Vancouver House
Vancouver, 2020



The environment changes with height too!

Burj Khalifa: 6-8 degrees
Celsius difference in external
air temperature at top of
tower, compared to bottom

Burj Khalifa, *Dubai*
2010



Design Principle 3:

Tall Buildings should **maximize layers of usage**
on all systems and materials

Copenhill, Copenhagen, 2017



Copenhill, Copenhagen, 2017



360 Ascent, Trbovlje, 2020

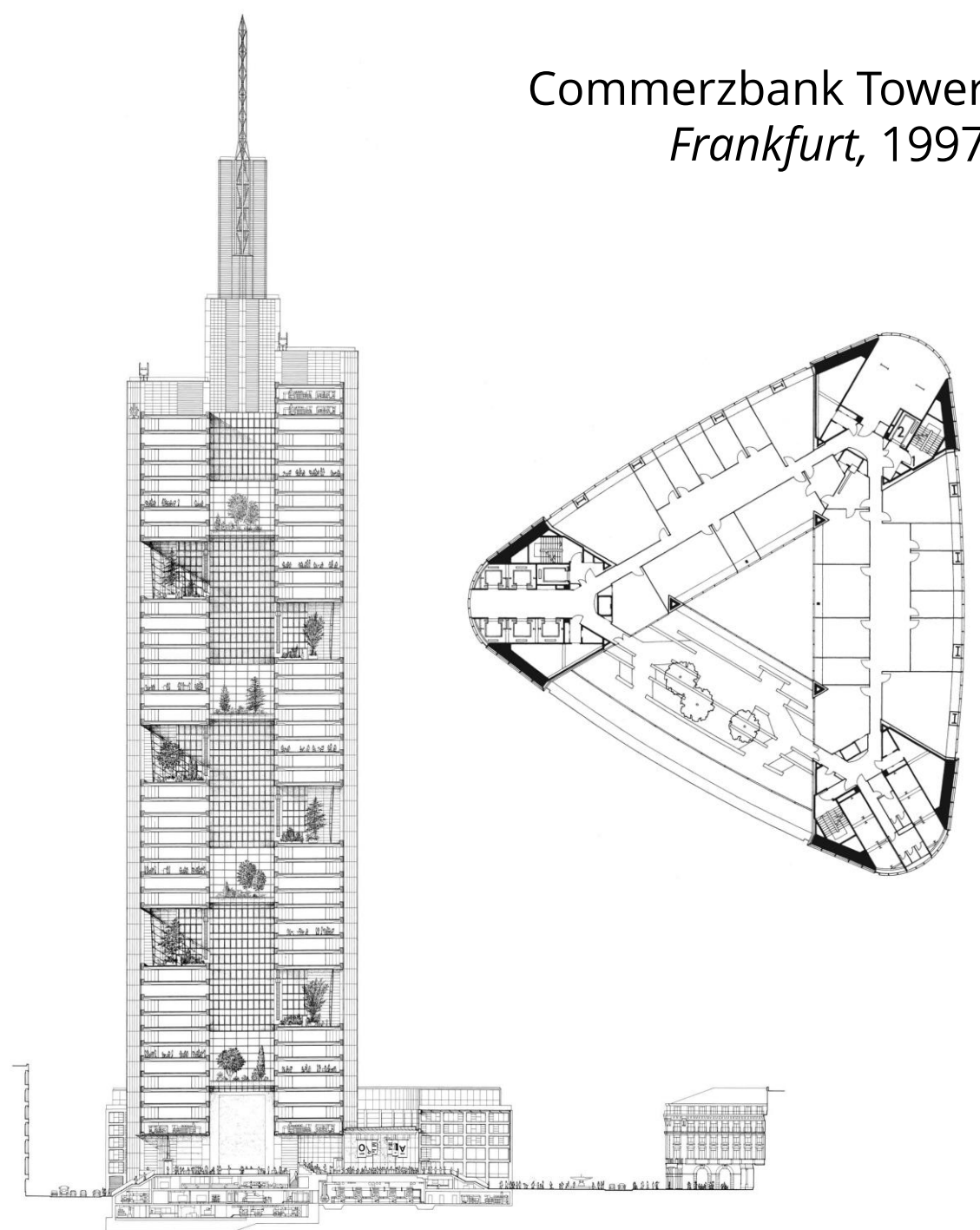


Design Principle 4:

Tall Buildings should provide **significant communal, open, recreational space**



Commerzbank Tower
Frankfurt, 1997



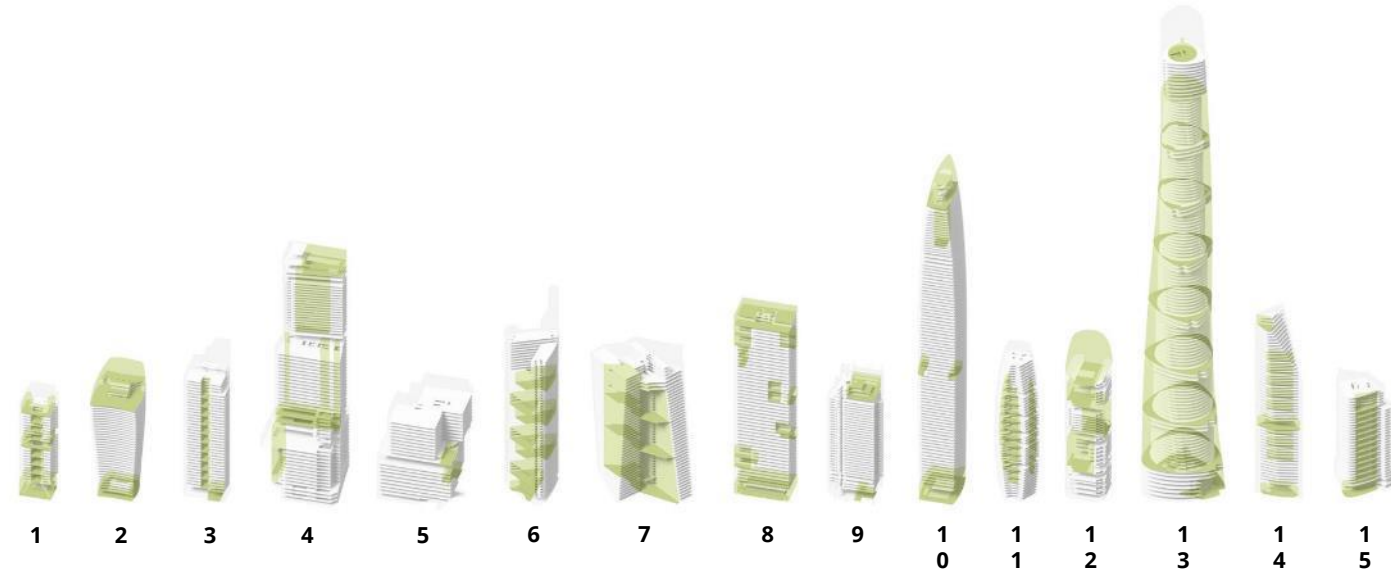
The Space Within: Skyspaces in Tall Buildings

Technical Guide, 204 pages

The Space Within: Skyspaces in Tall Buildings

An output of the CTBUH Urban Habitat / Urban Design Committee

James Parakh, Daniel Safarik & Peng Du



- | | | | | |
|---|---|---|--|--|
| 1. 8 CHIFLEY Sydney
140.5 m; 9 Skyspaces, 13.30% of TTV | 2. 20 FENCHURCH London
160.1 m; 1 Skyspace, 14.07% of TTV | 3. 110 BISHOPSGATE London
230.0 m; 12 Skyspaces, 3.89% of TTV | 4. ABENO HARUKAS Osaka
300.0 m; 1 Skyspace, 2.15% of TTV | 5. ANN & ROBERT H. LURIE CHILDREN'S HOSPITAL OF CHICAGO Chicago
136.2 m; 1 Skyspace, 0.76% of TTV |
| 6. COMMERZBANK TOWER Frankfurt
259.0 m; 9 Skyspaces, 13.85% of TTV | 7. EUROPEAN CENTRAL BANK Frankfurt
183.7 m; 2 Skyspaces, 14.21% of TTV | 8. FKI TOWER Seoul
245.5 m; 15 Skyspaces, 7.14% of TTV | 9. GRATTACIELO INTESA SANPAOLO Turin
166.3 m; 1 Skyspace, 4.26% of TTV | 10. KK100 Shenzhen
441.8 m; 4 Skyspaces, 3.90% of TTV |
| 11. MODE GAKUEN COCOON TOWER Tokyo
203.7 m; 36 Skyspaces, 8.56% of TTV | 12. OASIA HOTEL DOWNTOWN Singapore
190.9 m; 4 Skyspaces, 36.04% of TTV | 13. SHANGHAI TOWER Shanghai
632.0 m; 22 Skyspaces, 20.64% of TTV | 14. THE TOWER AT PNC PLAZA Pittsburgh
166.0 m; 13 Skyspaces, 4.67% of TTV | 15. TORRE REFORMA Mexico City
246.0 m; 10 Skyspaces, 7.03% of TTV |

Design Principle 5:

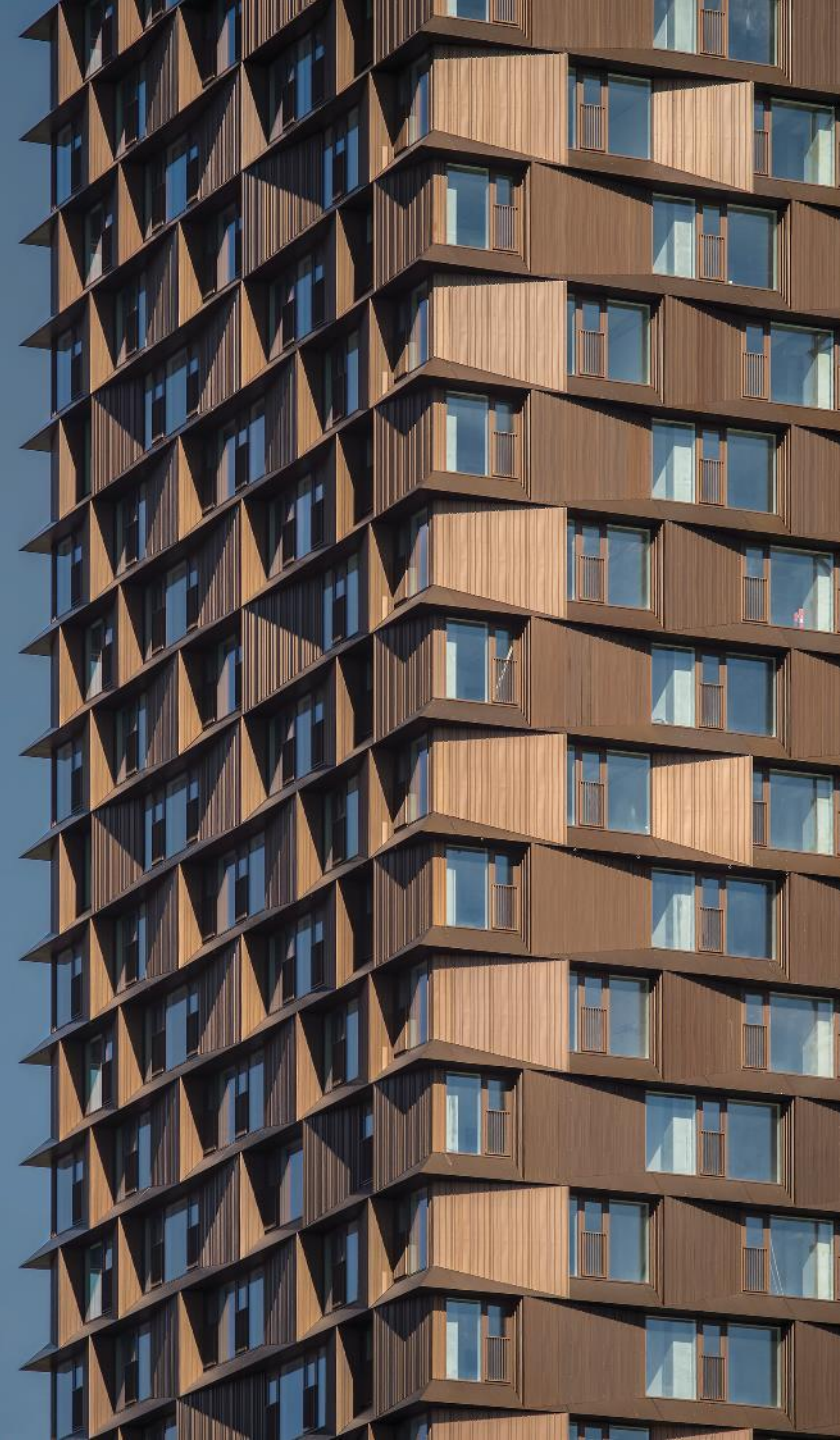
Tall Buildings should introduce more **façade opacity**
(and variation / texture) in skin/envelope

