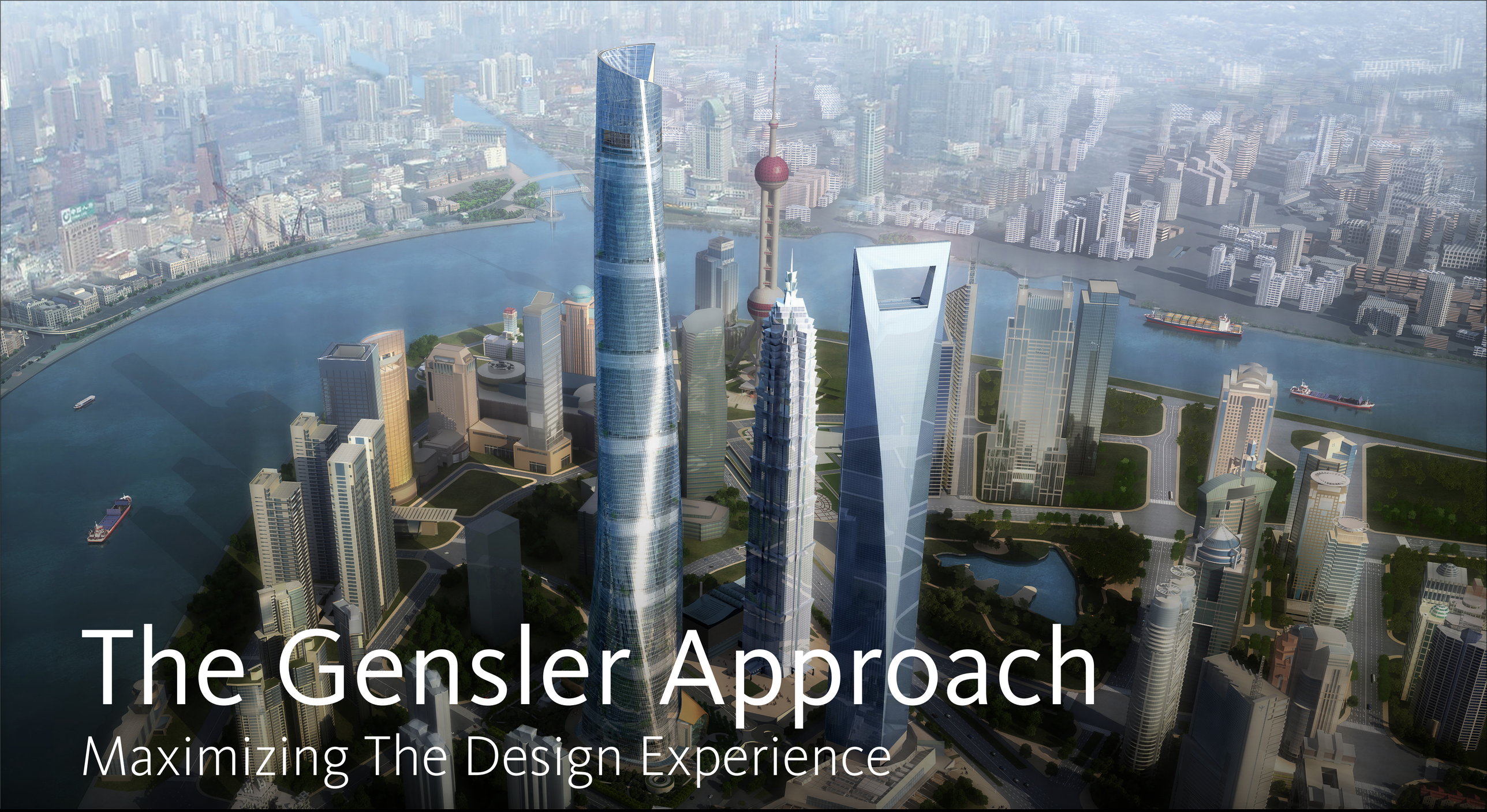


The Gensler Approach

Maximizing The Design Experience

We Design...

