

Lusail Towers

Lifting the design for future flexibility



Chuan Lim

Secretary, CIBSE Lifts Group
Partner, Environmental Engineering

Foster + Partners



Lusail City

Lusail Towers

2022 FIFA Stadium

Doha City Centre

Lusail Towers

Lifting the design for future ~~flexibility~~
adaptability



Foster + Partners

1

Lifting Design for Adaptability

2

Adaptability - Demonstrated

**A Good Lifting Strategy
is
Simple, Seamless and Adaptable.**

Usable Floor Area

vs

Performance

vs

Cost

Density Increase

Allow MULTIPLE vendors to
tender for project

Adaptable?

Adaptive Re-use

Allowance for future
technology. eg Ropeless

Change in Tenancy Configuration

Foster + Partners

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Change in Tenancy Configuration

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Initial Building Type	Lifting Arrangement	Adaptive Reuse to Other Building Function - Conversion to:				Summary
		Office	Hotel	Residential	Mixed Use	
		Sufficient No. of Lift Shafts	Sufficient No. of Lift Shafts	Sufficient No. of Lift Shafts	Sufficient No. of Lift Shafts	
Office	Baseline	N/A	✓	✓	✓	The Baseline lifting arrangement is suitable for adaptive reuse from Office to Hotel, Residential and Mixed Use.
Hotel	Baseline	X	N/A	✓	X	The Baseline lifting arrangement is only suitable for adaptive reuse from Hotel to Residential.
Residential	Baseline	X	X	N/A	X	The Baseline lifting arrangement is not suitable for adaptive reuse from Residential to Mixed Use, Hotel or Office.
Mixed Use	Baseline	X	✓	✓	N/A	The Baseline lifting arrangement is suitable for adaptive reuse from Mixed Use to Hotel and Residential, but not office conversion.



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TKE MOVE
BEYOND

KONE

OTIS

 **HYUNDAI ELEVATOR**


Schindler

 **MITSUBISHI
ELECTRIC**
Changes for the Better | **MITSUBISHI ELECTRIC
BUILDING SOLUTIONS CORPORATION**

Usable Floor Area

vs

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Density Increase

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tender for project

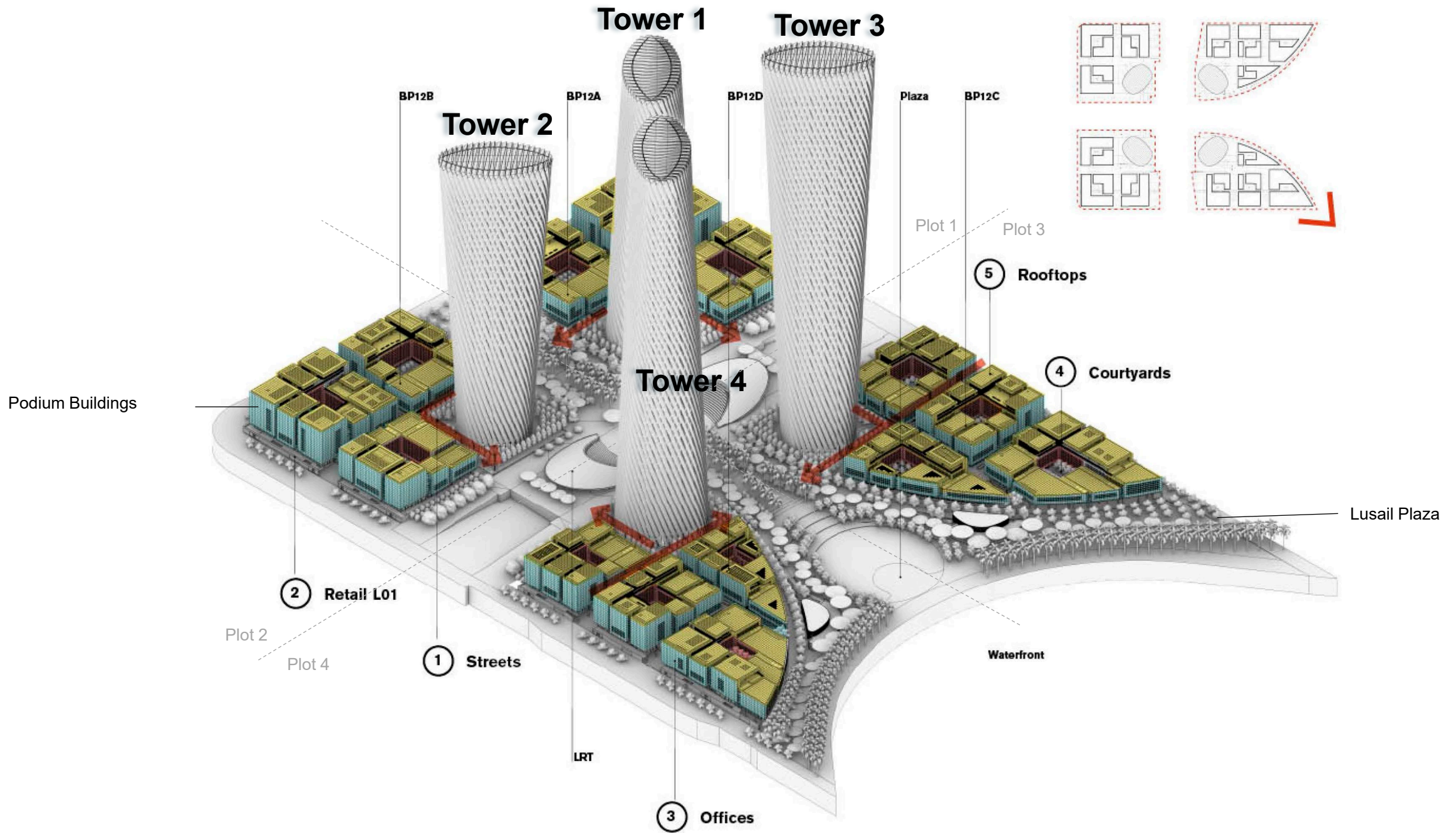
Adaptable?