Hotel Alsik, Sønderborg, 2019





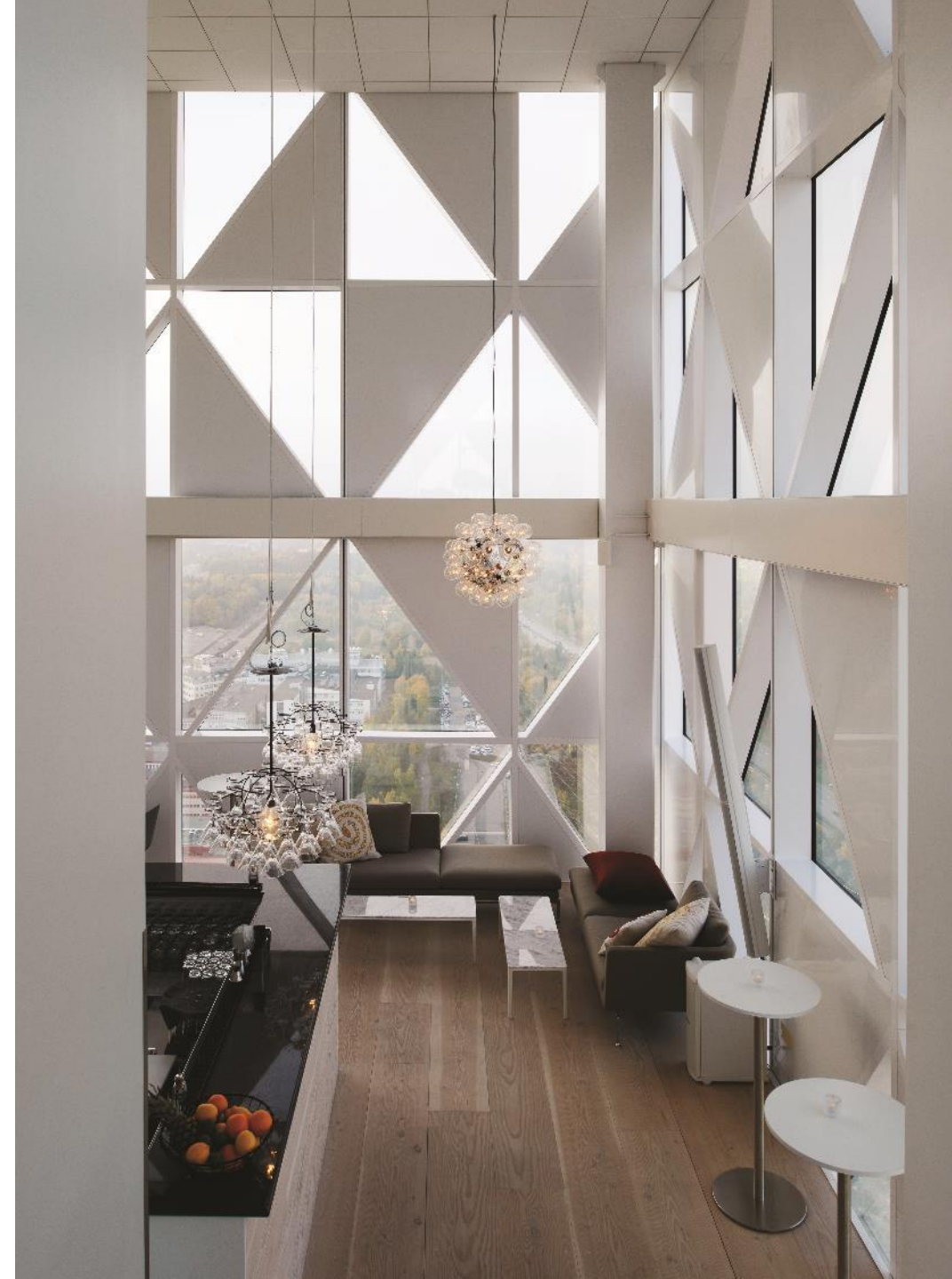
Nordbro Tower, Copenhagen, 2019



Victoria Tower, Stockholm,
2011



© Tord-Rikard Soderstrom



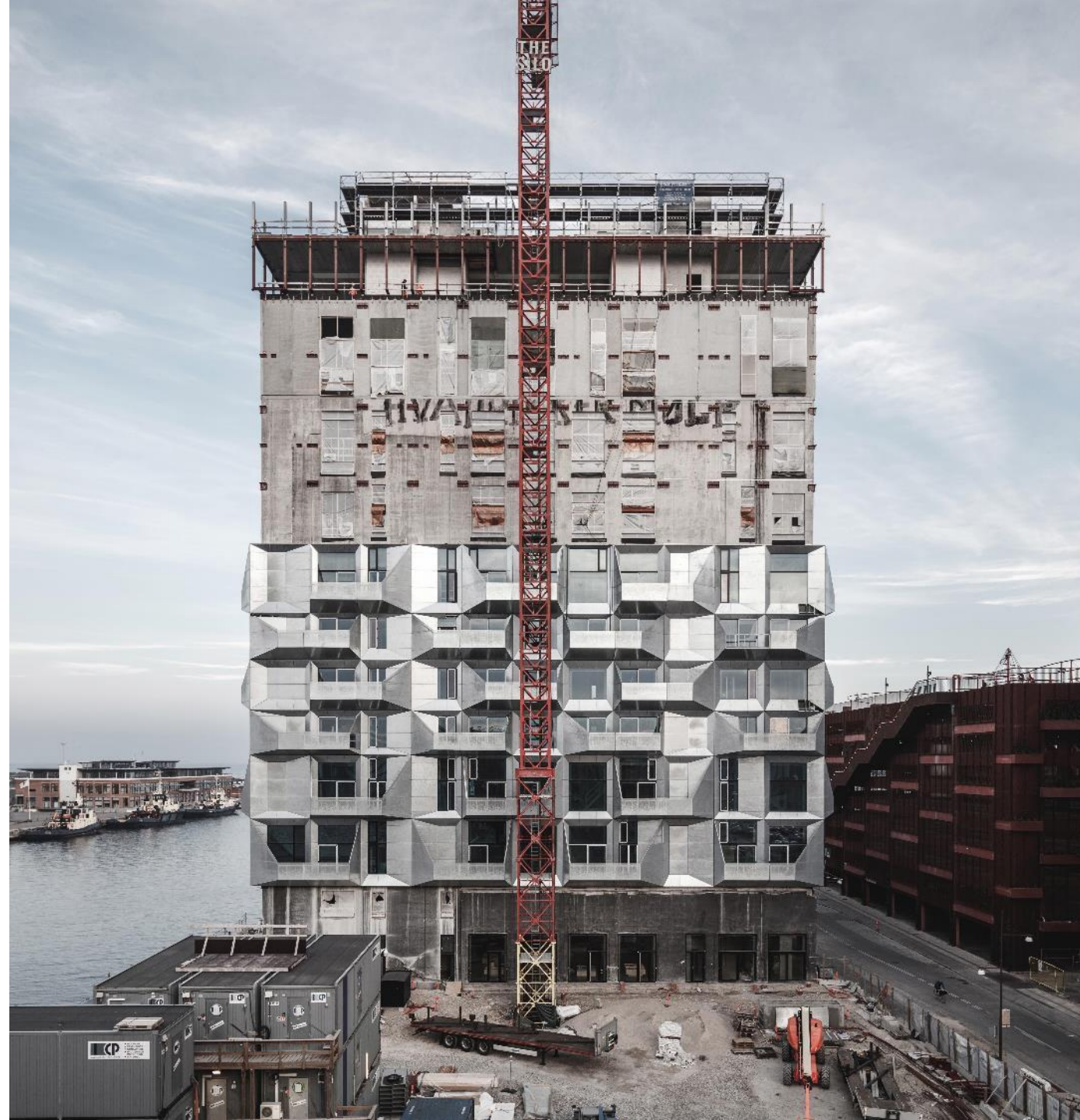
The Silo, Copenhagen, 2017



The Silo, Copenhagen, 2017



© COB



Design Principle 6:

Tall Buildings should **maximise use of timber**,
both internally and externally (facades)