We Design…

2SF

We Design…

2SF

20,000 SF

We Design…

20,000,000 SF

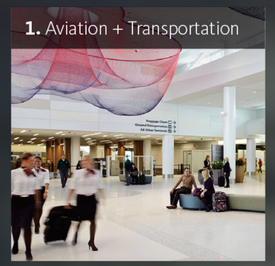
2SF

20,000 SF

Gensler Practice Areas

20
Practice Areas

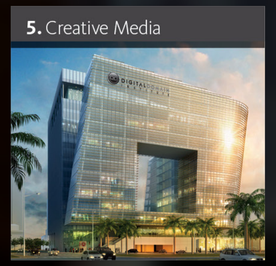
DIVERSE KNOWLEDGE
INTEGRATED APPLICATION
INNOVATIONS ACHIEVED


1. Aviation + Transportation


2. Brand Design


3. Commercial Office Buildings


4. Consulting

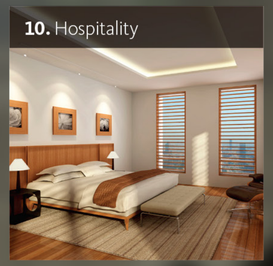

5. Creative Media


6. Education + Culture


7. Financial Services Firms


8. Headquarters

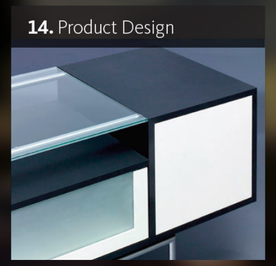

9. Health + Wellness


10. Hospitality

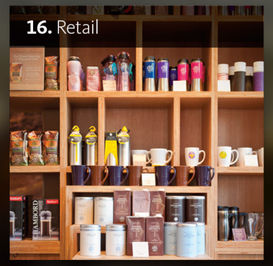

11. Mission Critical Facilities

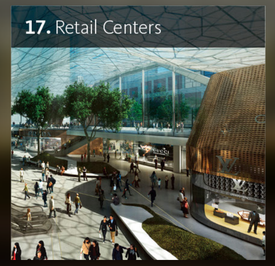

12. Mixed Use + Entertainment


13. Planning + Urban Design

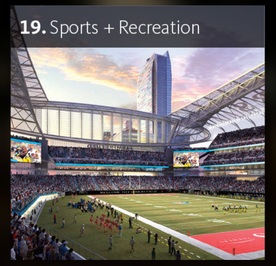

14. Product Design

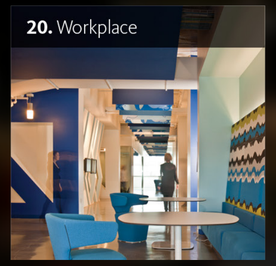

15. Professional Services Firms


16. Retail

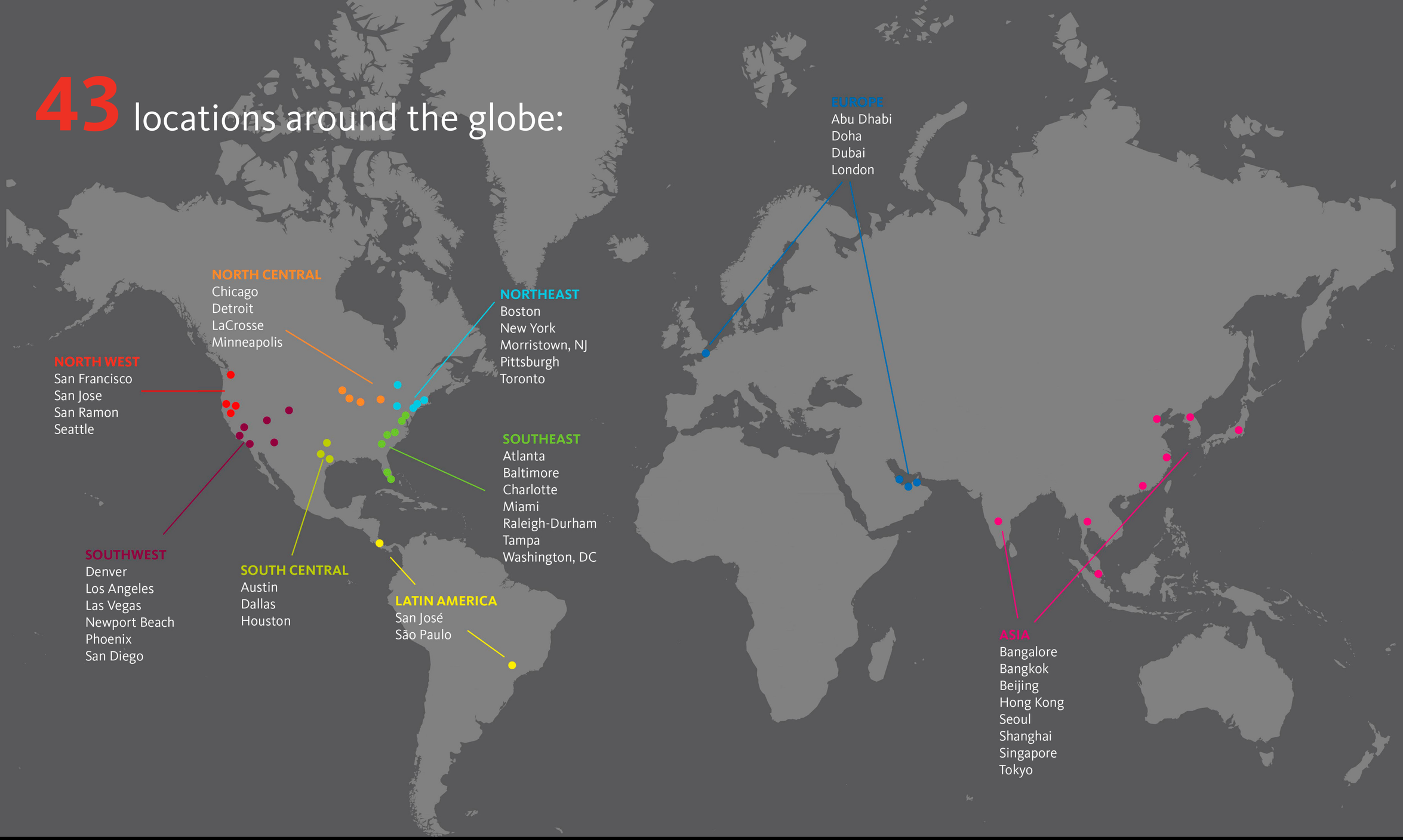

17. Retail Centers


18. Science + Technology


19. Sports + Recreation


20. Workplace

43 locations around the globe:



2000+

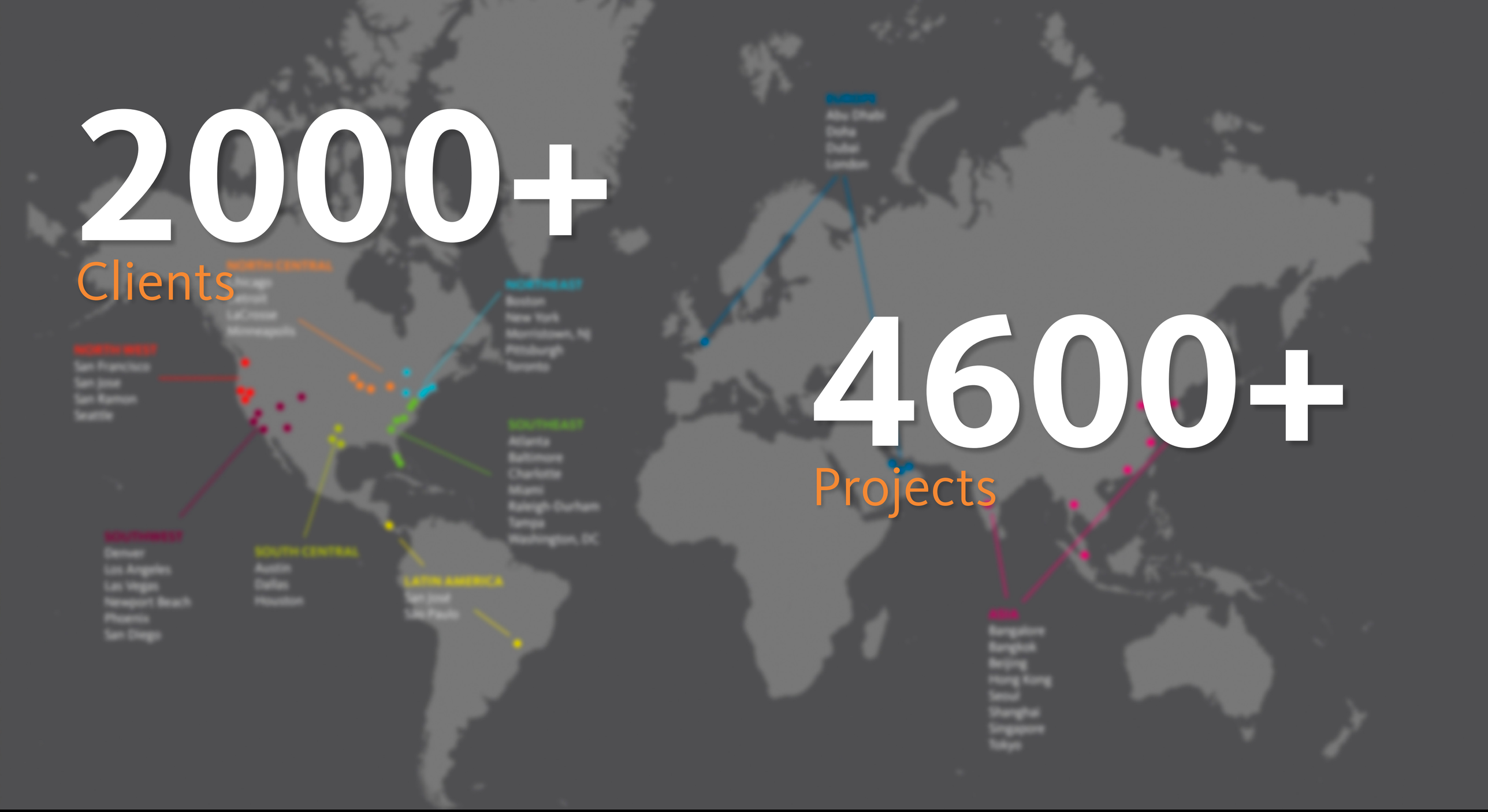
Clients

2000+

Clients

4600+

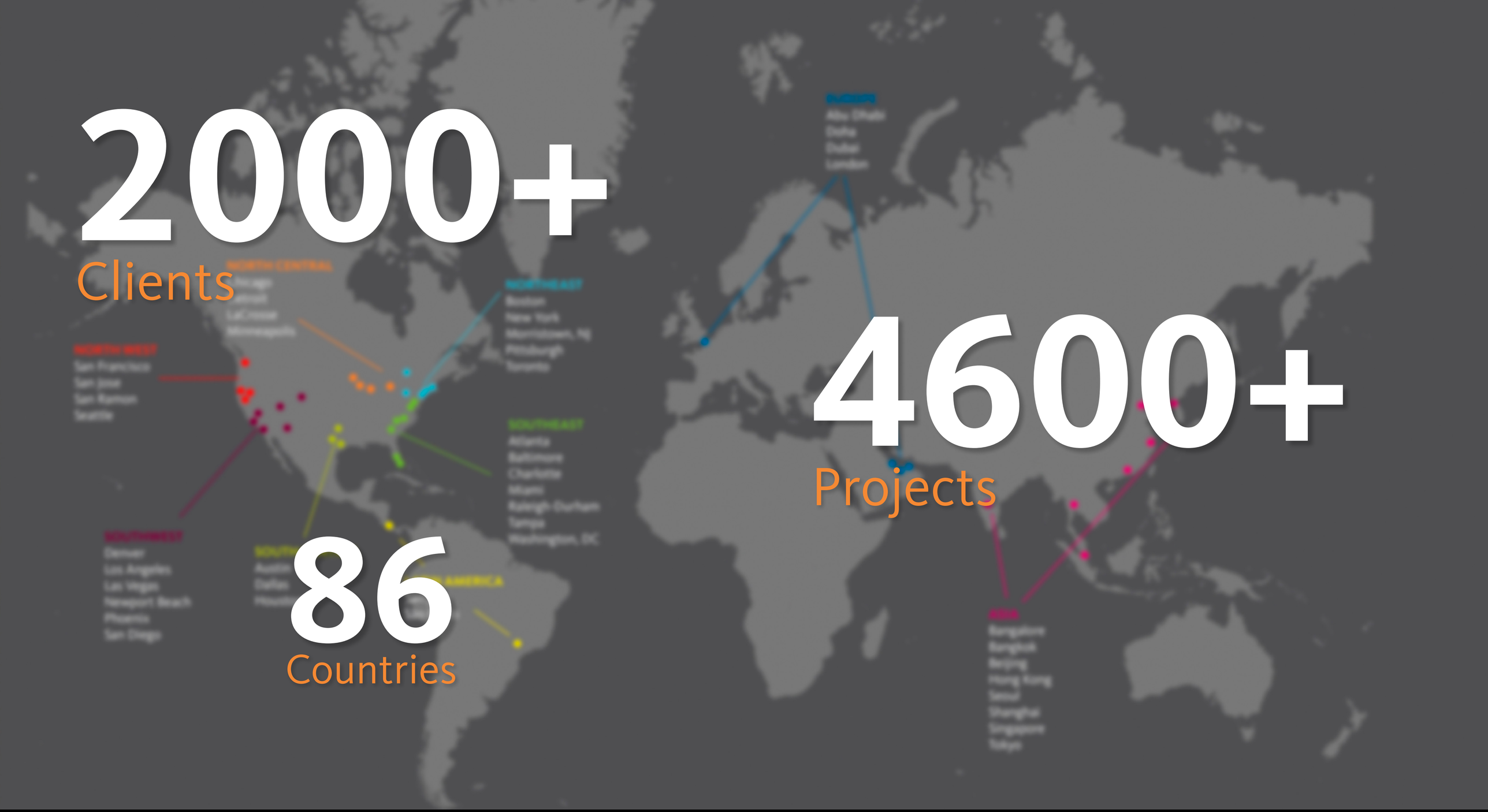
Projects



2000+
Clients

4600+
Projects

86
Countries



Clients

ELECTRONIC ARTS

SONY COMPUTER ENTERTAINMENT

AUTODESK

Google

peermusic the global independent

belkin

cie GAMES

INDUSTRIAL LIGHT & MAGIC A LUCASFILM COMPANY

plantronics

ACTIVISION BLIZZARD