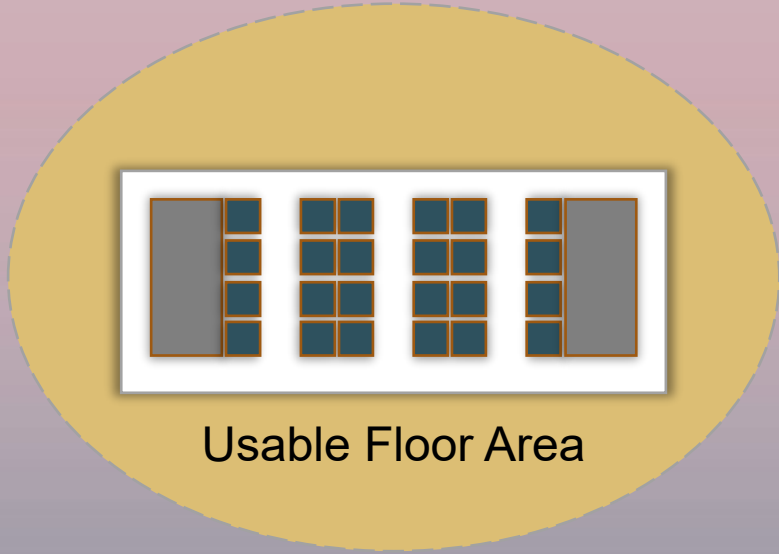
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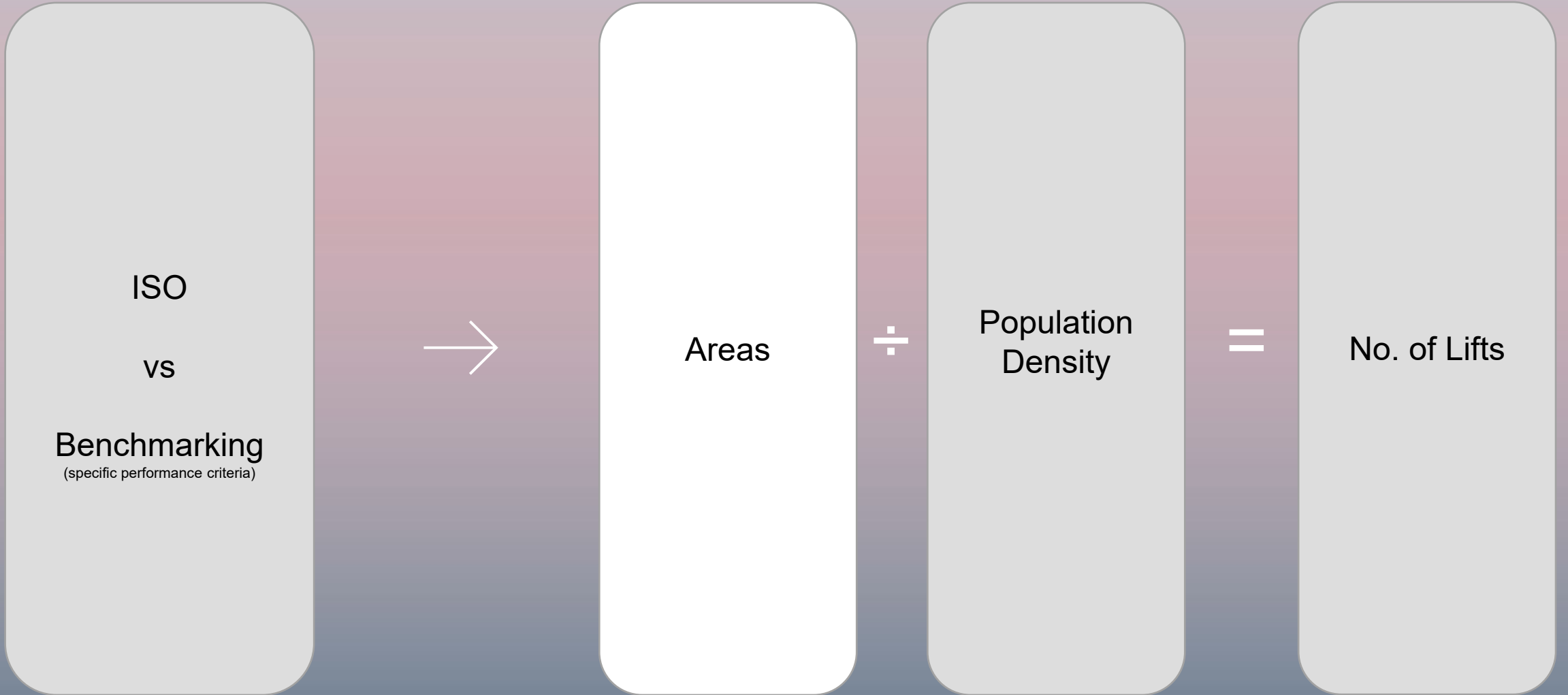




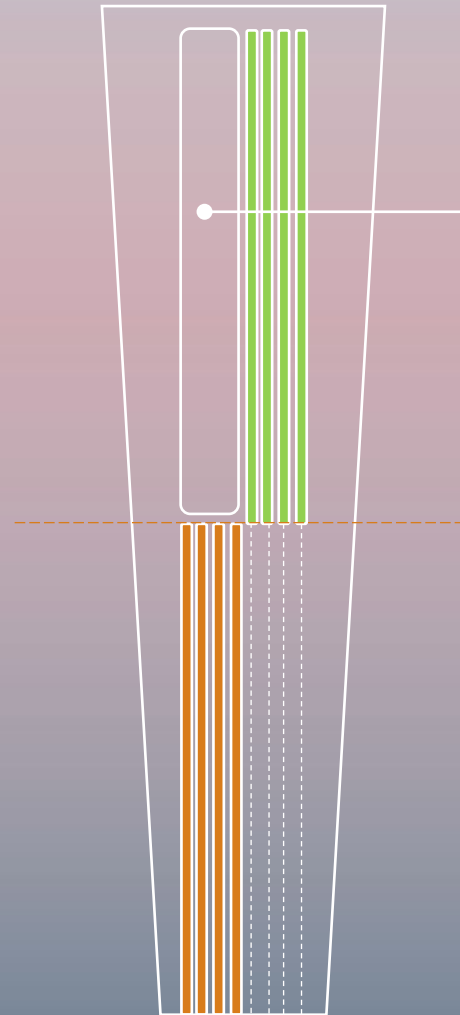
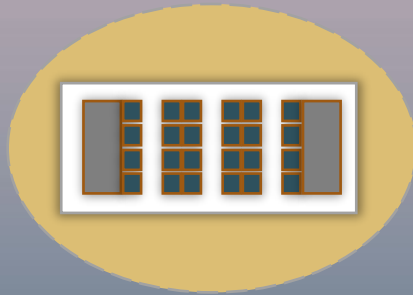
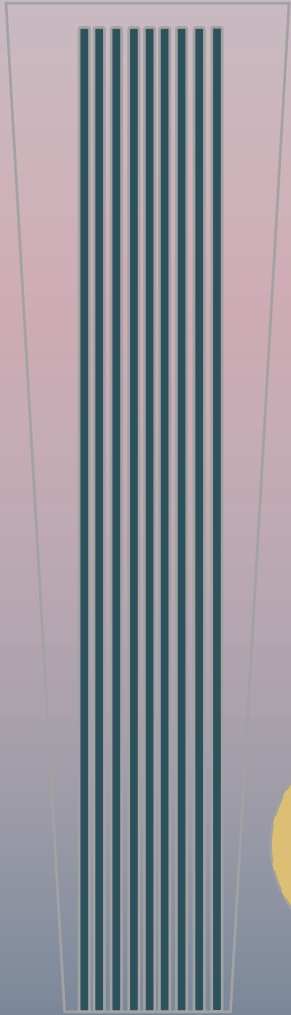
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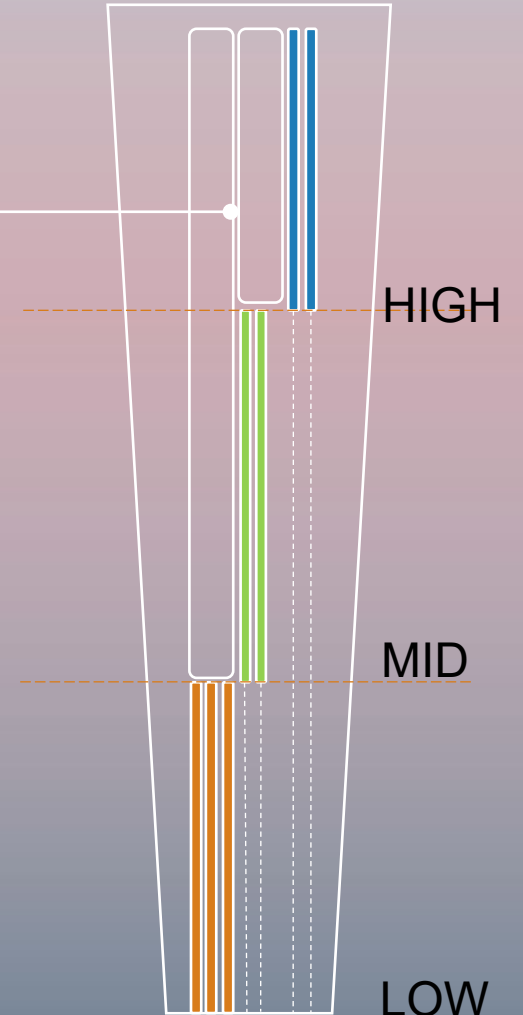
Typical Office Lifting Design Methodology