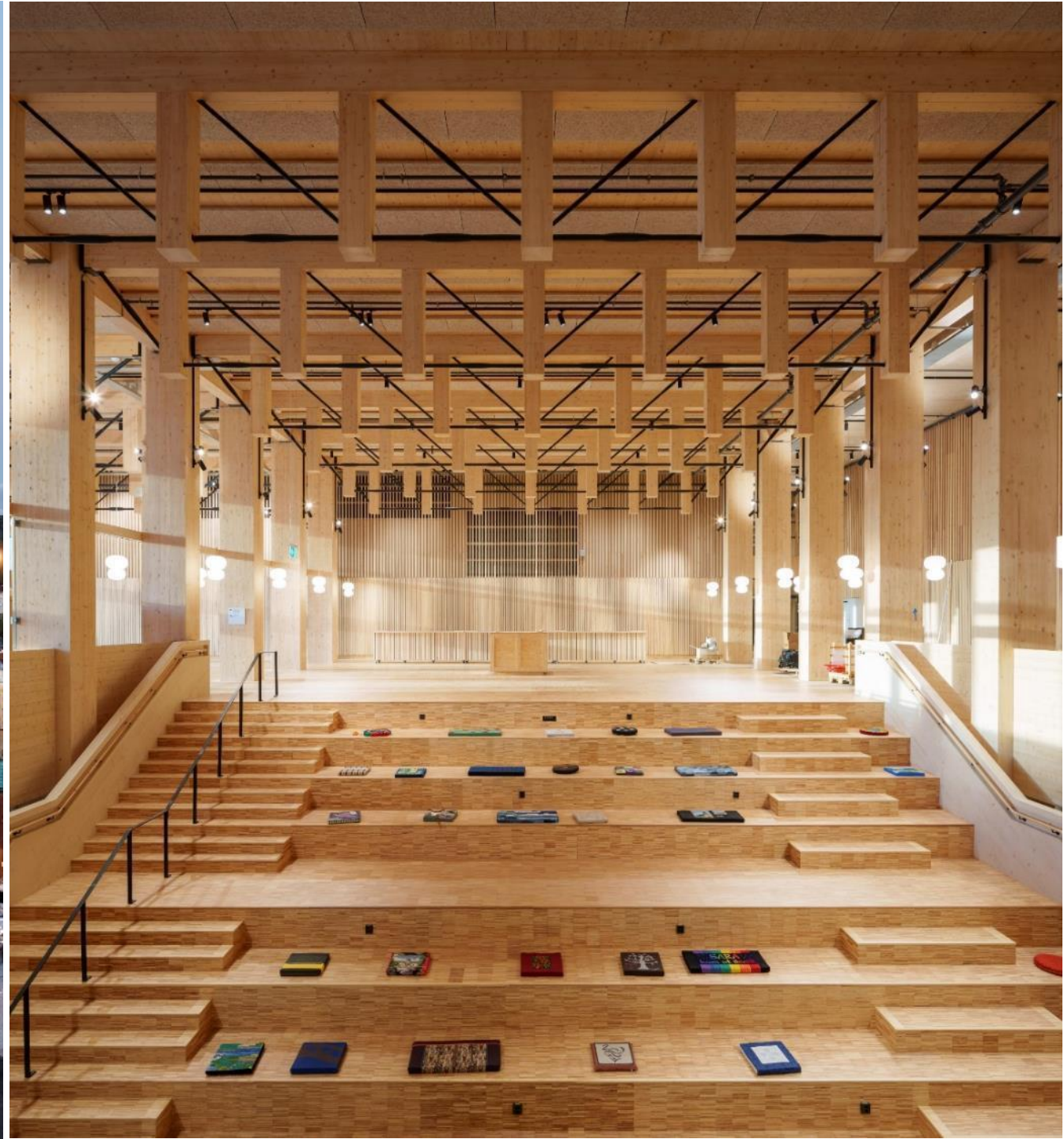
Mjøstårnet, *Brumunddal*, 2019



Sara Kulturhus, Skellefteå, 2021

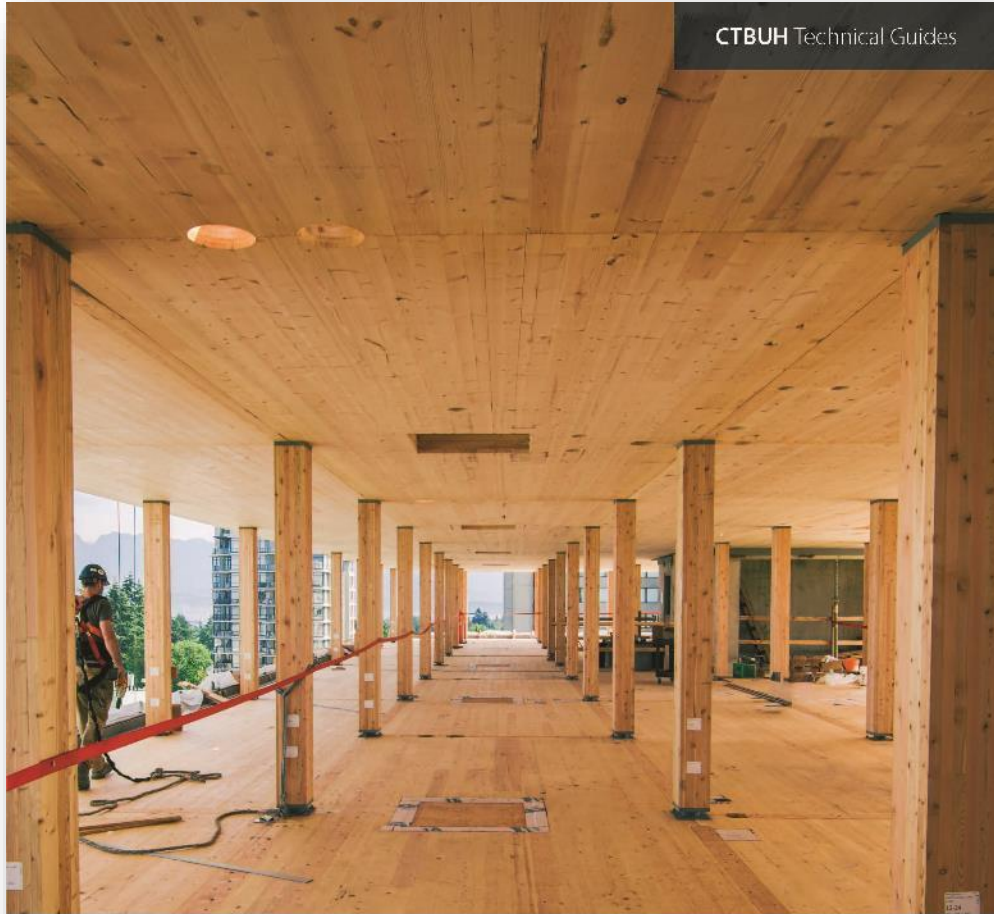


© White Arkitekter



Tall Timber: Mass Timber for High-Rise Buildings

Technical Guide, 334 pages



Tall Timber: Mass Timber for High-Rise Buildings

Antony Wood, Daniel Safarik, Will Miranda & Jake Elbrecht



Case Study 2.5

Brock Commons Tallwood House Vancouver, Canada

Background/Overview

In 2013, Natural Resources Canada (NRCan) launched the Tallwood Building Demonstration Initiative to showcase the application, practicality, and environmental benefits of structural building systems that were innovative and low-carbon. The initiative established financial and technical support for the design and construction of tall wood-based buildings, in an effort to develop ways to better utilize Canada's natural resources. The first tower construction project, Brock Commons Tallwood House, was selected for construction through the initiative's competitive process with the intent to advance the design and manufacture of mass timber products.

In Canada, it was also demonstrated that mass timber is a viable structural option for mid-rise and high-rise buildings. At the time of its completion in 2017, it stood as the tallest building in the world that utilized mass timber. The 18-story project (see Figure 2.1.1) consists of student housing on the University of British Columbia, with additional academic and recreational spaces. The ground floor includes administrative, food services, amenities such as social and study spaces for students, and mechanical, electrical, and other service areas. Levels 2 to 17 are residential with 18 single units and two quad units per floor (see Figure 2.1.2), and a student lounge located on Level 18.

Project Base Metrics

- Status:**
 - Completed: 2017
- Building Function:**
 - Residential student housing
- Structural Classification:**
 - Core and Tube (see Figure 2.1.1)
- Structural Materials:**
 - Mass Timber:**
 - Mass timber: CLT, 100 mm to 180 mm thick (CLT) walls, 2 to 5 floors (CLT) walls, 3 to 4 floors
 - Concrete:**
 - Structural concrete: 100 mm to 180 mm thick (CLT) walls, 3 to 4 floors
 - Concrete: 100 mm to 180 mm thick (CLT) walls, 3 to 4 floors
 - Steel:**
 - Column connections: levels 1 to 18
 - Angular connections: levels 1 to 18
 - Diaphragm connections: levels 1 to 18
 - Deck framing
- Building Milestone Dates:**
 - Construction start: September 2015
 - Complete construction: 2017
 - Construction period: 24 months
- Height:**
 - Height to architectural top: 180 meters
 - Height to highest occupied floor: 170 meters
 - Height to top: 180 meters
- Number of Floors:**
 - 4th floor: 18
 - Basement: 6
 - Service: 6
- Building Floor Area:**
 - Total gross floor area: 1,122,000 m²
 - Net area: 1,077,000 m²
 - Area of building footprint: 10,000 m²
 - Plot area: 10,000 m²
 - Site coverage: 30%
- Number of Apartments:**
 - 180 (170 single units, 10 quad units)
- Number of Elevators:**
 - 4
- Building Occupancy:**
 - 400 occupants
- Building Density:**
 - 170 units/10,000 m²

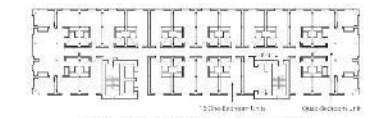


Figure 2.1.1: Typical floor plan showing the layout of the building, including the core and tube structure.



Figure 2.1.2: Typical floor plan showing the layout of the building, including the core and tube structure.

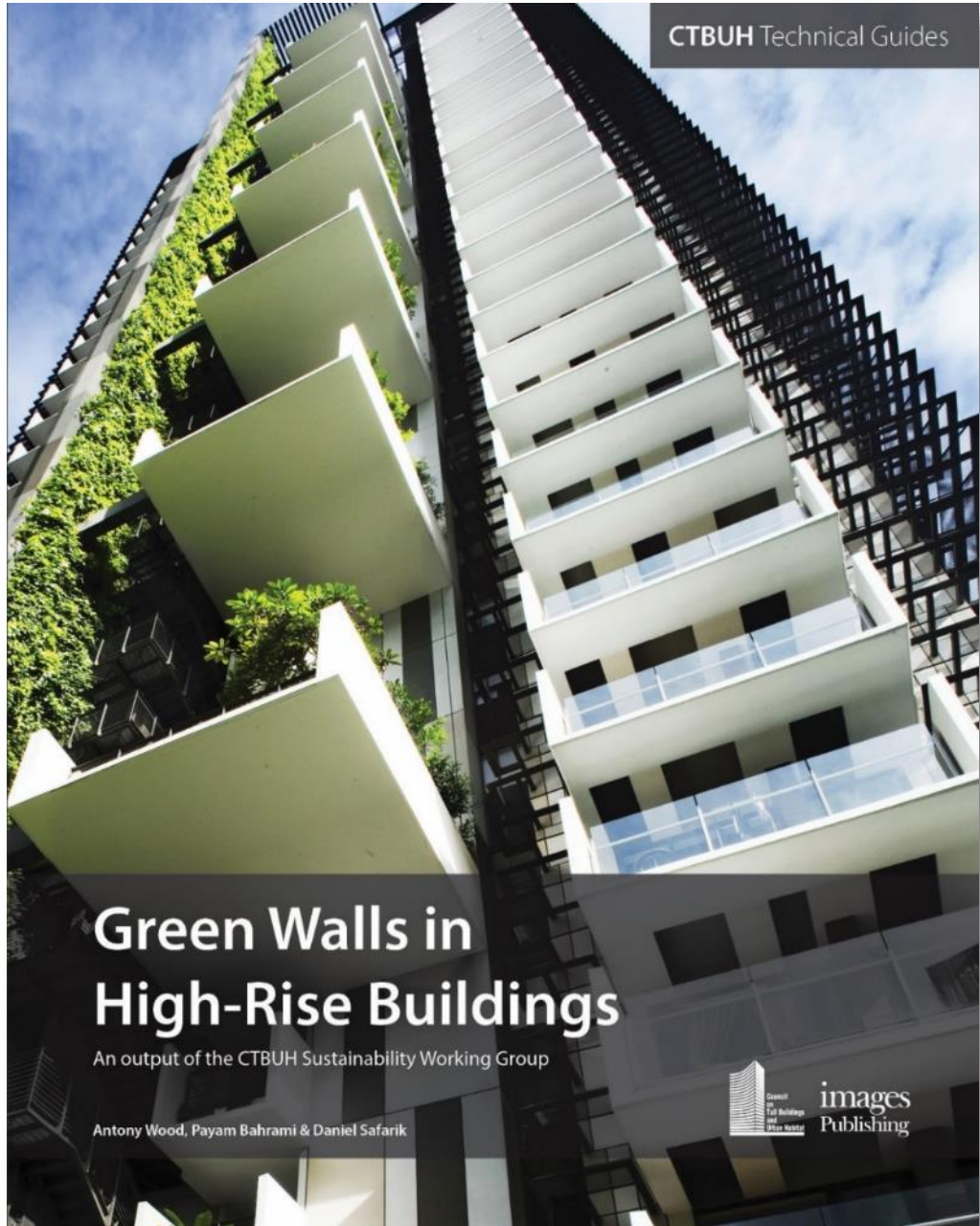
Figure 2.1.1: Typical floor plan showing the layout of the building, including the core and tube structure. Figure 2.1.2: Typical floor plan showing the layout of the building, including the core and tube structure.

Design Principle 7:

Tall Buildings should embrace **organic vegetation** as an essential part of the material palette

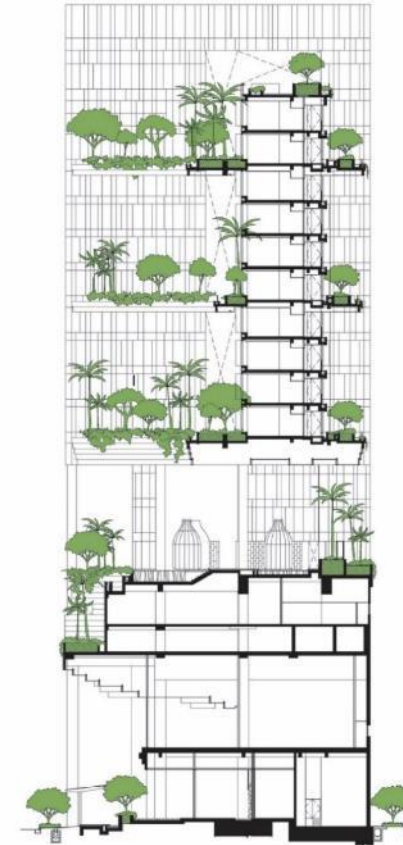
Bosco Verticale, *Milan*,
2014





Green Walls in High-Rise Buildings

Technical Guide, 300 pages



Pasona Headquarters, Tokyo,
2011



Typical Double Skin Façade





KMC Corporate Office, *Hyderabad*, 2012

Design Principle 8:

Introduce physical, circulatory and programmatic connections – **skybridges**



Bella Sky Hotel,
Copenhagen, 2011



The Cosmopolis of the Future
Harry Petit, from King's Views of New York. 1908



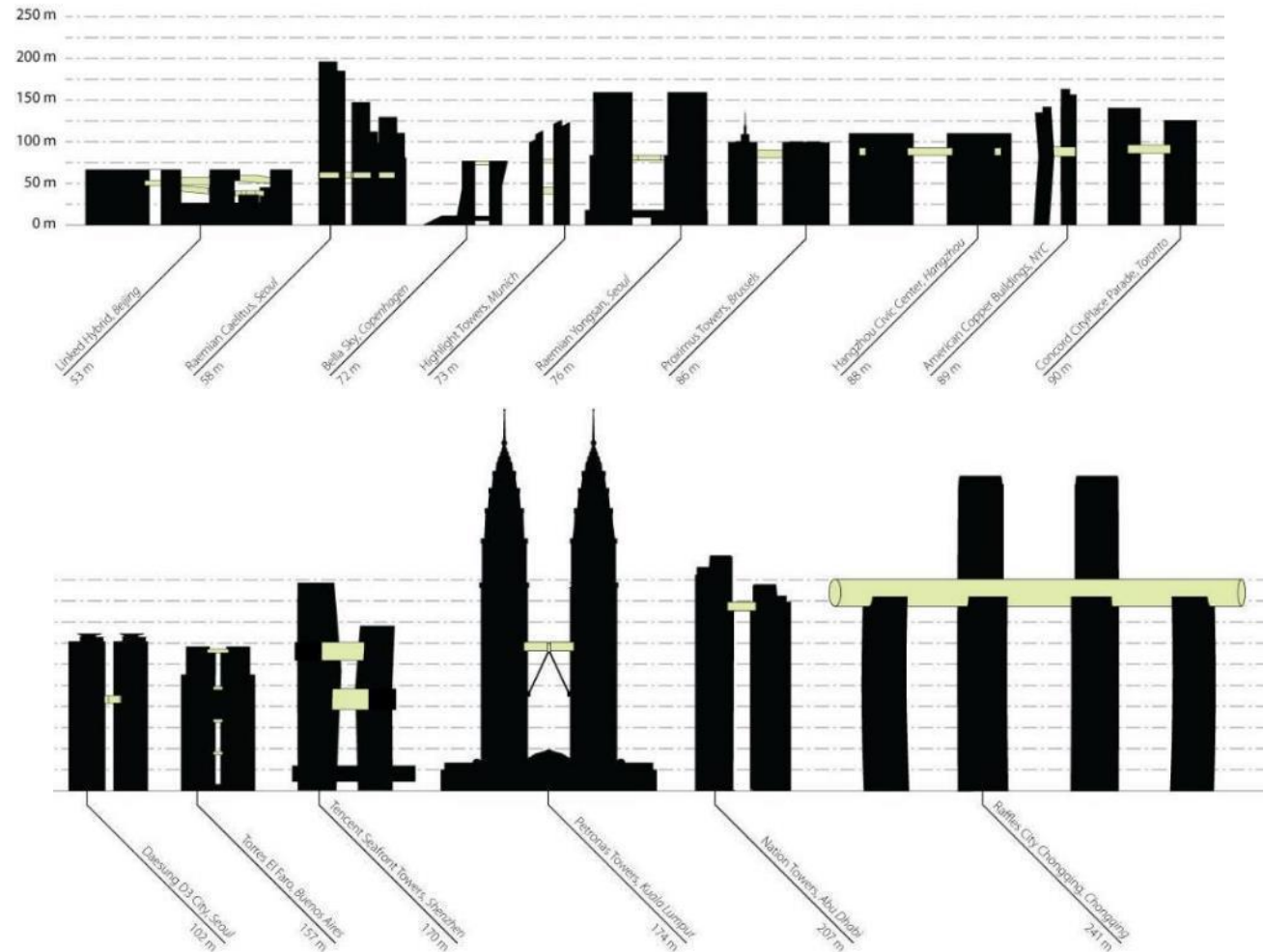
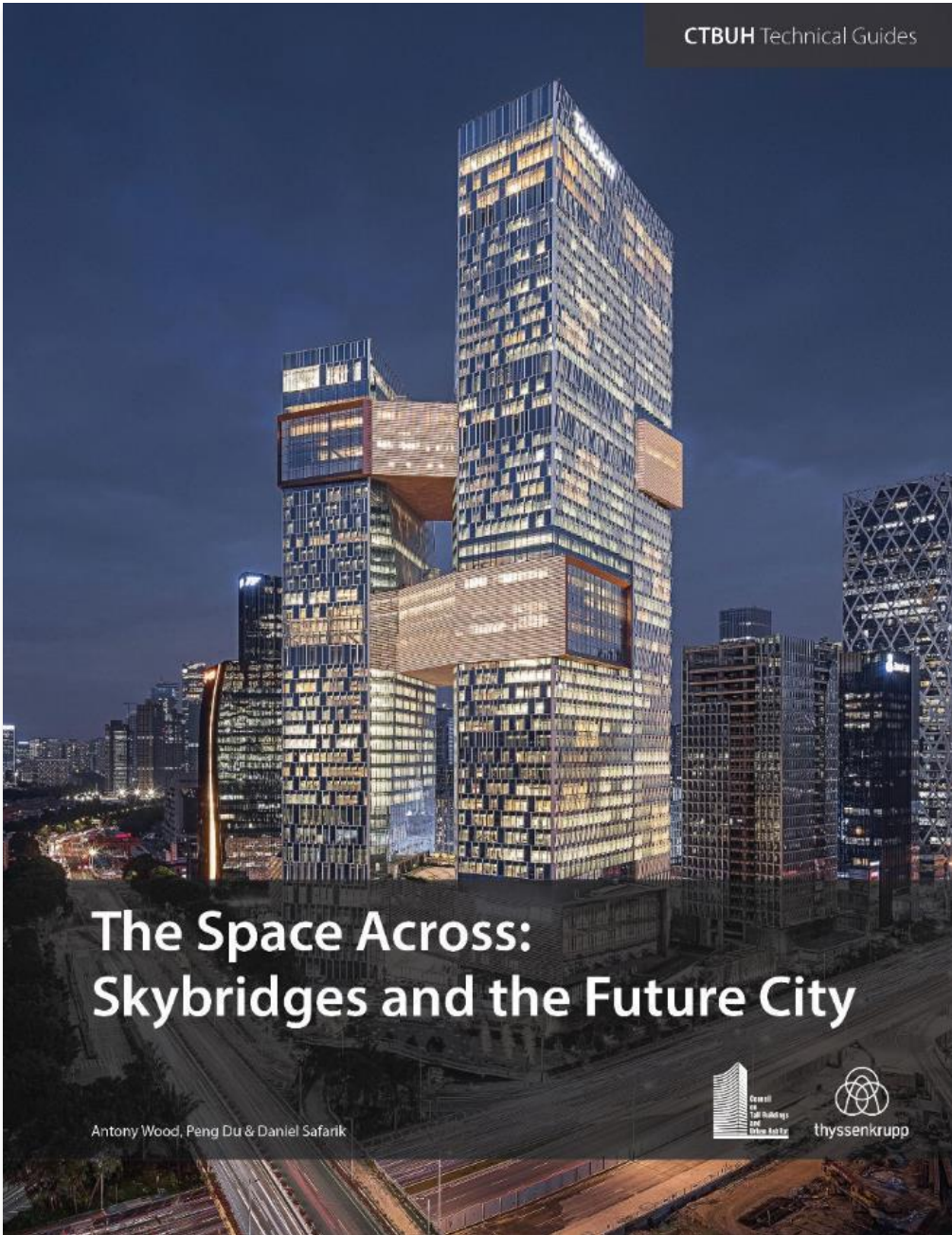
Metropolis
Erich Kettelhut, still from
Fritz Lang's film, 1927



The Fifth Element
Luc Besson, still from
the film, 1997

The Space Across: Skybridges and the Future City

Technical Guide, 300 pages



The Pinnacle@Duxton, Singapore, 2010



The Pinnacle@Duxton, Singapore, 2010



Design Principle 9:

Tall Buildings should see the **Roof Plane** as the most valuable space (and place) in the whole building

A Typical Tall Building Rooftop



Skypark, Hong Kong, 2016



The Pakubuwono Spring, *Jakarta*, 2018



Lighthouse 2.0, Aarhus, 2022



Marina Bay Sands, Singapore, 2010



Marina Bay Sands, Singapore, 2010



The Interlace, Singapore, 2013



The Interlace, Singapore, 2013



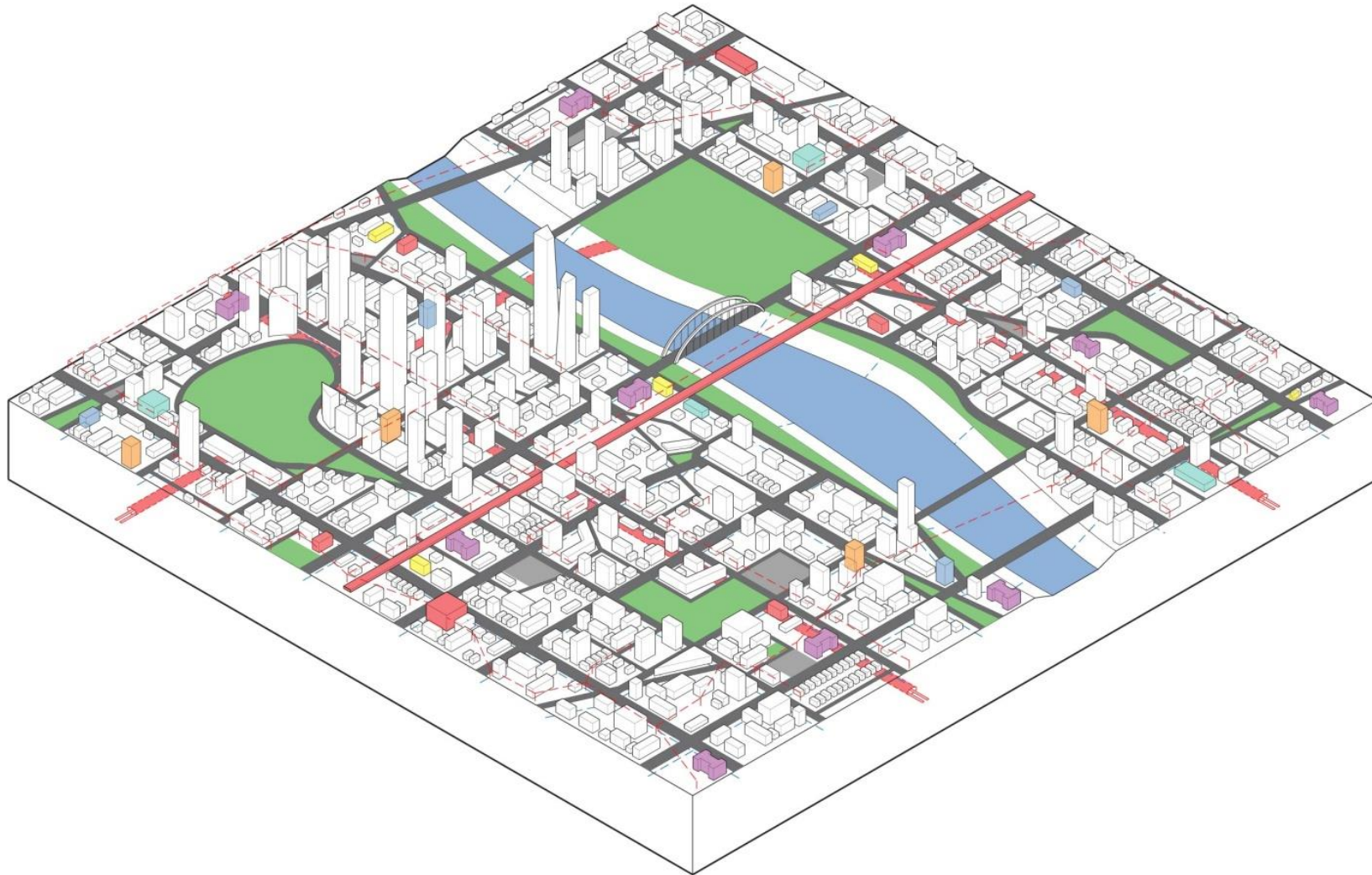
Design Principle 10:

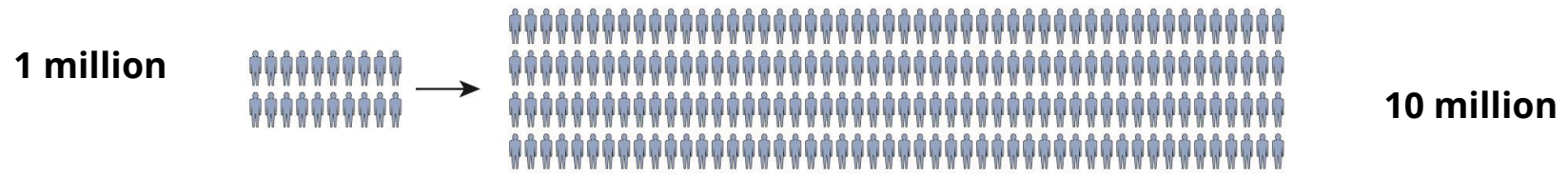
We need to challenge the conventional functions inside tall buildings and bring **ALL** aspects of the city up into the Sky