Riot GAMES

PDI

facebook

SONY PICTURES

The Walt Disney Company

DREAMWORKS ANIMATION SKG

PIXAR ANIMATION STUDIOS

DIGITAL DOMAIN

IMAX

NOKIA

AVID

hulu

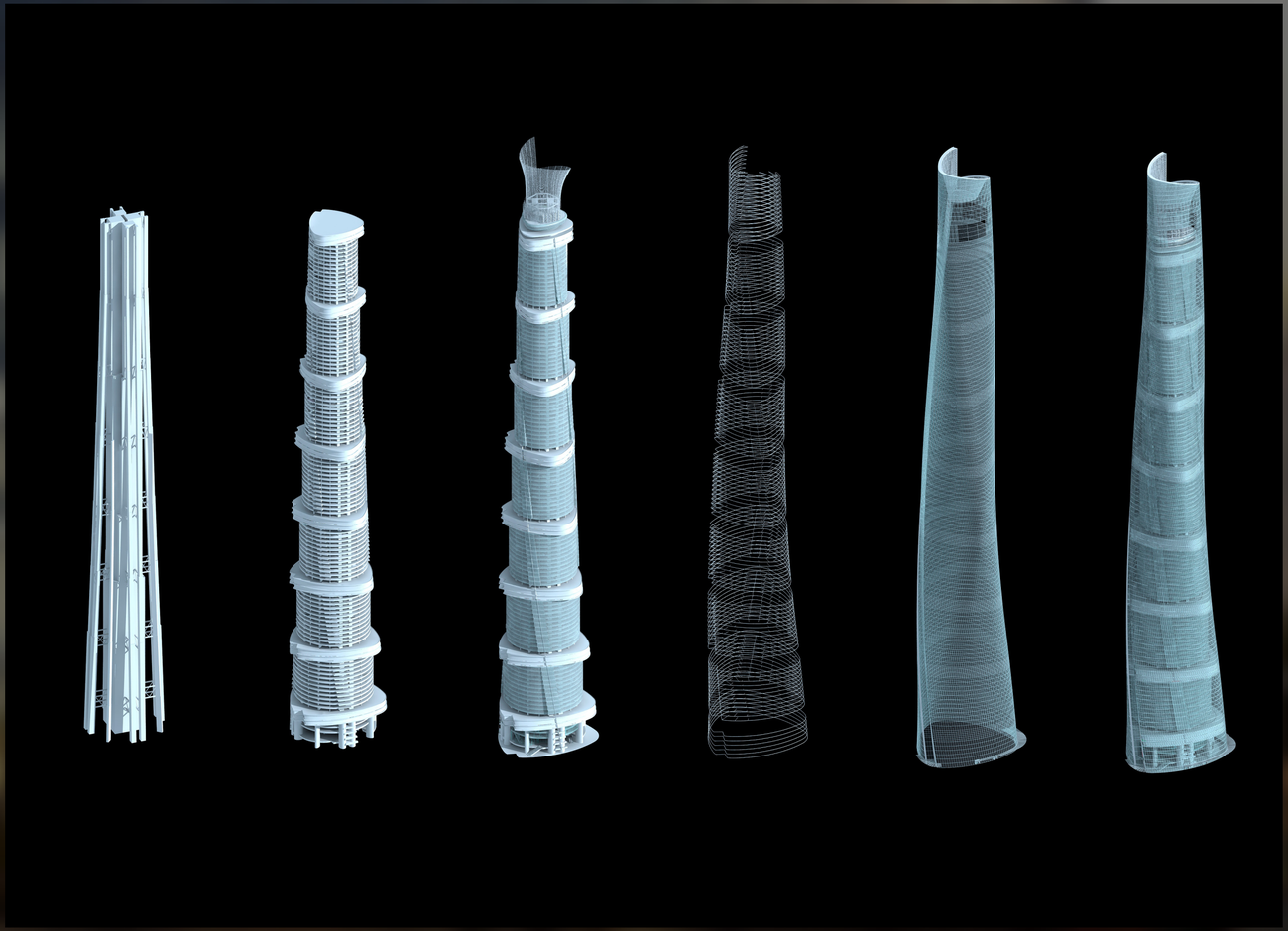
Gensler Toolkit

Software

- Autodesk Revit
- Autodesk 3ds Max
- Trimble SketchUp
- iRAY
- Rhino
- Adobe Creative Suite
- V-Ray
- Pano2VR
- Unity
- Octane
- And much more