Zoning

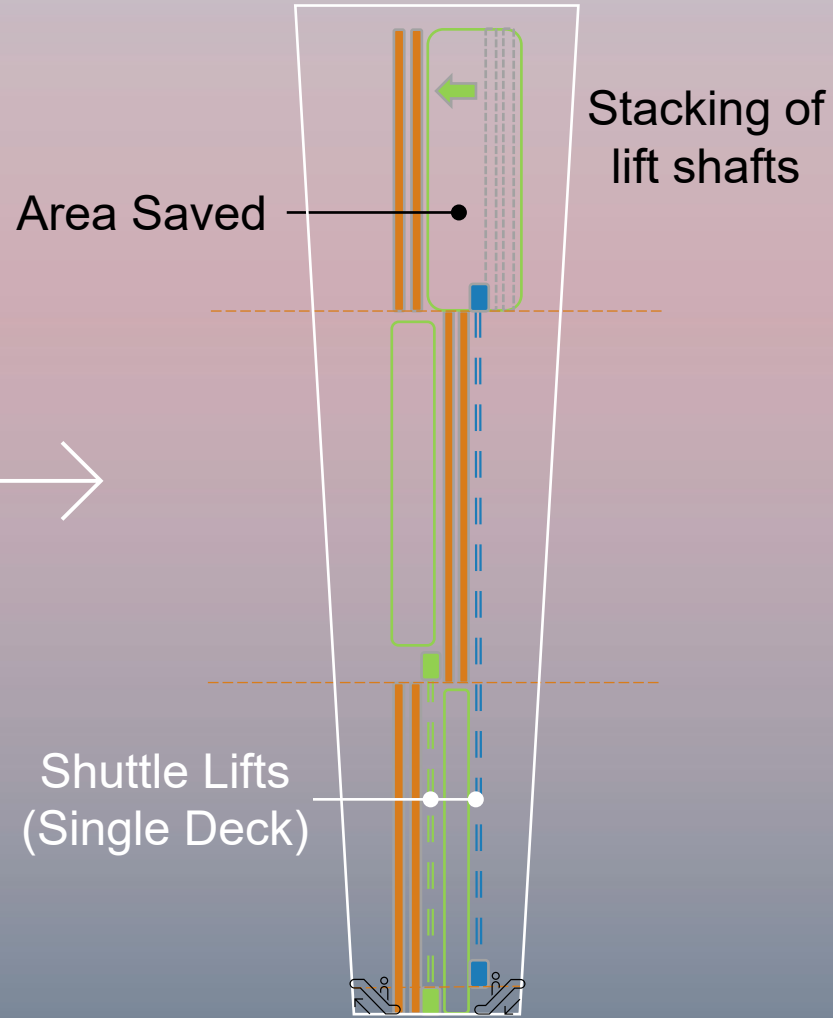


Area Saved

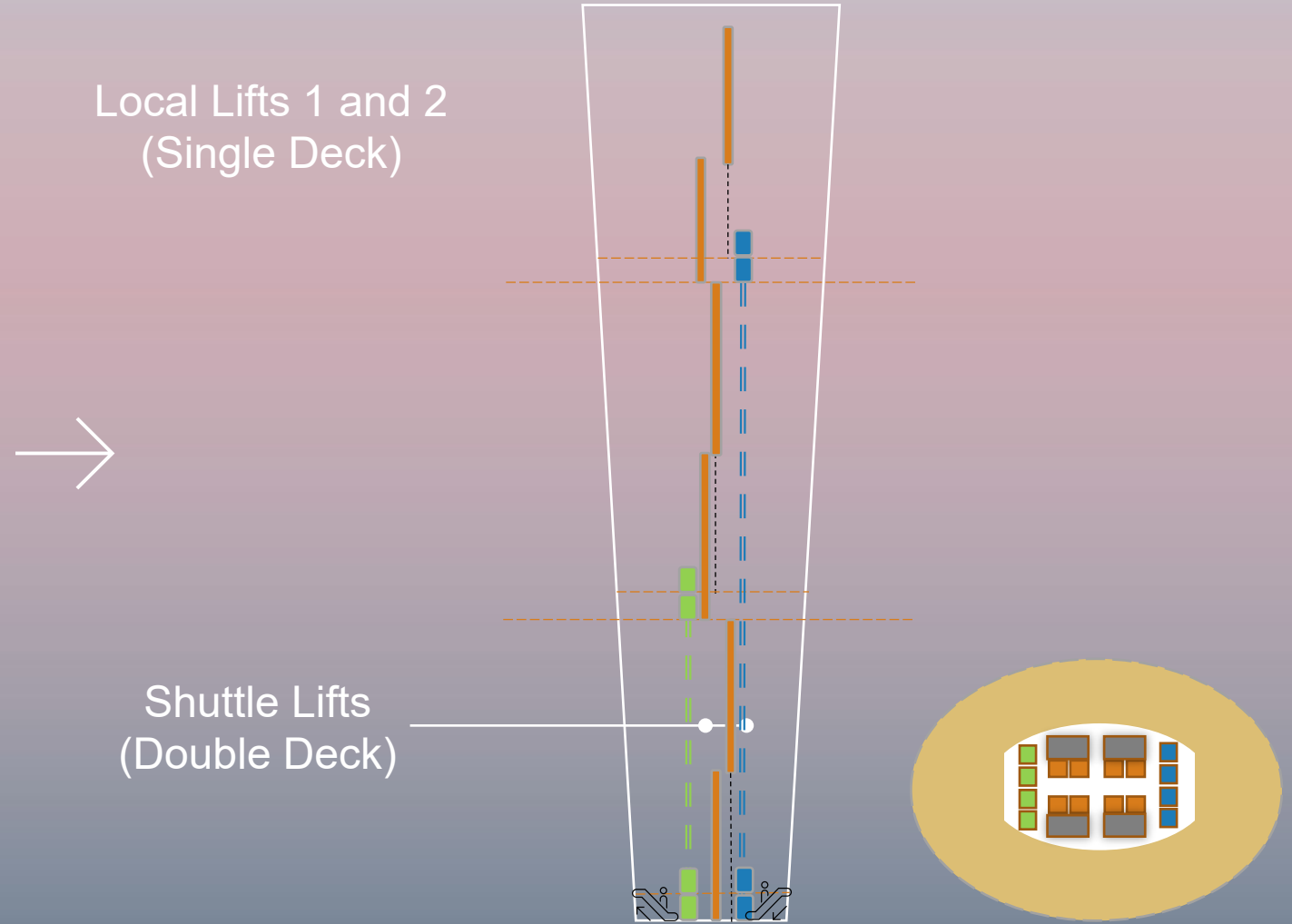