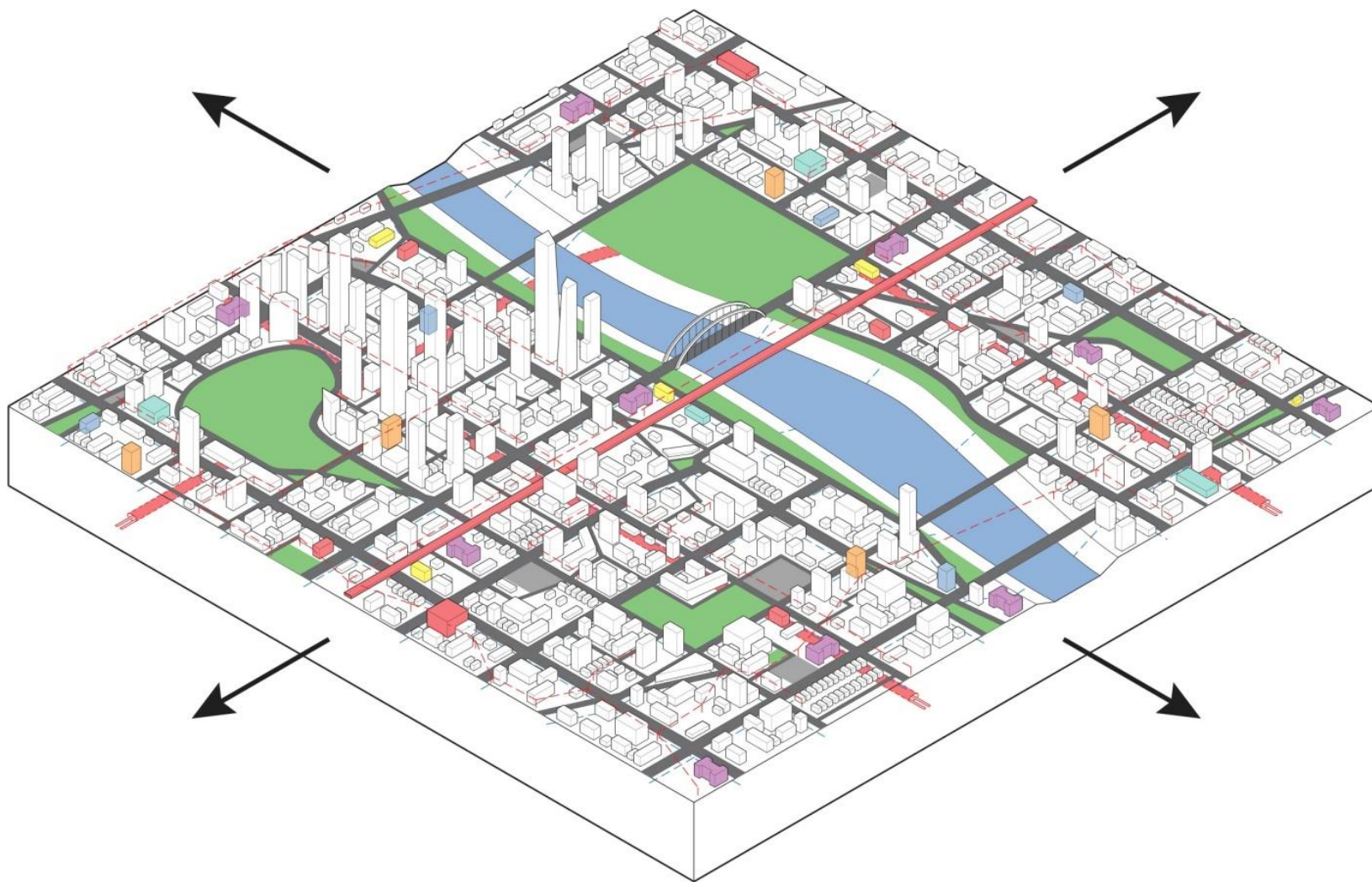




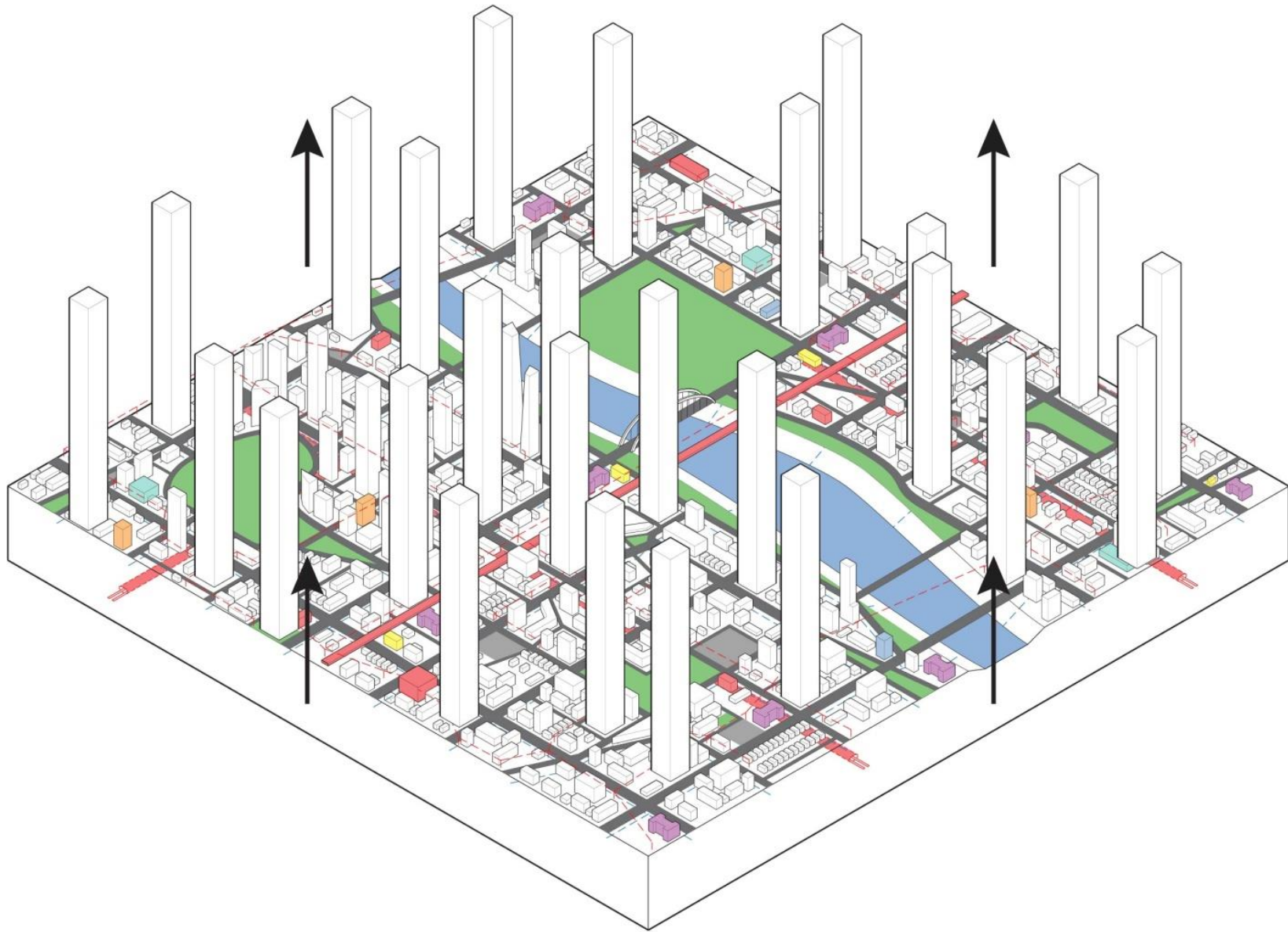
1 million

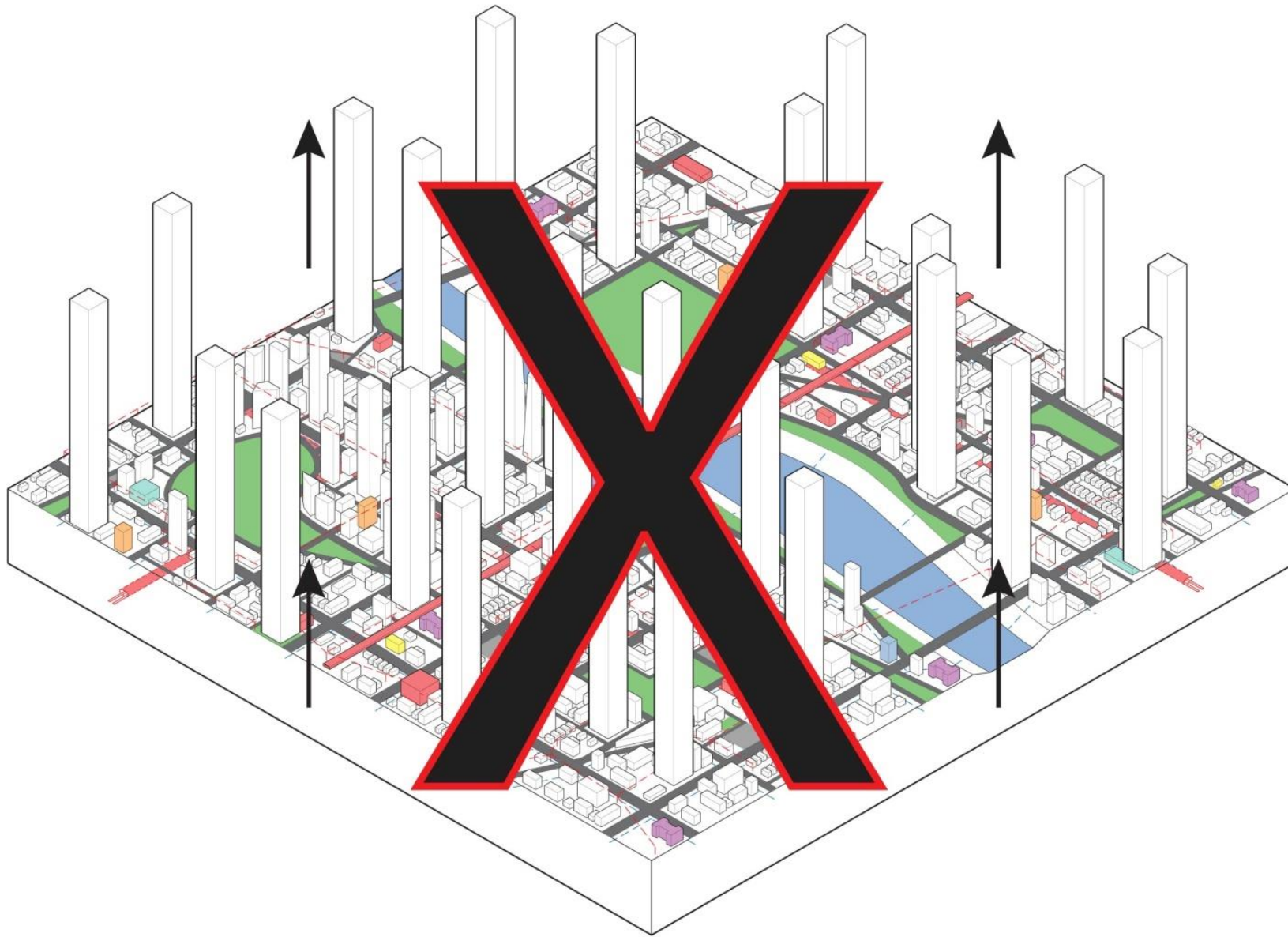




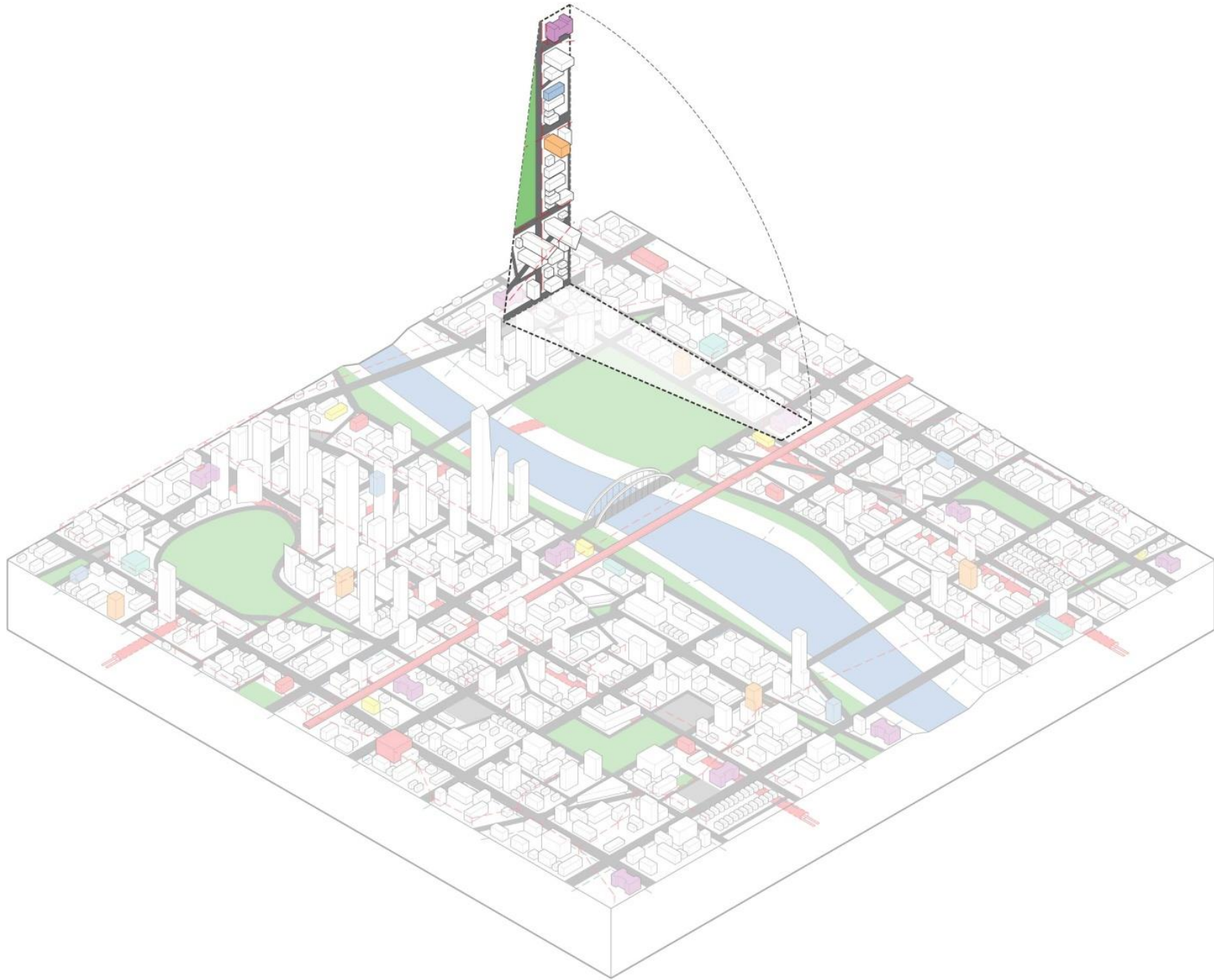


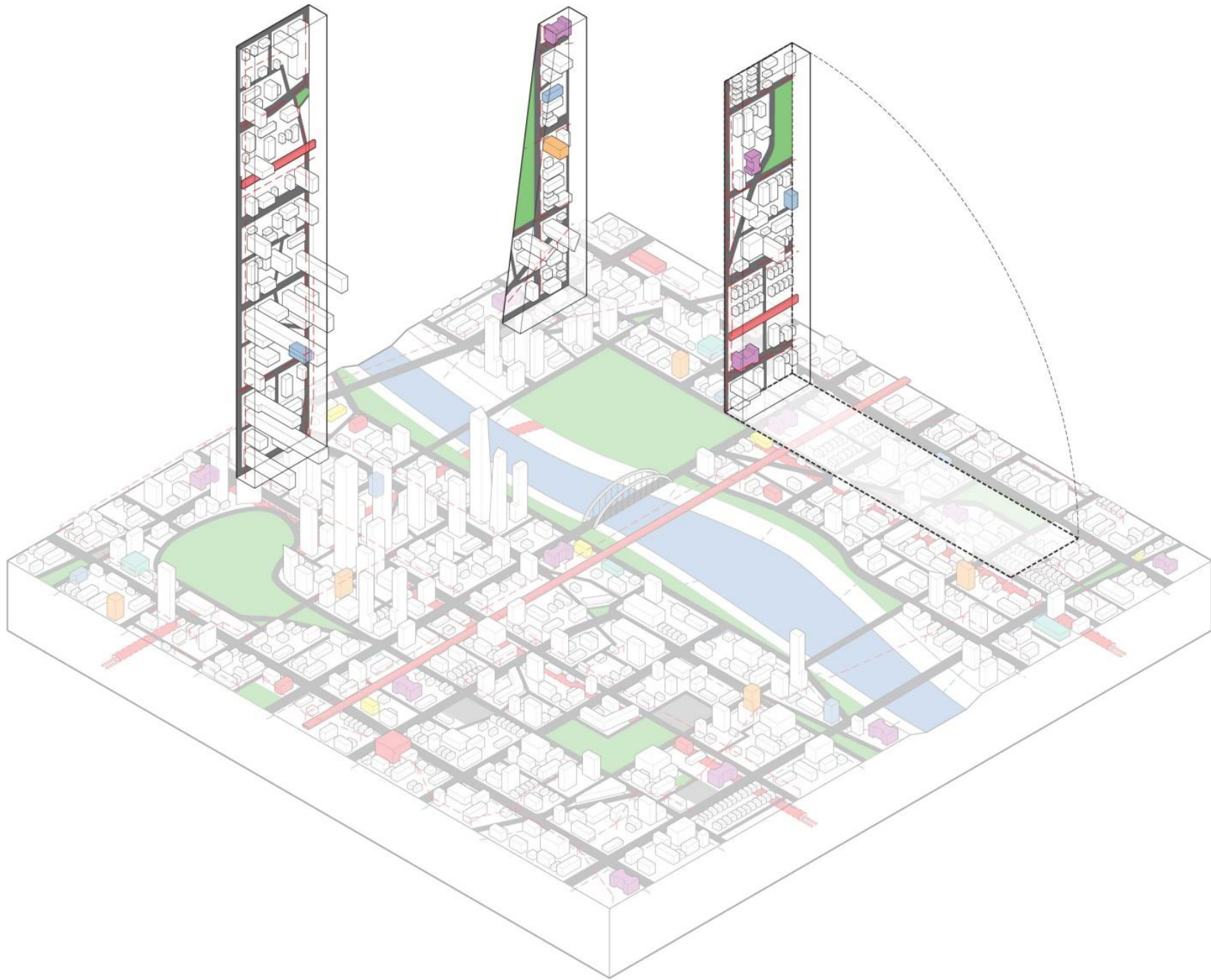




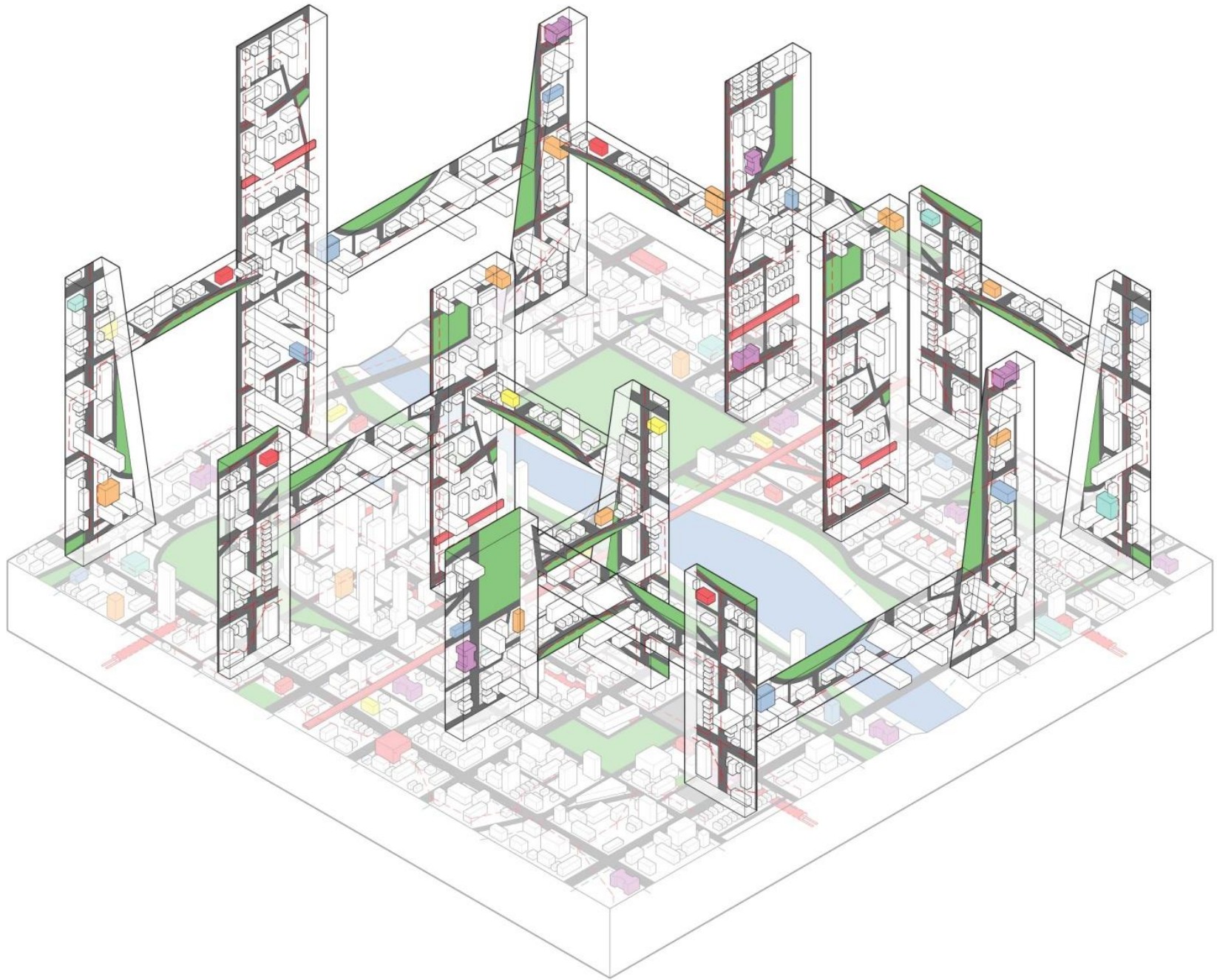