Hardware

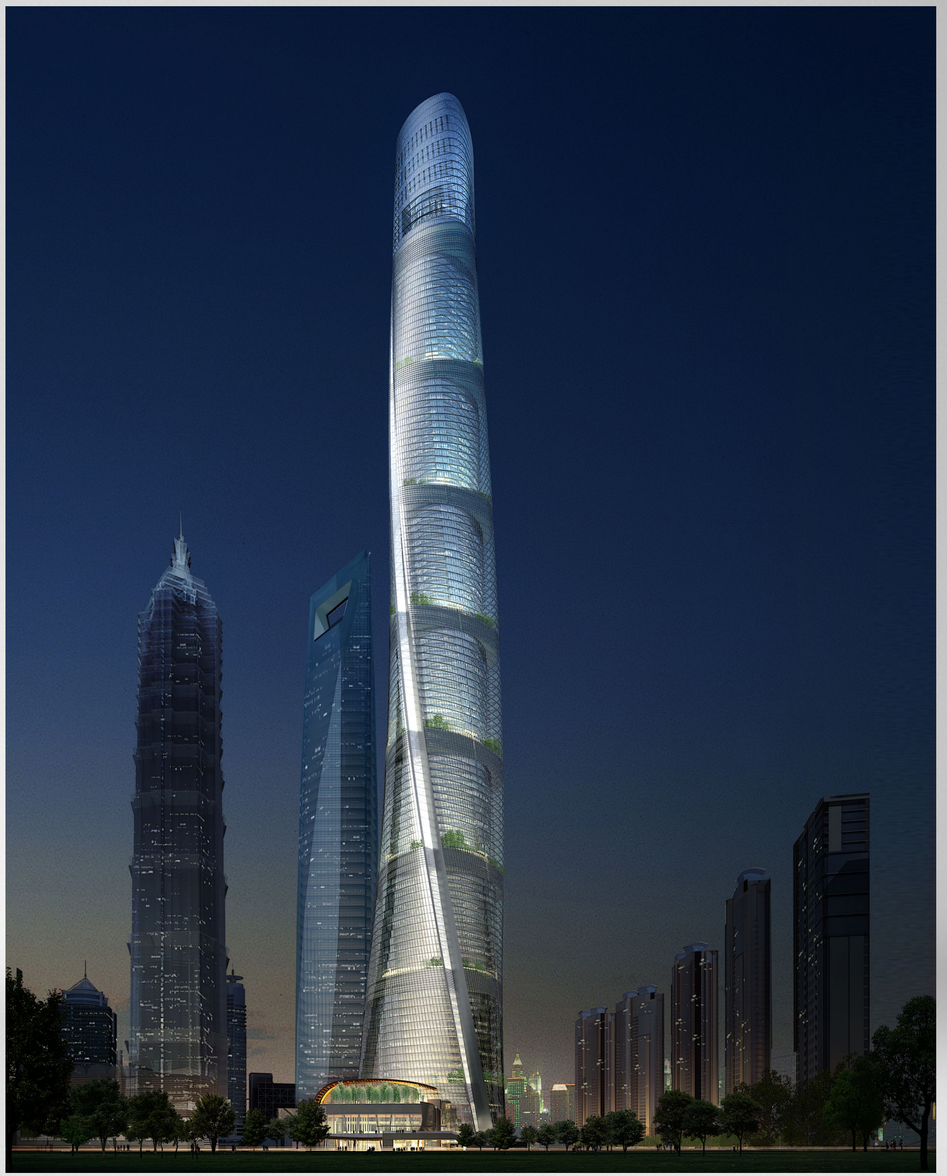
- **Lenovo ThinkPad W530**
  - i7-3820QM(2.70GHz)
  - 16GB RAM (2x8gb)
  - 256GB SSD
  - **NVIDIA Quadro K2000M**
- **Lenovo ThinkStation D30 4223E79**
  - Intel Xeon E5-2630 Processor(x2)
  - 32GB RDIMM Ram
  - 256GG SSD
  - **nVIDIA Quadro 4000-6000**



Shanghai Tower Construction and Development Co., Ltd.

Shanghai Tower

Shanghai, China



Construction moves ahead as the technical complexities of the tower's structure, glass enclosure, and mechanical systems are skillfully managed.

FROM THE GROUND UP

Gensler's vision for Shanghai Tower has taken tangible form after completion of the immense foundation. Soil conditions in Shanghai—a clay-based mixture typical of a river delta—meant supporting the tower on 831 reinforced concrete bore piles sunk deep into the ground. For three days, a small army of workers assembled to complete the marathon, 60-hour continuous concrete pour. When the job was finished, more than 61,000 cubic meters of concrete had been used to create the six-meter-thick mat foundation.

The tower's scale and complexity have created so many "firsts" for China's construction industry that more than 100 expert panels have been established to analyze every aspect of the design. Workers are busy building forms for the concrete core and erecting the gigantic composite supercolumns—measuring 5 x 4 meters at the base and reinforced with steel plates that weigh 145 metric tons each—that will provide structural support for the tower. To carry the load of the transparent glass skin, Gensler designed an innovative curtain wall that is suspended from the mechanical floors above and stabilized by a system of hoop rings and struts. And the strategic division of the tower into nine vertical zones will supply the lifeblood of the building's heating, cooling, water, and power throughout with less energy and at lower cost.

►
Workers positioned rebar and poured the mat foundation in March 2010. They affixed steel for the supercolumns through the summer and, by October, the structural core was taking shape.

61k
cubic meters of concrete in the mat foundation slab

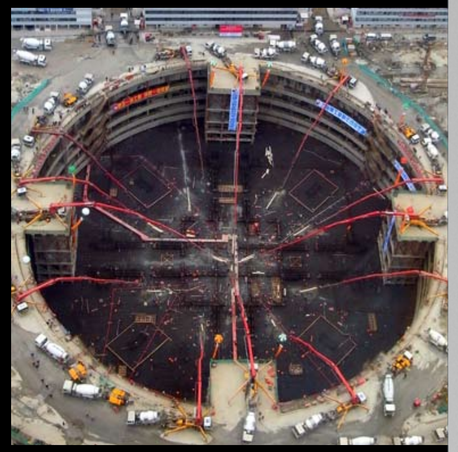
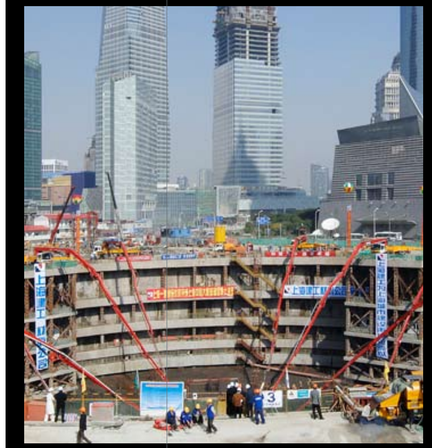
total floor area, in square meters
521k

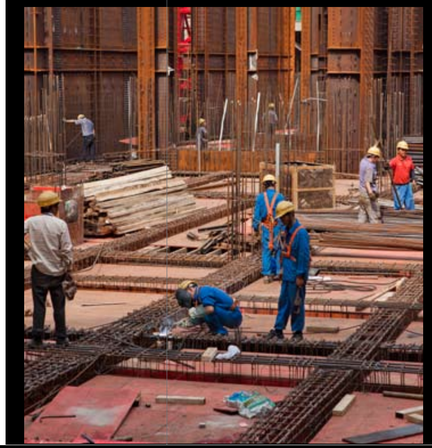
weight of in metric tons
1,200

number of structural piles in entire project
2,000

number of elevators
106



With integrated design and technology, Shanghai Tower embodies a new understanding of the super-highrise building and its place in the 21st-century city.