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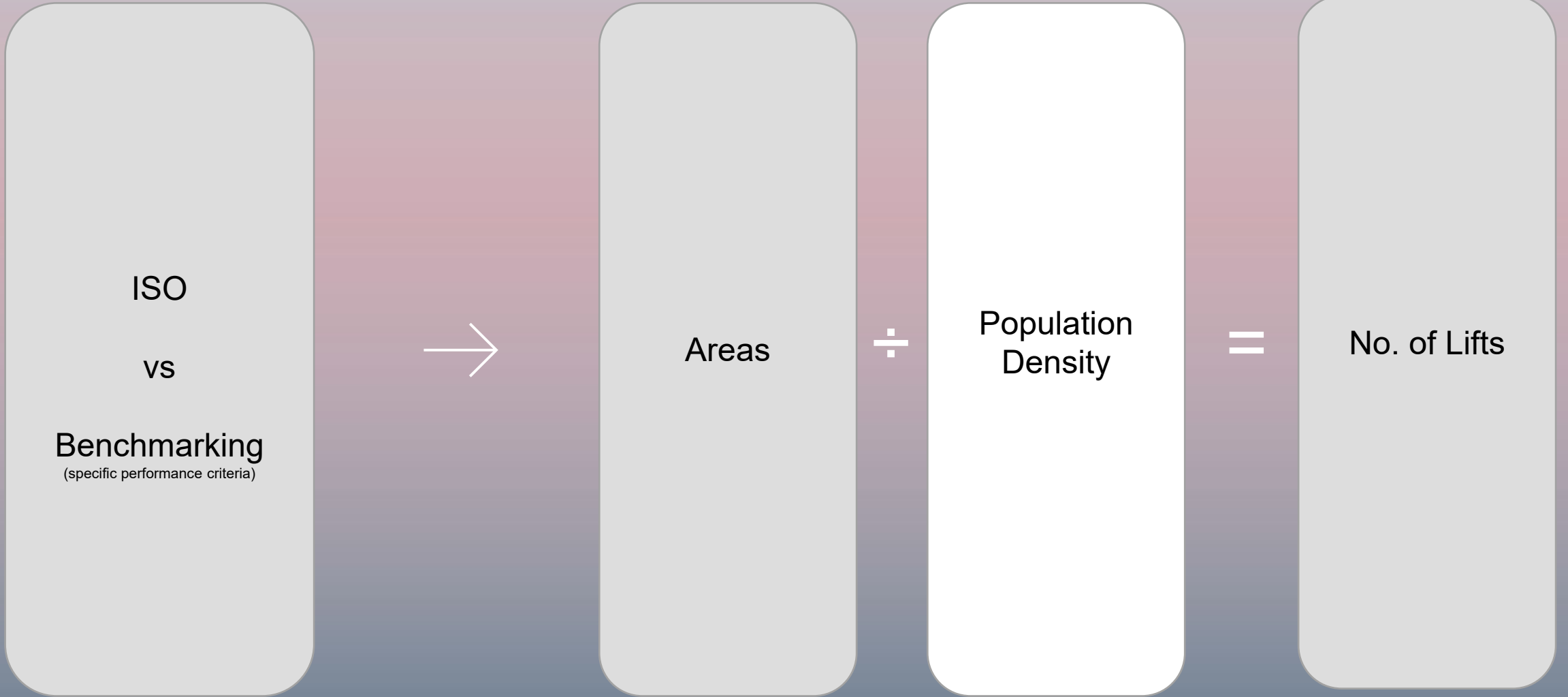
Zoning + Sky Lobbies