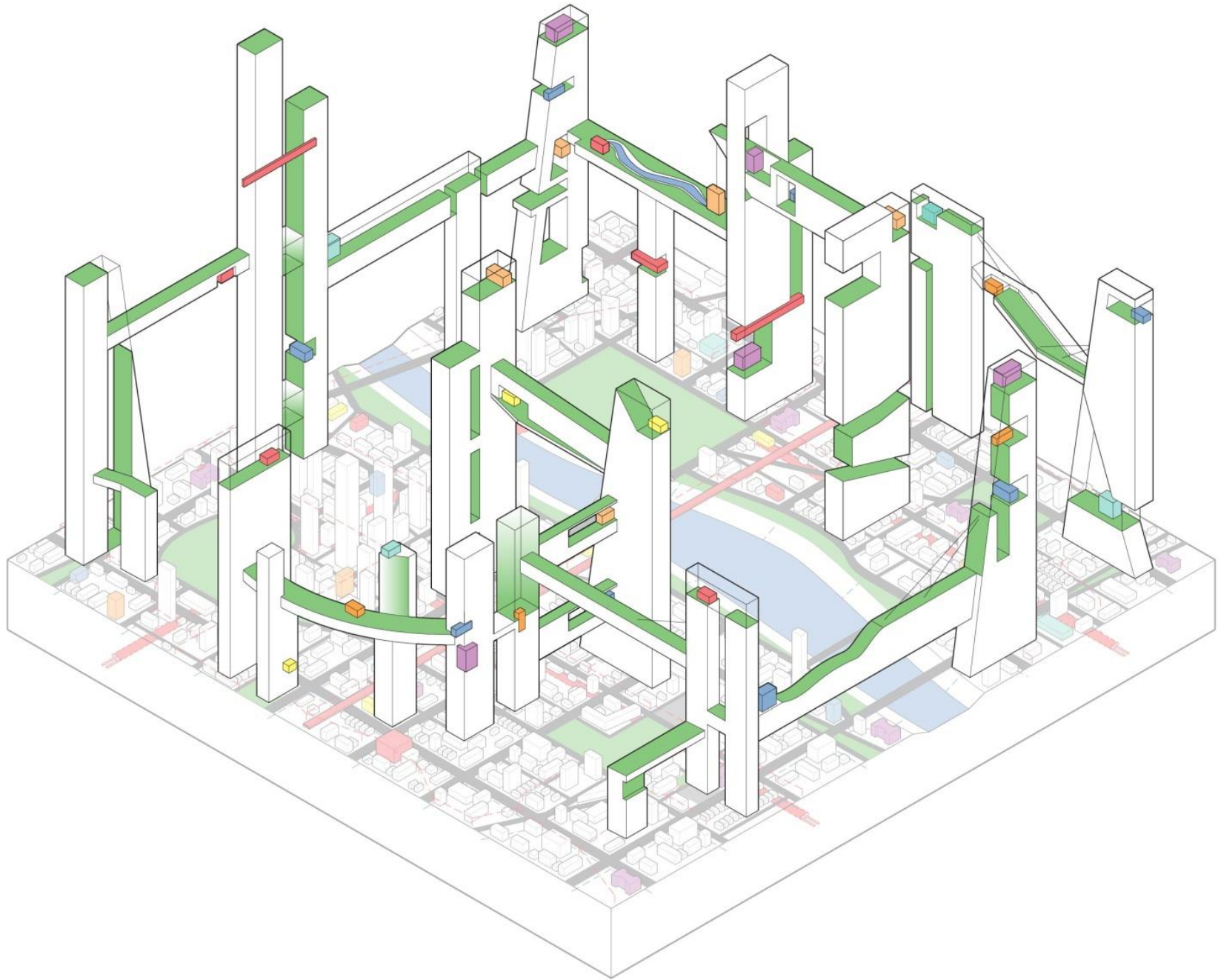












Introducing the CTBUH

CTBUH

ADVANCING SUSTAINABLE VERTICAL URBANISM....

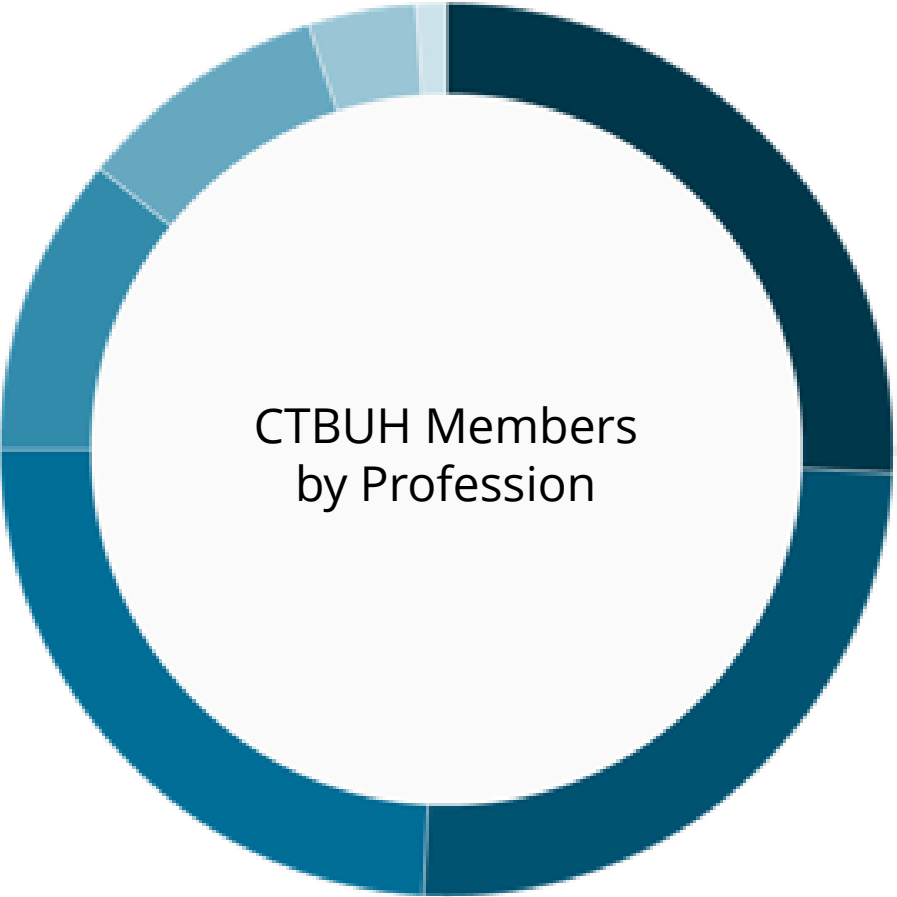
Founded in 1969.

Non-profit, multi-disciplinary, worldwide association focused on tall buildings and sustainable cities.