INNOVATION TAKES THE PRIZE

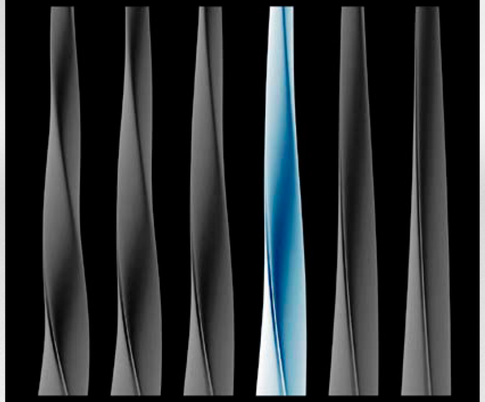
Gensler won the Shanghai Tower project in an invited multi-stage competition among leading international architects. What secured the win were the tower's design and performance, and Gensler's commitment to China. To refine the tower's shape, Gensler's team used a series of wind tunnel tests to simulate the region's greatest natural force, the typhoon. Results produced a structure and shape that reduce wind loads by 24 percent—ultimately yielding a savings of $58 million in construction costs. A simple structure, public spaces within the double façade, and sky gardens based on Shanghai's traditional open courtyards will make Shanghai Tower an unrivaled asset for the Lujiazui district.

▼
A 16-meter-tall scale model of the tower passed a shake table test simulating earthquakes measuring up to 7.5 on the Richter scale.

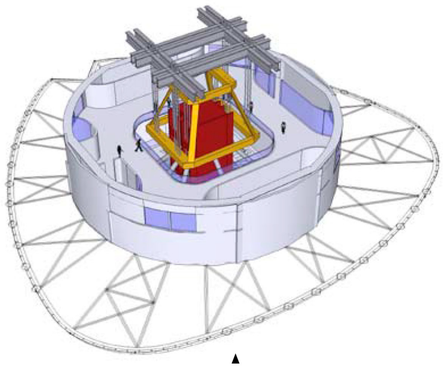
Shaped to reduce wind loads

Gensler's design team anticipated that three important design strategies—the asymmetry of the tower's form, its tapering profile, and rounded corners—would allow the building to withstand typhoon wind forces common to Shanghai. Using wind tunnel tests, Gensler and structural engineer Thornton Tomasetti refined the tower's form, ultimately reducing building wind loads by 24 percent. The result is a simpler and lighter structure with unprecedented transparency and a 32 percent reduction of costly materials.

▼
Many options were studied, but wind tunnel tests pinpointed a 120-degree rotation as optimal for minimizing wind loads.



▲
Landscaped atriums are located at regular intervals throughout the building.



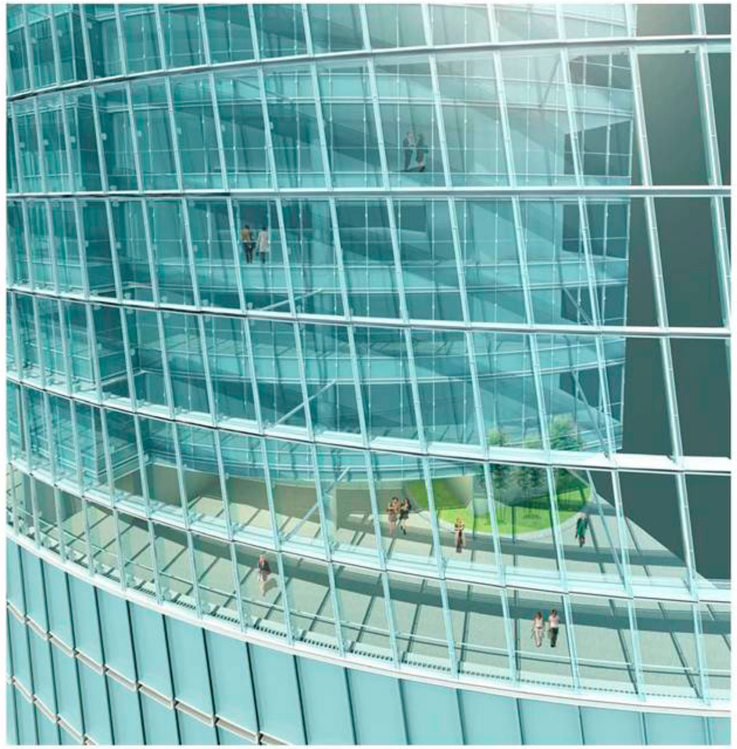
▲
Tuned-mass damper minimizes building movement.

Benefits of the double skin

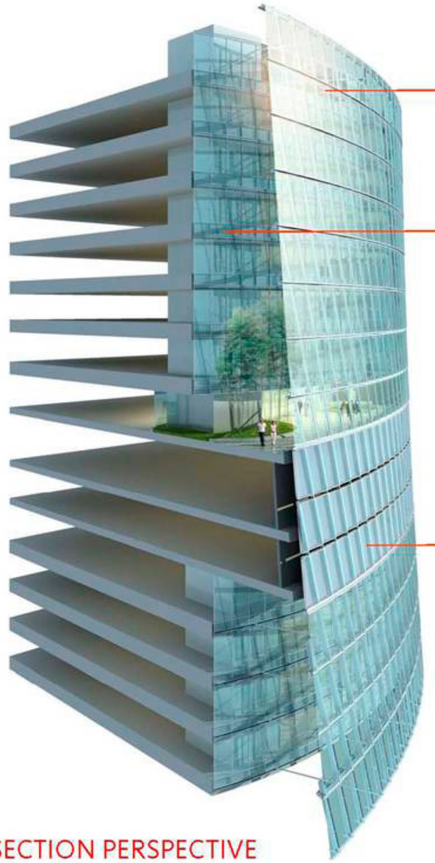
The innovative design incorporates two independent curtain walls—the outer skin is cam-shaped in plan, the inner one is circular. The space between them forms atriums that will house landscaped public gardens at regular intervals throughout the building. These sky gardens will improve air quality, create visual connections between the city and the tower's interiors, and provide a place where building users can interact and mingle.