Zoning + Sky Lobbies + Double Deck Shuttles + Spilt Locals

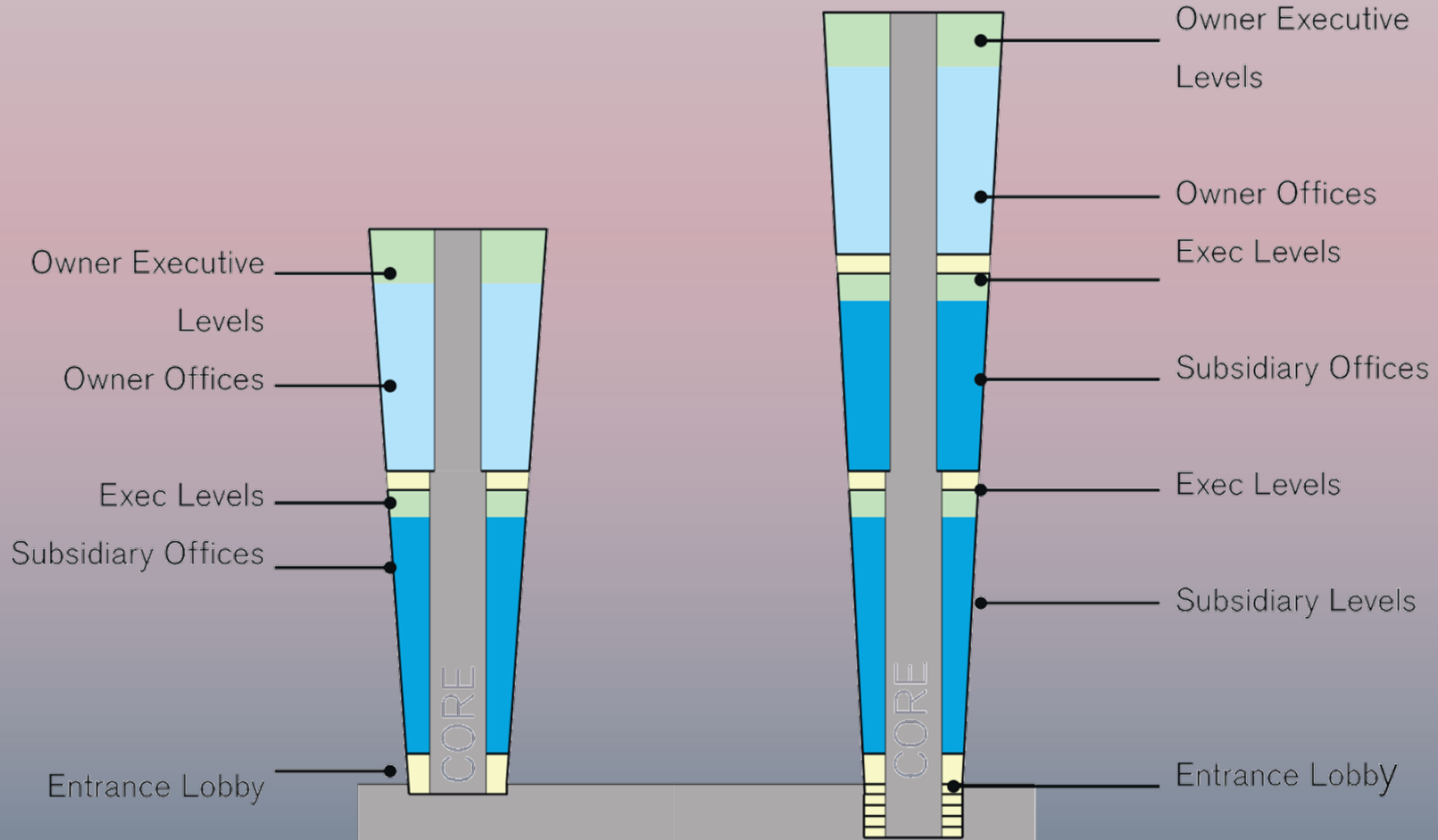


Typical Office Lifting Design Methodology

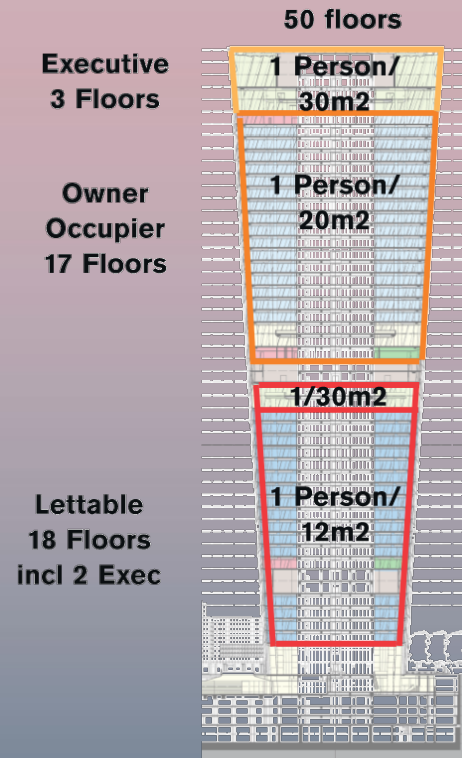


Tower 1 / 2

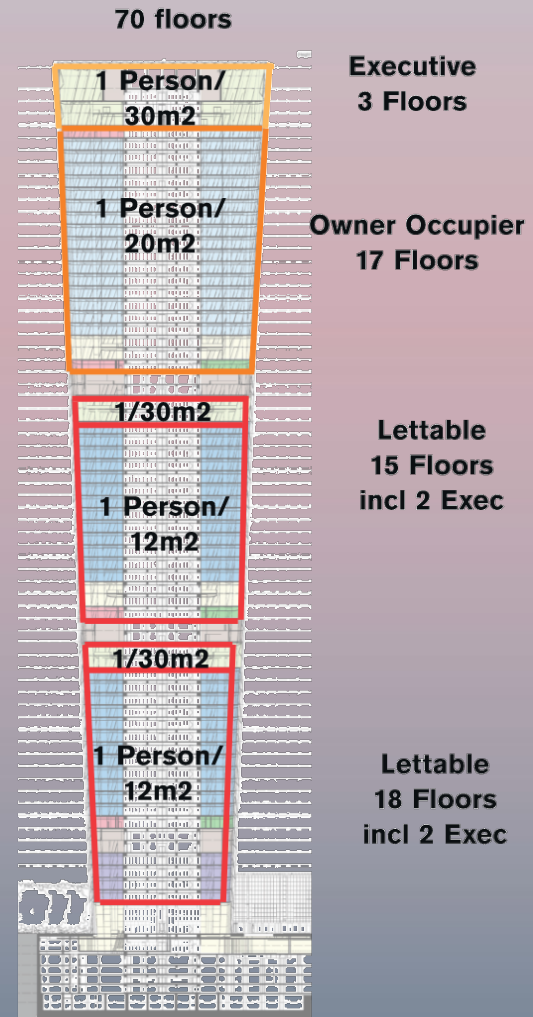
Tower 3 / 4

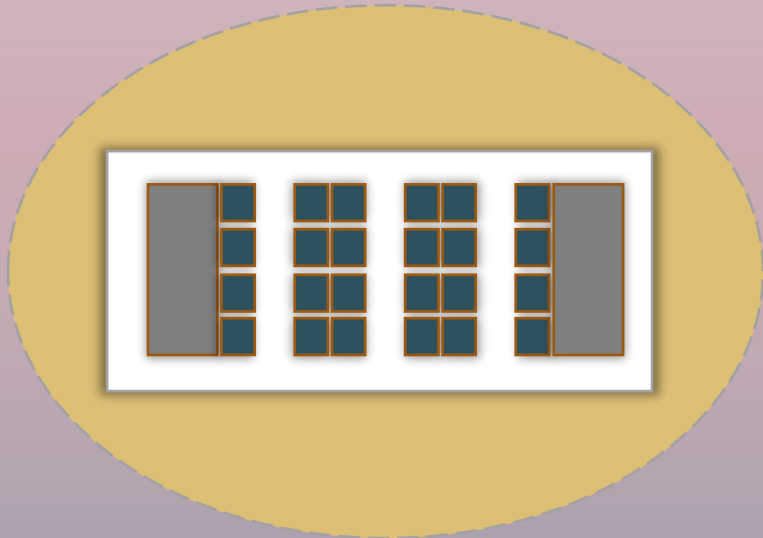


Tower 1 / 2

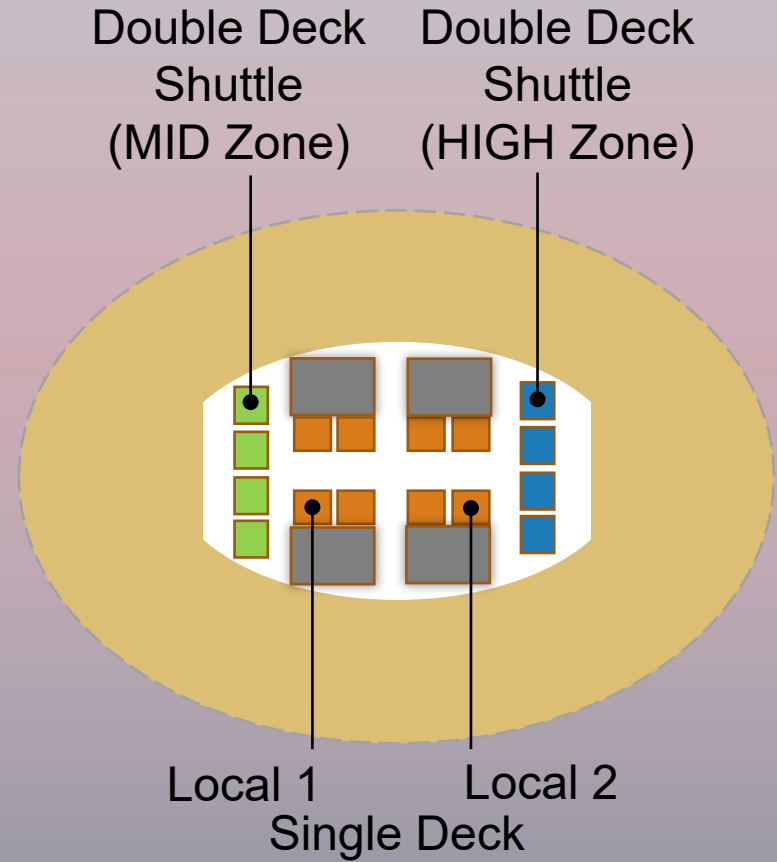


Tower 3 / 4





Average usable floor area = approx. 42%



Average usable floor area = approx. 72%

Usable Floor Area
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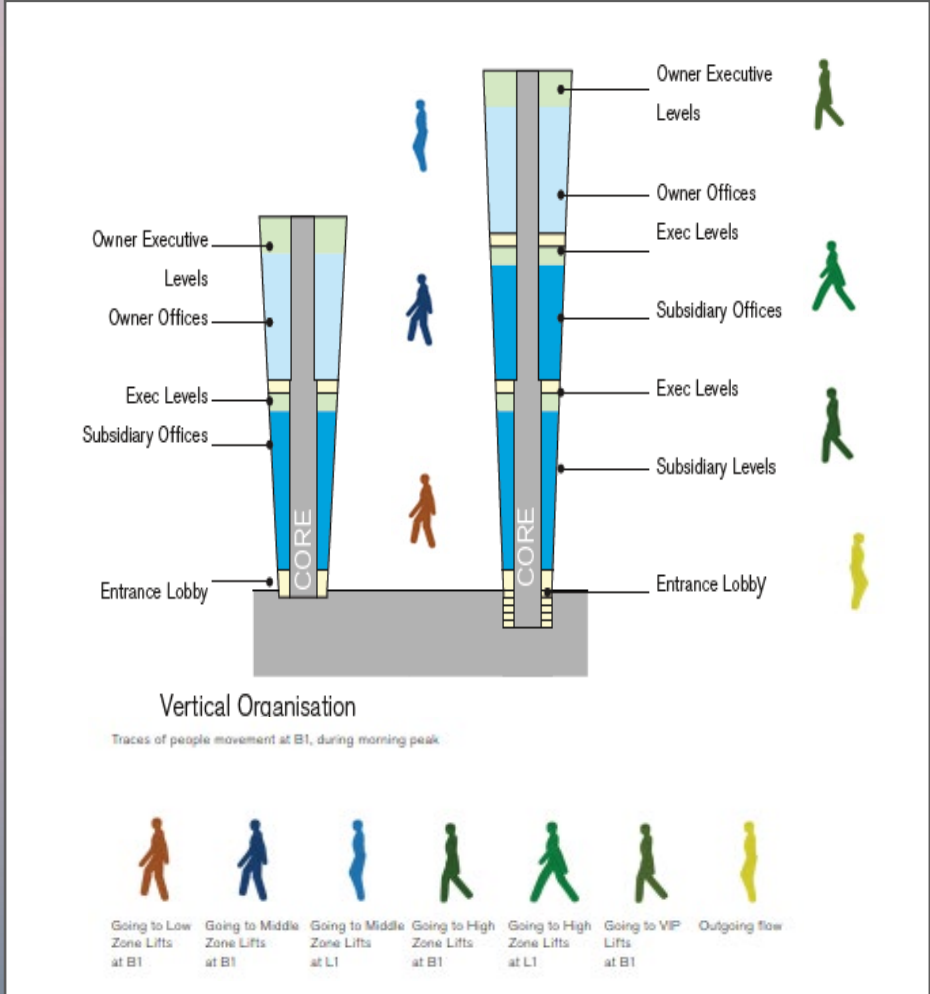
1

Lifting Design for Adaptability

2

Adaptability - Demonstrated

Foster + Partners and TK Elevator work together in Vertical Transportation scenarios



Vertical Transportation scenario analysis