“ The CTBUH organizational member network embraces over **2 million** individuals working in **10,000+** offices in more than **100** countries around the world. ”

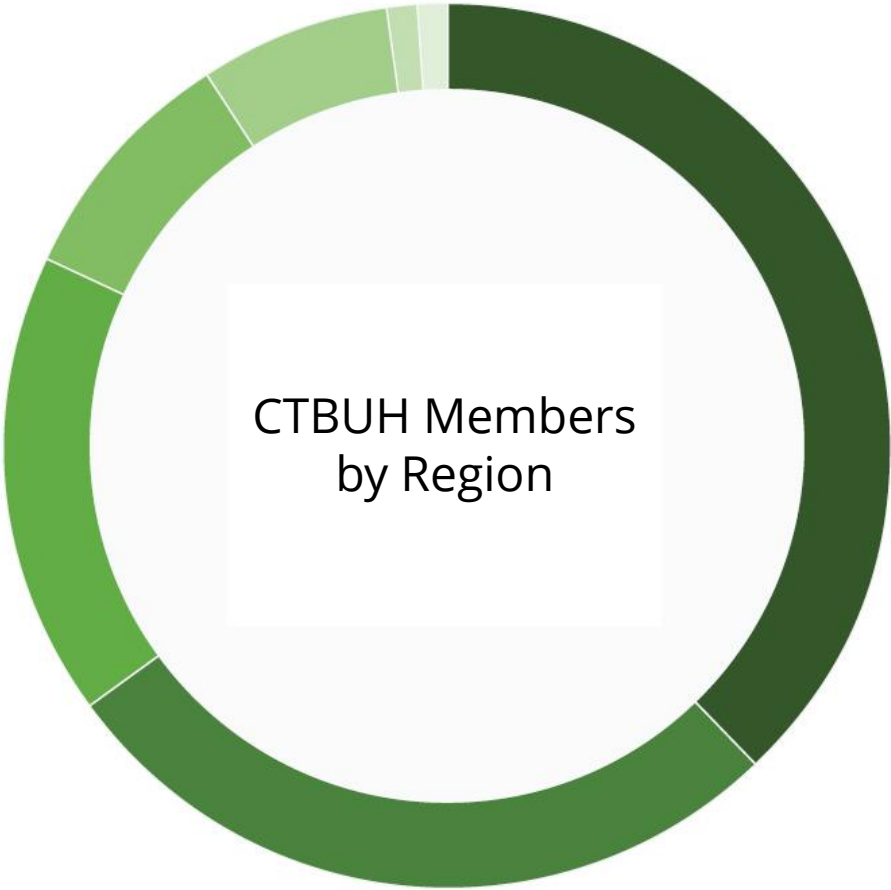


Membership By Discipline



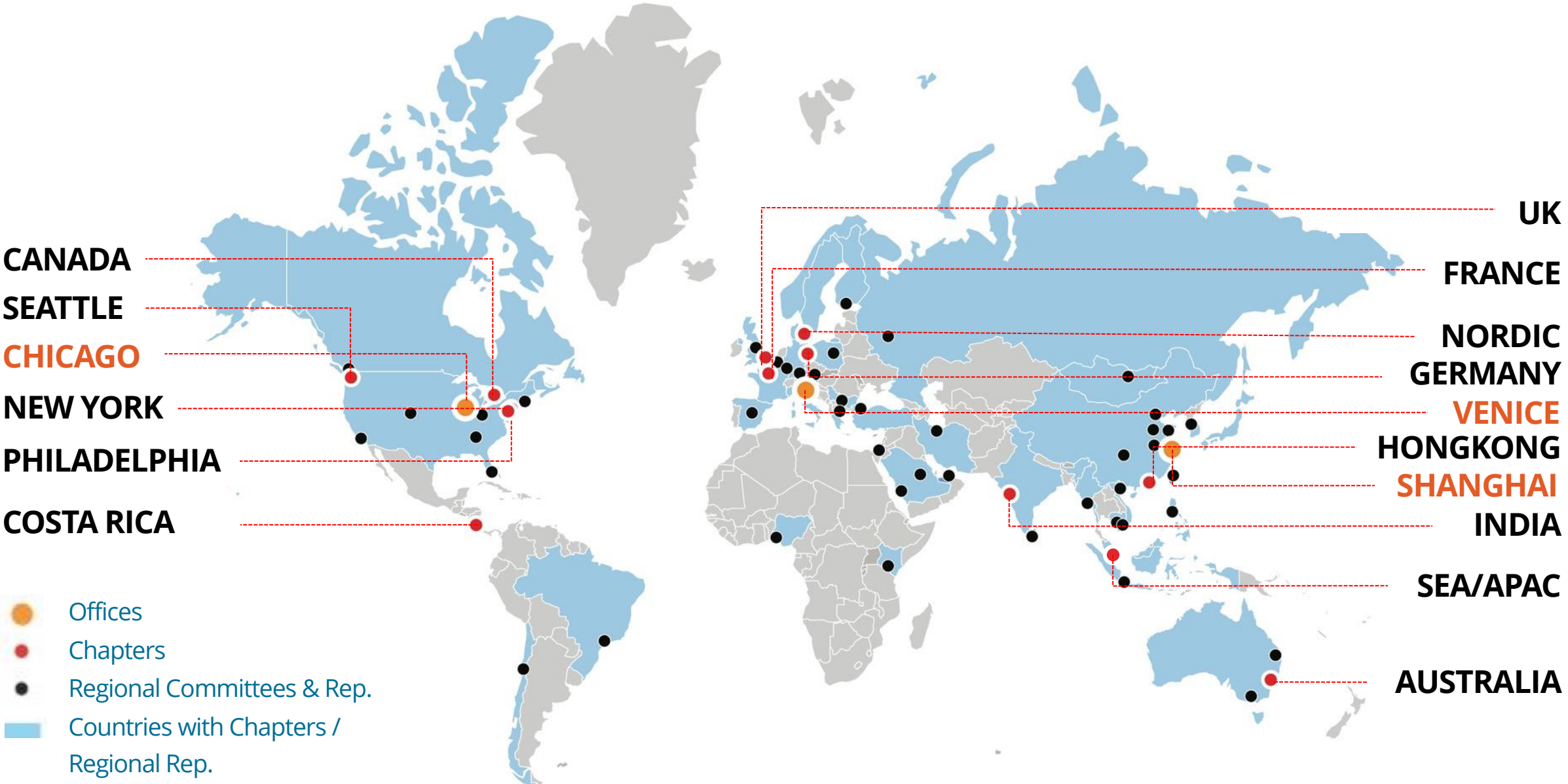
- **26%** Owner/Developer/Funder/Occupier
- **25%** Engineering (all types)
- **24%** Architecture/Urban/Interiors
- **11%** Construction/Project Management
- **9%** Materials/System Supplier
- **5%** Association/Government/University
-

Membership By Region

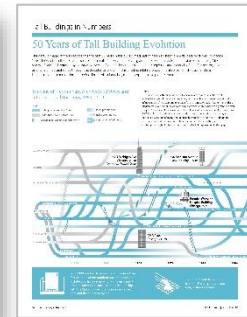
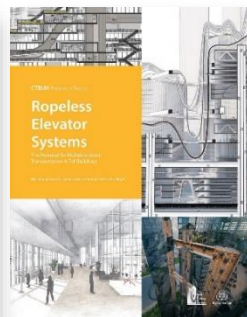
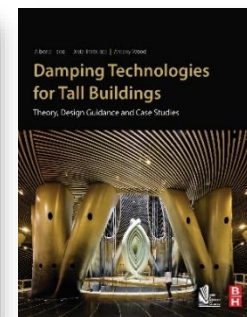
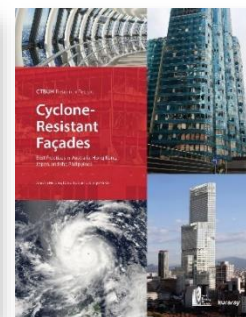
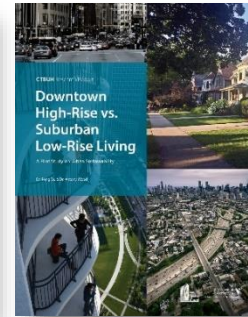
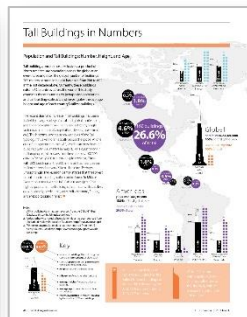
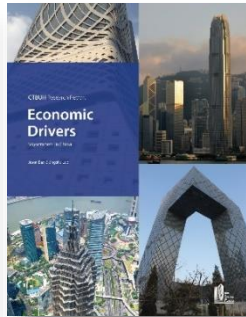
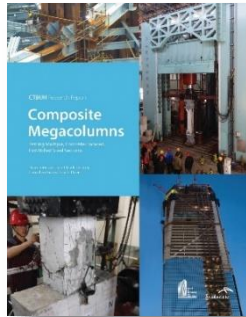
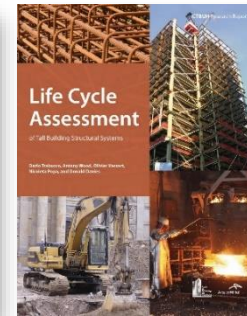
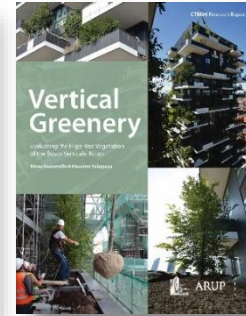
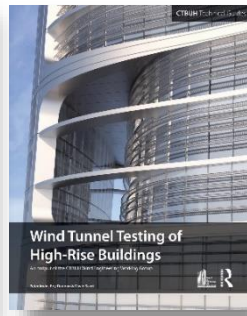
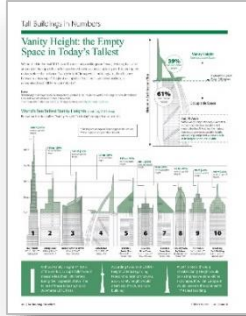
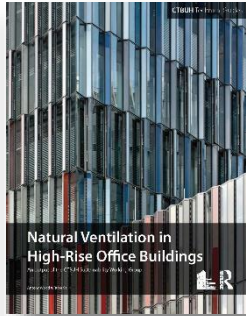
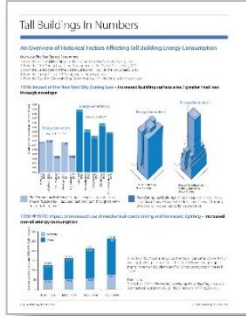


- **38%** North America
- **27%** Asia
- **17%** Europe
- **9%** Middle East
- **7%** Australia
- **1%** Africa
- **1%** Central/South America