Executive Summary:

OPTION A / A+ : „BASIC“		OPTION B : „ECONOMIC“			OPTION C : „COMFORTABLE“	OPTION D : „SMART“
	B 1:	B 2:	B 3:			
✓	✓	✗	✗	✗✗	✓	✓
✓	✓	✗	✗	✗✗	✓	✓
✗	✗	✗	✗	✗	✓	✓
✗	✗	✗	✗	✗	✓	✓
✗	✗	✗	✗	✗	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓

- 7 different scenarios analysed and compared

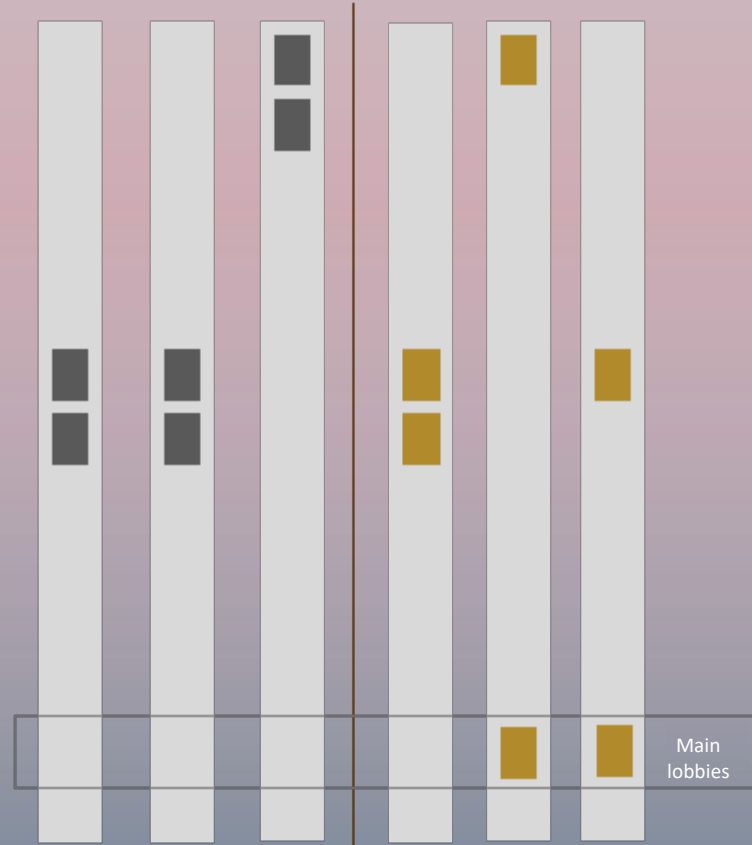
Two alternatives for double car roped systems have been considered

Design considerations

DOUBLE DECK



- Two connected cabins
- Fixed distance between floor levels
- Odd + even destinations stop together
- High capacity when full occupancy



TWIN



- Two independent cabins
- Flexibility between floor levels
- Flexibility with interfloor traffic
- Adaptability for future by software
- Energy efficiency



INNOVATING FOR HIGH DENSITY

FLEXIBILITY BY
DESIGN
ADAPTABILITY BY
SOFTWARE

TWIN®

2 CABS.
1 SHAFT.
0 CROWDS.



INNOVATING FOR HIGH DENSITY

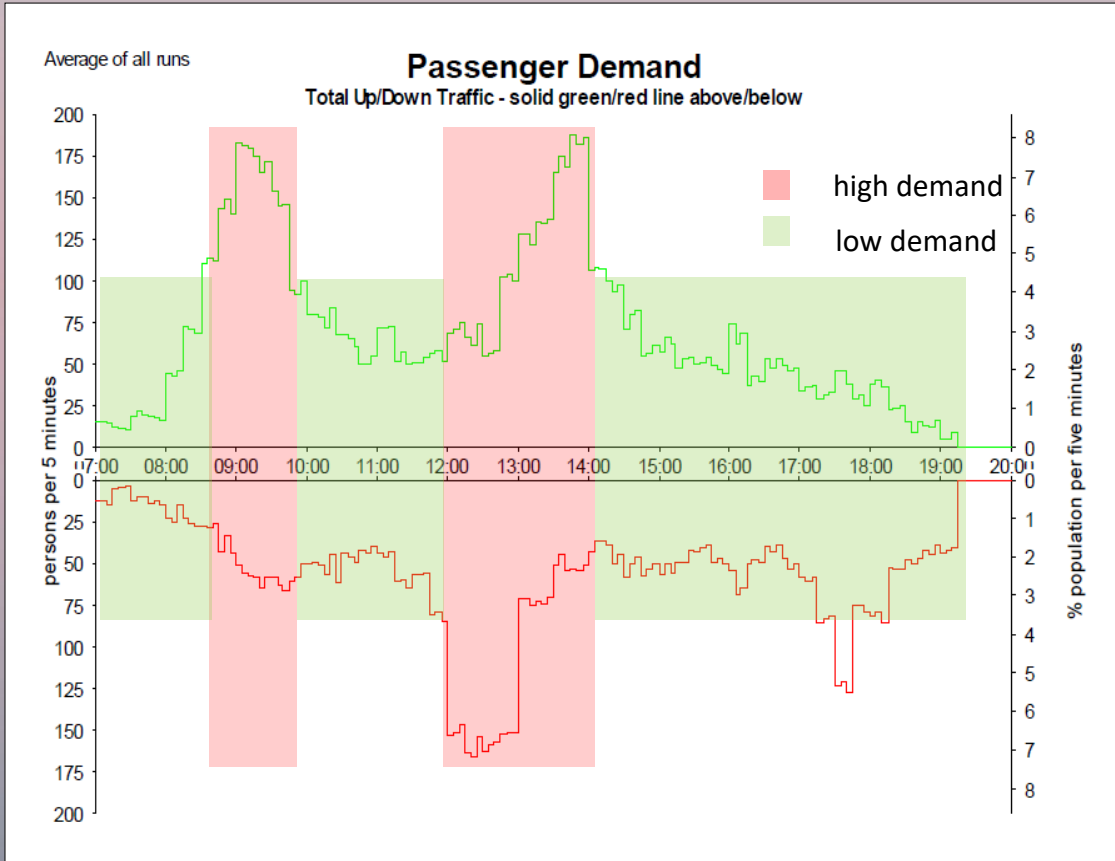
**FLEXIBILITY BY
DESIGN
ADAPTABILITY BY
SOFTWARE**

TWIN®

**2 CABS.
1 SHAFT.
0 CROWDS.**

Electrical load considerations in double cabin systems

Real use case TKE sample Double Deck vs TWIN®




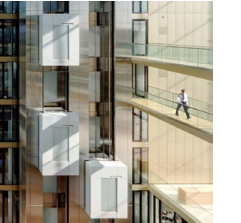
High demand typically represents up to 30% of the run time.



Max. Electrical Loads [kW]

Group of 6 x high-rise Double Deck
 2x1.600kg - 8m/s*

Group of 6 x high-rise TWIN®
 1.600kg - 7m/s + 7m/s

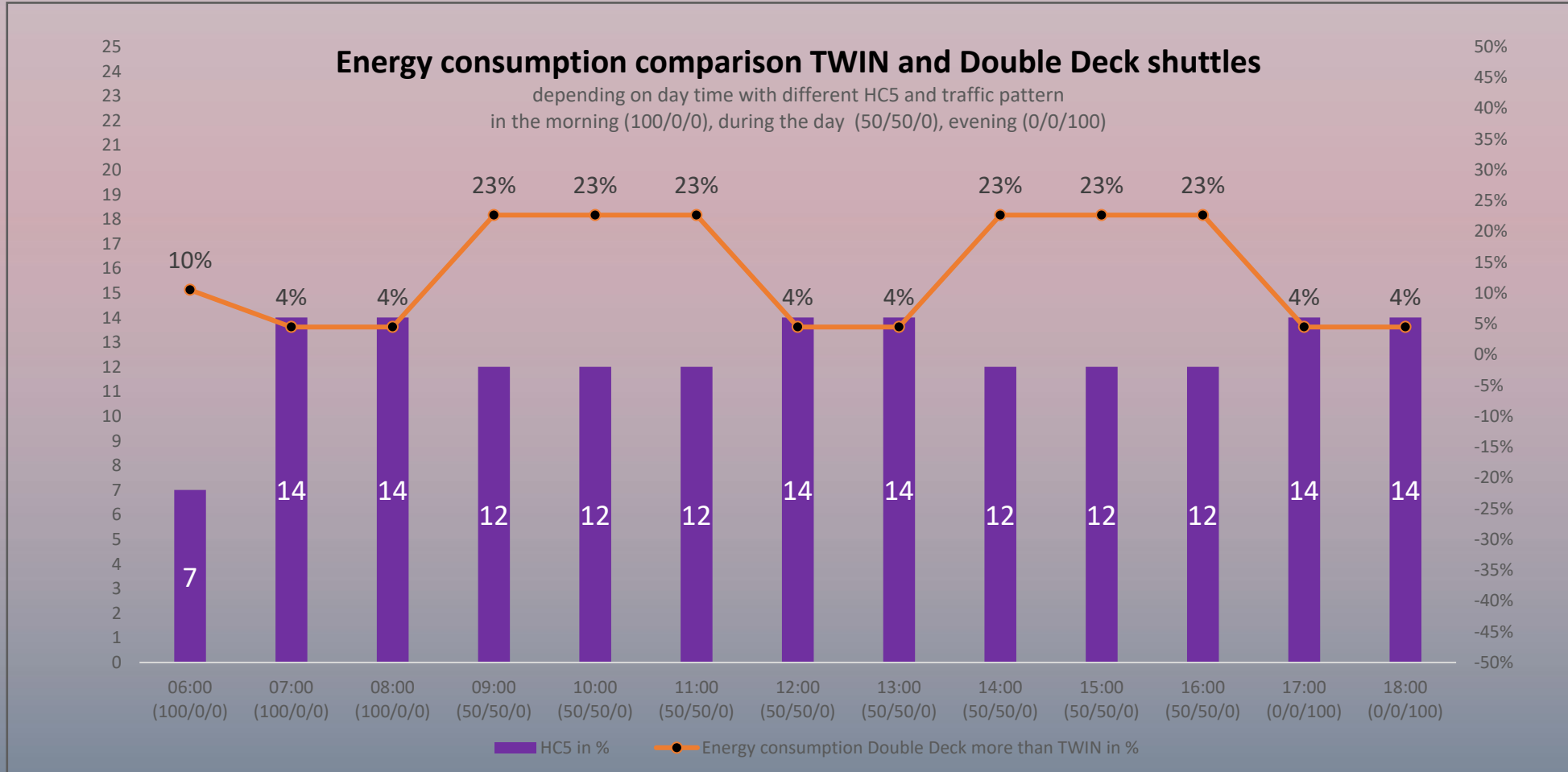
*8m/s was required to reach similar performance as TWIN