CTBUH Global Representation. Offices, Chapters & Representatives



Recent Research Outputs / Publications

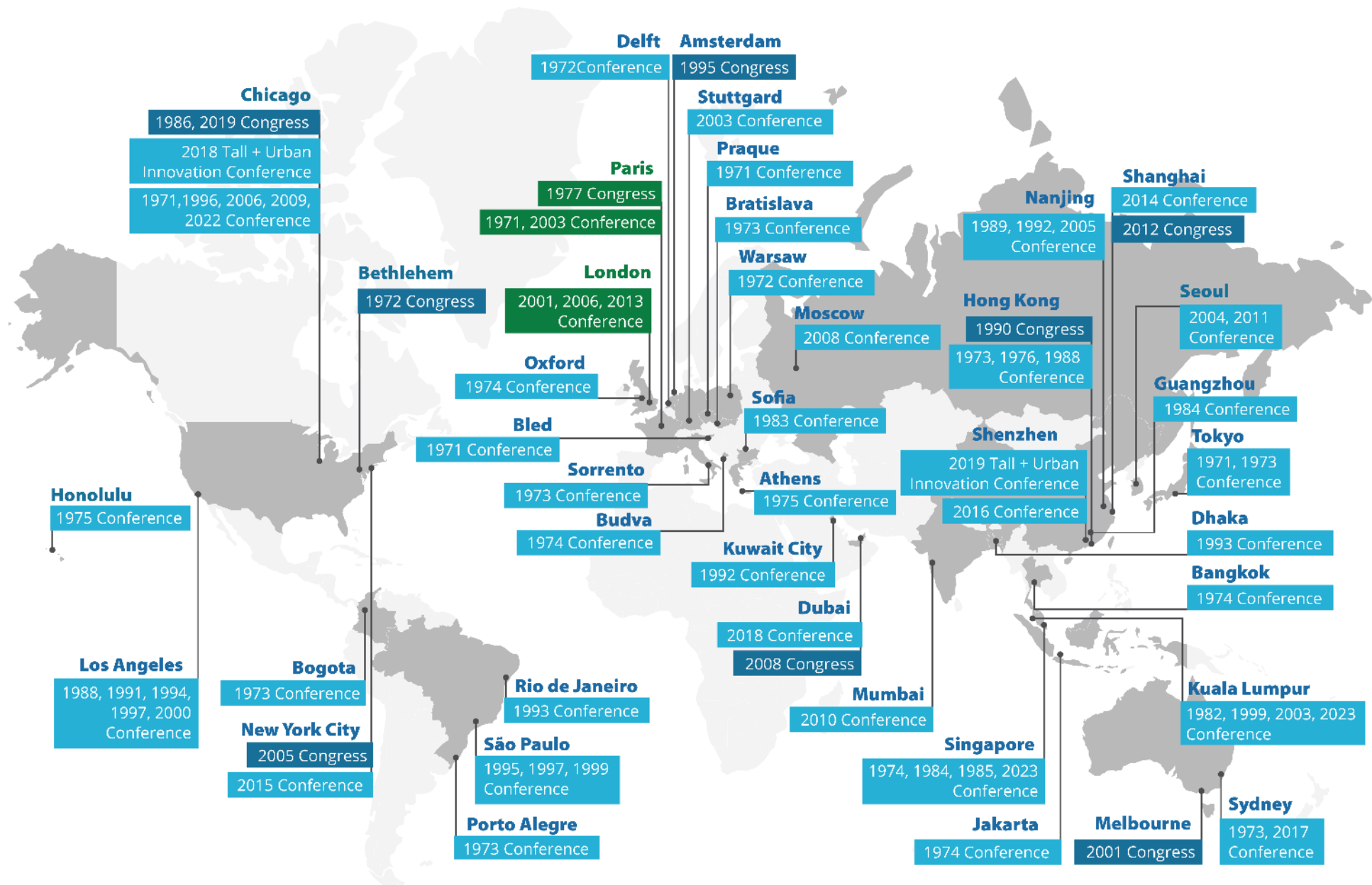


Recent Research Outputs / Publications

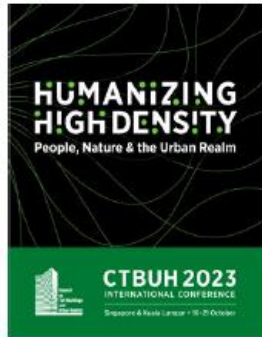


Introducing the CTBUH 2024 London & Paris Conference

50+ Years of CTBUH Conferences



50+ Years of CTBUH Conferences



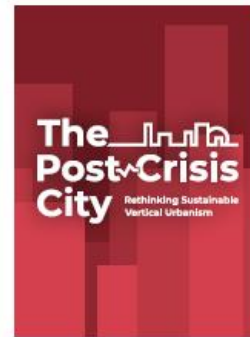
Singapore & Kuala Lumpur, 2023



Chicago, 2022



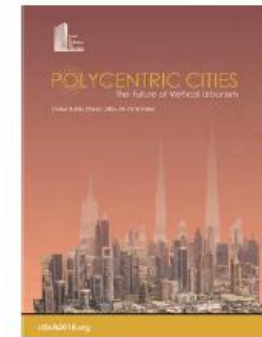
Global, 2021



Virtual, 2020



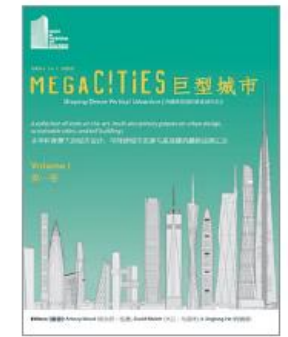
Chicago, 2019



Dubai & Abu Dhabi, 2018



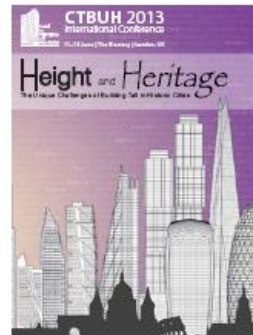
Sydney, Melbourne & Brisbane, 2017



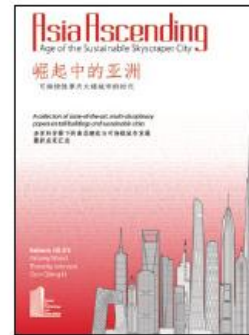
Shenzhen, Guangzhou & Hong Kong, 2016



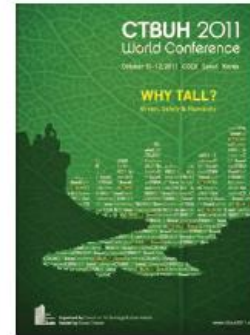
New York, 2015



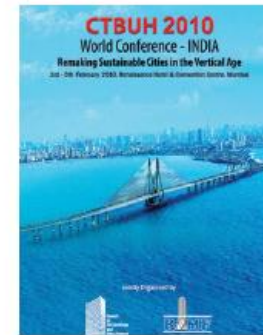
London, 2013



Shanghai, 2012



Seoul, 2011



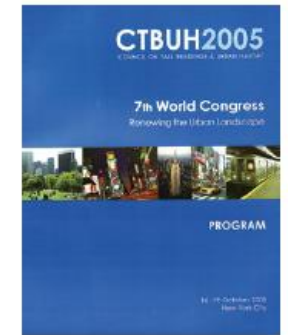
Mumbai, 2010



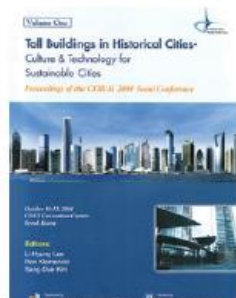
Chicago, 2009



Dubai, 2008



New York, 2005



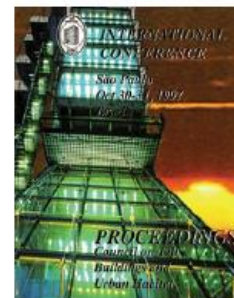
Seoul, 2004



Kuala Lumpur, 2003



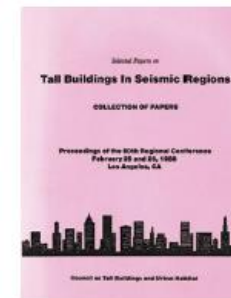
Melbourne, 2001



Sao Paulo, 1997



Amsterdam, 1995



Los Angeles, 1988



Chicago, 1986



Singapore, 1984



Paris, 1977

NEW OR RENEW

ADDRESSING THE DENSITY DILEMMA



CTBUH 2024
INTERNATIONAL CONFERENCE

London & Paris • 23-27 September

2024.ctbuhconference.com

London Core Conference Venue

Days 1-3: Monday 23 – Wednesday 25 September
@ The Barbican Centre, London



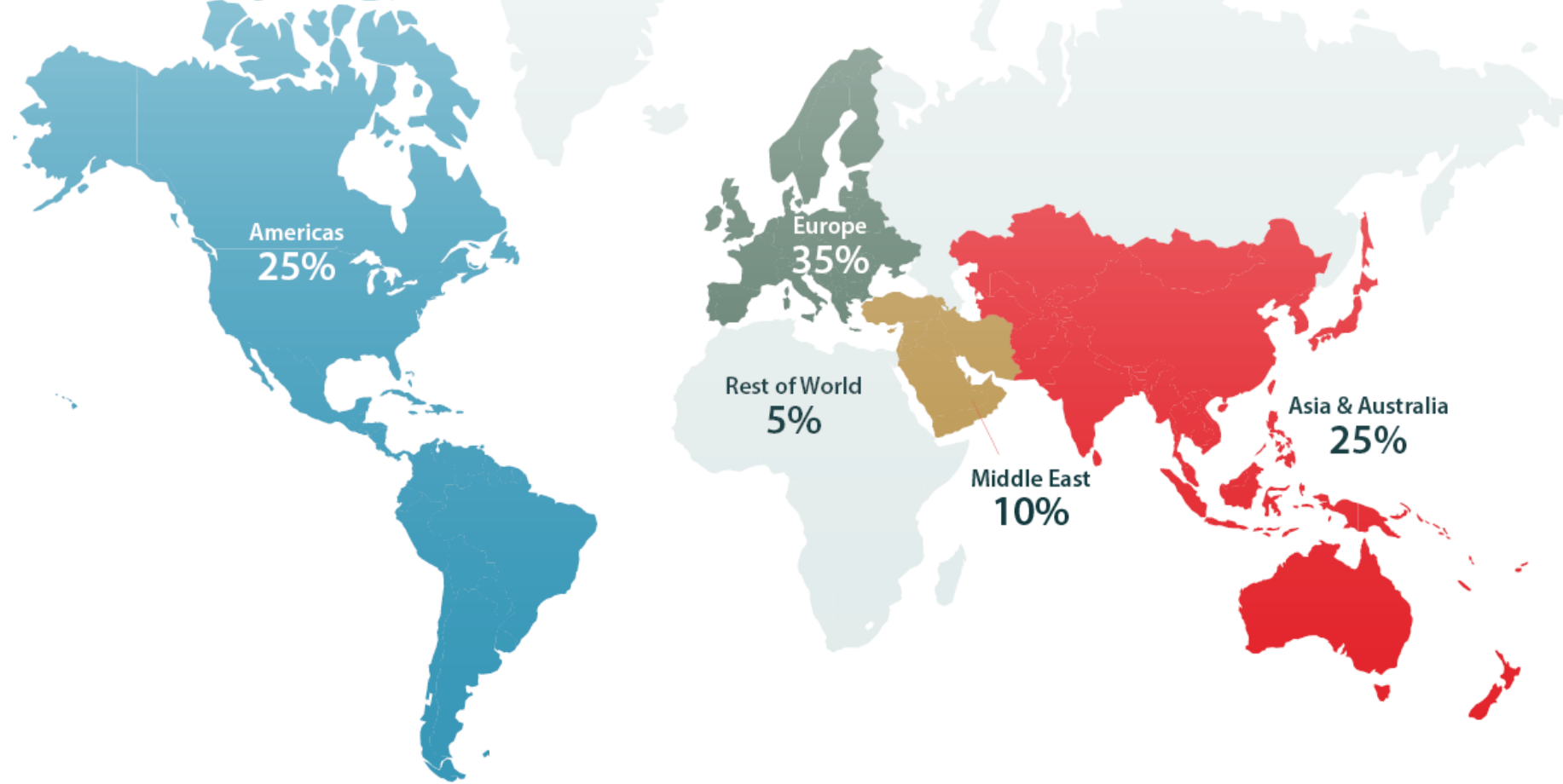
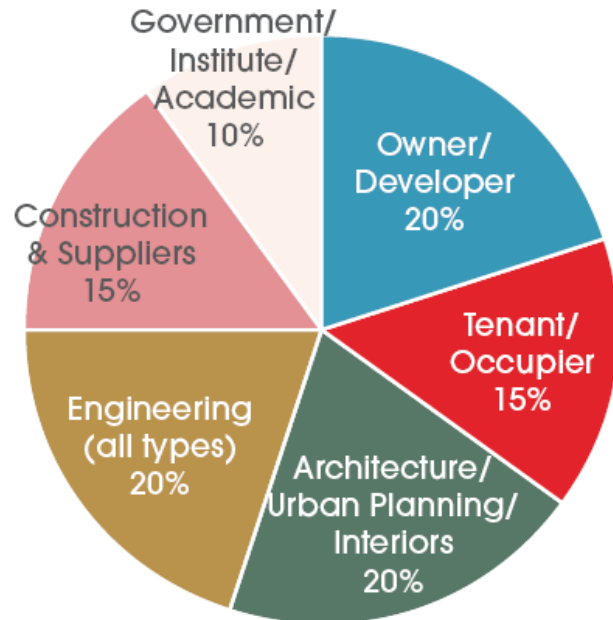
Attendance by Region

1200+ Delegates

50+ Countries

(see Regional Attendance at right)

Attendance by Profession



Expected Attendance

1200+
DELEGATES

200
SPEAKERS

50+
COUNTRIES

9
TRACKS

4
Evenings of
Social Events

1
GREAT
CONFERENCE!

Program Overview

	Monday, 23 Sept. Day 1	Tuesday, 24 Sept. Day 2	Wednesday, 25 Sept. Day 3	Thursday, 26 Sept. Day 4	Friday, 27 Sept. Day 5
	London				Paris
	Workshops	Core Conference	Core Conference	Off-Site Programs	Core Program
MORNING	CTBUH Leaders Meeting, followed by Leaders-Only Networking Lunch	Presentations & Panel Discussions	Presentations & Panel Discussions	AM Off-Site Programs	Presentations & Building Tours at Off-Site Programs
AFTERNOON	Technical Workshops			PM Off-Site Programs	
EVENING	Opening Networking Reception	Sponsor-Organized Social Events	Awards Ceremony & Dinner	Travel to Paris	Closing Networking Reception

Awards Ceremony & Dinner: Award Categories

Deadline for Submissions: 9 February 2024

PROJECT

Best Tall Building Awards



By Height
Under 100 Meters
100–199 Meters
200–299 Meters
300–399 Meters
400 Meters & Above



By Region
Americas
Asia
Australia
Europe
Middle East & Africa



Best Tall Building Worldwide

Best Tall Non-Building Award



Urban Habitat Award



Future Project Award



10 Year Award



PROCESS

Construction Award



Repositioning Award



COMPONENT

Innovation Award



Structure Award



Systems Award



Space Within Award



PEOPLE

Lifetime Achievement Awards



Lynn S. Beedle Lifetime Achievement Award



Fazlur R. Khan Lifetime Achievement Award

Equity, Diversity & Inclusion



CTBUH Fellows



How to Get Involved



SPEAK

Abstract submission deadline:
31 January 2024



SPONSOR

Exclusive sponsorships are available to promote your company and expertise internationally



SERVE

Get involved in the local organizing committee and help steer the event

48 Confirmed Sponsors

(as of 16 January 2024)

Diamond



Platinum



Gold



Silver +



Silver





awood@ctbuh.org

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