In High demand (~30%) Double Deck energy efficient when fully loaded

In low demand (~70%) TWIN energy efficient: can move only 1 car

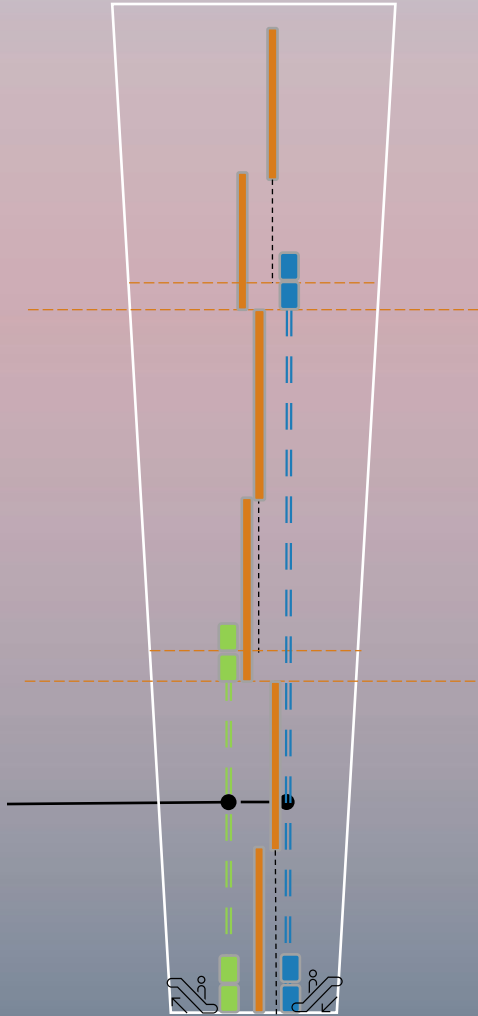
Lusail Towers energy consumption simulation

Double Deck energy consumption is up to 23% more than TWIN[®] system for HC5 traffic pattern and demand



up to **23%**
less energy consumption
with TWIN[®]

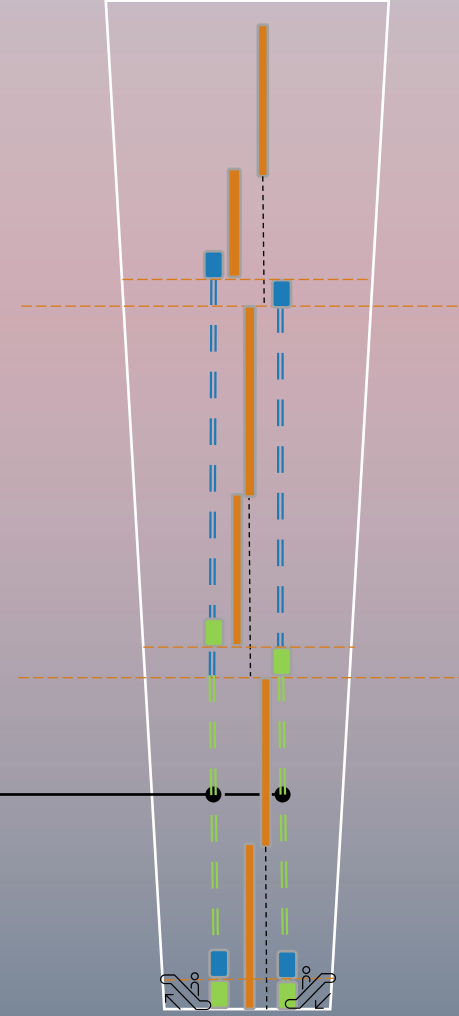
**F+P
Double Deck Shuttles**



Shuttle Lifts
(Double Deck)



**TKE
TWIN Shuttles**



Shuttle Lifts
(TWIN)

Foster + Partners

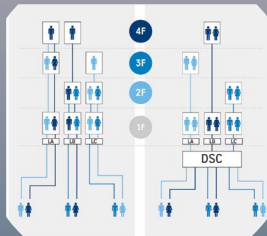
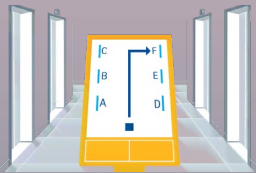
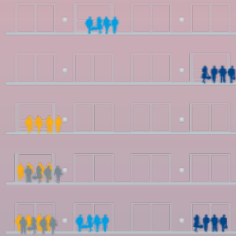
Destination Selection Control (DSC)

Intelligent solution to ensure a smooth and efficient journey for new, and existing buildings

Traditional input



DSC input



Time to destination reduction up to **25%**



Increase capacity up to **30%**

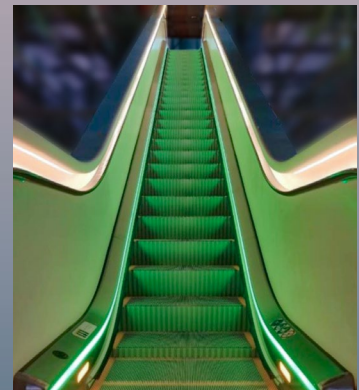
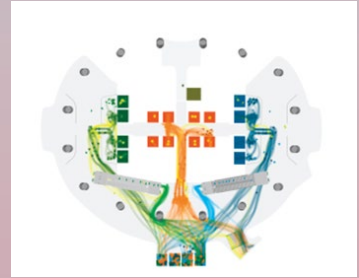
- Less crowding
- Fewer stops
- More efficient use of available elevator capacity



Powerful group control system allowing to transfer control across different elevator groups



Passenger segregation: Low & Mid Zone take elevator at Lower Ground Level; Upper zone take elevator at Lobby 1 level



System Innovation and Value Added to the project

Key benefits for this project



space



sustainability



efficiency



flexibility



connected



controlled



seamless flow



comfort

TWIN as shuttle:

1

Increases capacity and reduces shaft footprint

2

Enables independent cabins accessing different sky lobbies

3

Intelligently parks one car during low-traffic reducing energy consumption

4

Advanced with intelligent Destination Selection Control (DSC) improves Time to Destination

5

Universal Transfer Function integrating final destination across Elevator Systems provides seamless passenger flow

Key benefits and lessons learned for future projects

Key benefits of System

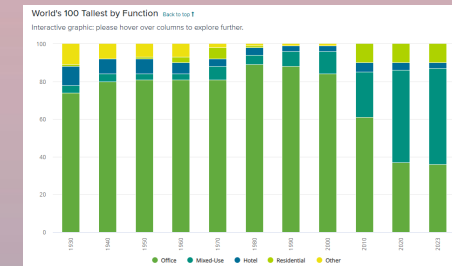
- Double Cabins reduce building core embodied carbon providing additional capacity
- Flexible systems maximize energy efficiency
- Destination Selection Control enables adaptability by software
- Early engagement to design People Flow facilitates passenger experience increasing VT performance

Lessons learned for future projects

- Scenario analysis for multi-use
- Multi-use building require early passenger segregation
- Vertical transportation efficiency enriched by building zoning
- Flexibility by design adaptability by software
- Co-creation and early collaborative design is key for success

Aligned with market trends

- Future flexibility and building resiliency



→ **50%**
mixed use

- Sustainability by design
- User experience and future adaptability

Some updates from site.

Summary

1. **Designing for adaptability does not mean over provision**
2. **Early onboarding of vendors is important**

Questions?

clim@fosterandpartners.com

A Focal Point of the 2022 World Cup
and Qatar National Vision 2030

Thank you!

Foster + Partners