▼
The landscaped sky lobbies will be social and retail hubs for each neighborhood within the building.

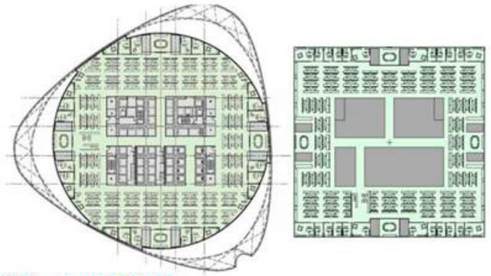
SHINGLE HORIZONTALY – "Wide Stack Joint":
NUMBER OF PANEL TYPES = 10 panel type per floor;
Total of 1280 different panel types.
竖直构件=数量 = 10 种/层



OPTION 2 : Horizontal and Vertical Shingle :
方案2-水平构件和竖直构件



SECTION PERSPECTIVE
透视图



18% more Glass

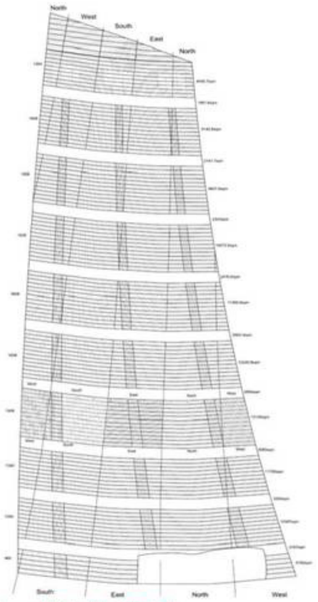
Gensler © 2008 | 上海中心大厦 SHANGHAI TOWER

Quantity of Panels:

Glass Panels: +/- 19,000

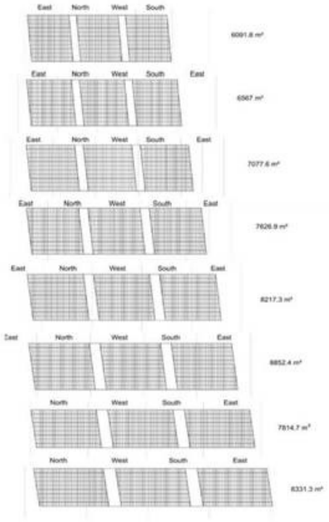
Quantity of Panels:

Glass Panels: 15,934



Unwrapped Exterior Skin = 132,860m2

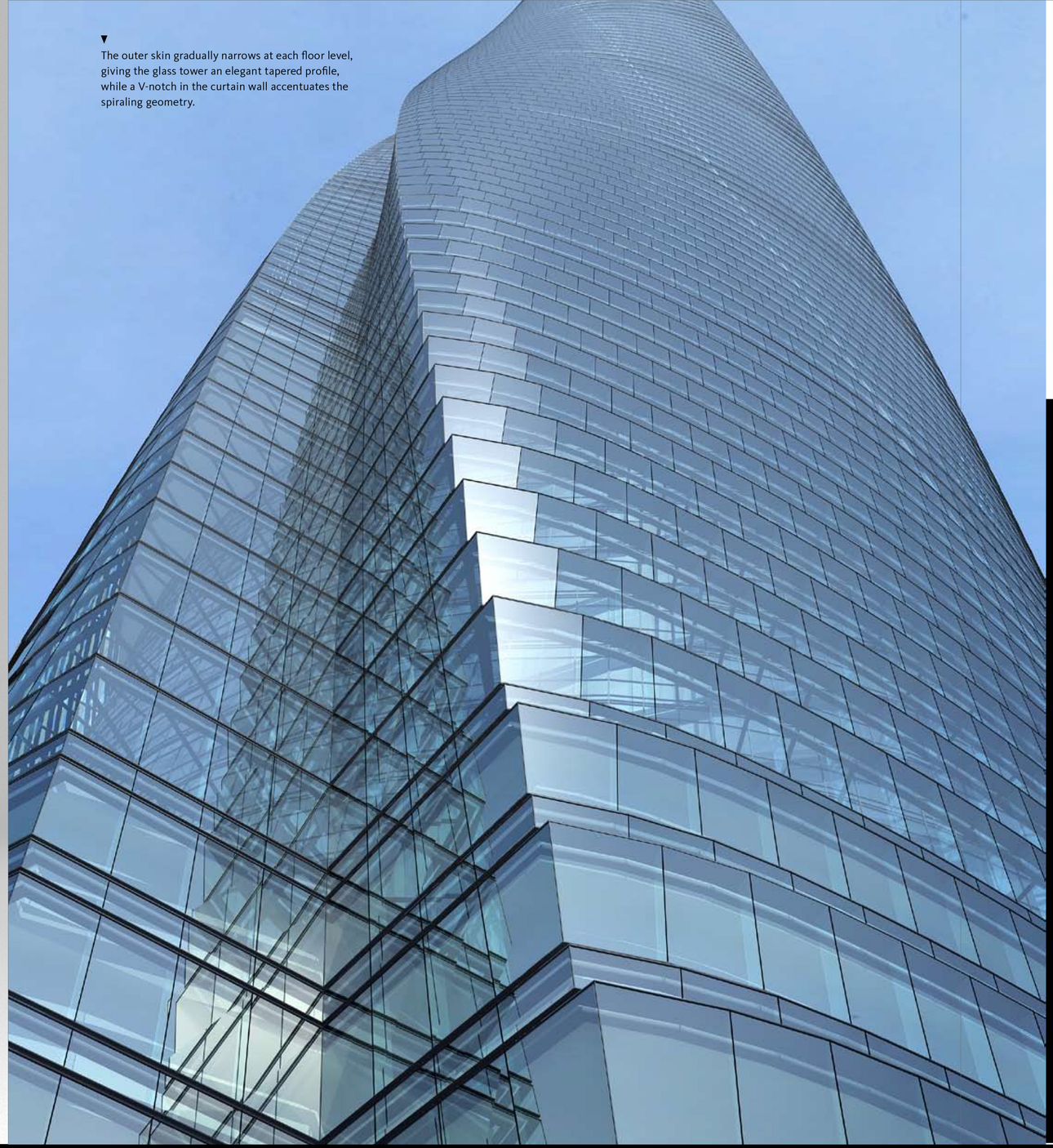
外幕墙展开：外围幕墙总面积=132,860m2



Unwrapped Interior Skin = 60,579m2

内幕墙展开：内幕墙总面积=60,579m2

Gensler © 2008 | 上海中心大厦 SHANGHAI TOWER



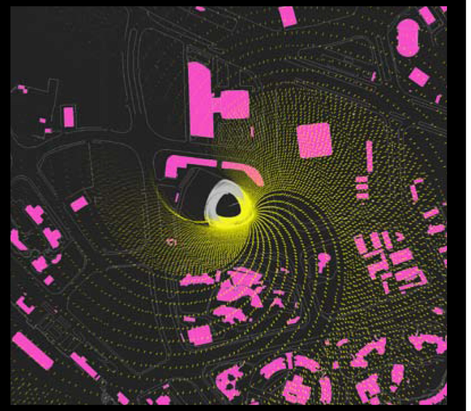
▼
The outer skin gradually narrows at each floor level, giving the glass tower an elegant tapered profile, while a V-notch in the curtain wall accentuates the spiraling geometry.

Minimizing reflection and glare

Concerns over light pollution had significant impact on the design of the outer curtain wall. Building codes in China's urban districts are highly sensitive to the impact of sunlight reflecting off glass façades toward surrounding buildings. Two curtain-wall schemes—"staggered" and "smooth"—were studied extensively. The tests revealed that a staggered skin made of glass panels set vertically was far superior to a smooth skin of angled glass, which would reflect much more light onto neighboring buildings.

▲
The outer curtain-wall design incorporates metal shelves at each floor level, producing the preferred staggered configuration.

▼
Light reflectance off the curtain wall was modeled using Ecotect software, which showed that the "staggered" curtain-wall design was much more desirable.



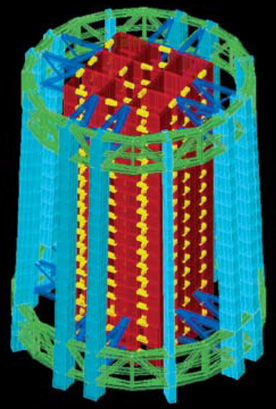
A fast-tracked super-highrise tower

The simplicity of Shanghai Tower's structure is a response to many challenges: a windy climate, an active earthquake zone, and clay-based soils. The heart of the structural system is a concrete core. The core acts in concert with an outrigger and supercolumn system, with double-belt trusses that support the base of each vertical neighborhood. This makes for an easier and faster construction process—a significant cost savings for the client.

▲
This series of drawings illustrates the layering of structure, composite floors, inner skin, and exterior curtain wall.

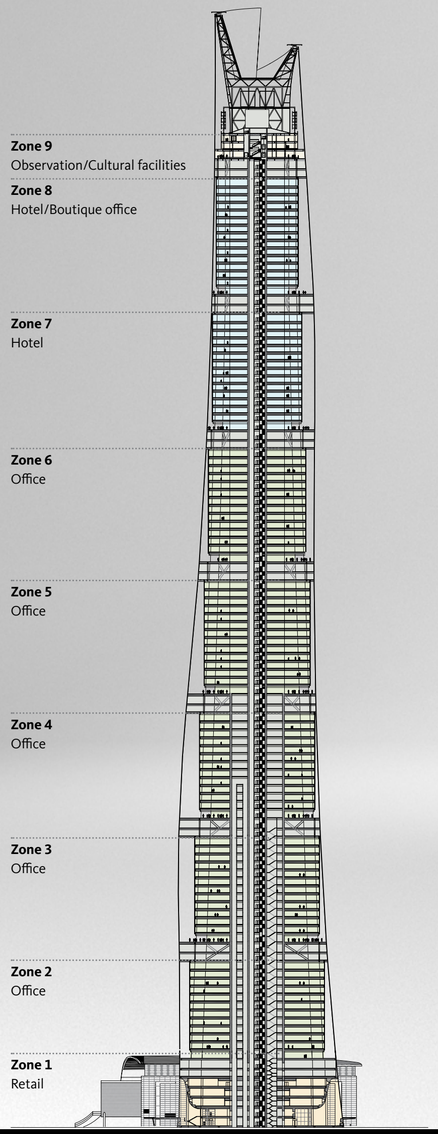
▼
The simplified mega-frame proved to be an economical approach to construction.

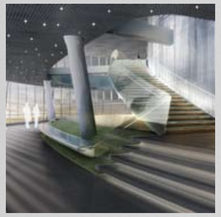
- Core
- Double-belt truss
- Outrigger
- Beam
- Supercolumn



SELF-CONTAINED CITY

Shanghai Tower is a city within a city comprising nine vertical zones, each 12 to 15 stories high. Each zone is encircled by public space within the double-skin façade. Within each neighborhood, a mix of uses caters to the daily needs of occupants. Separate elevators shuttle people among zones, and below-grade parking links via walkways to the nearby super-highrise towers.



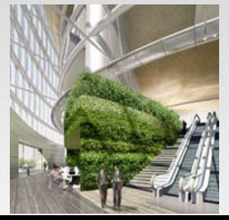


◄
Observation level
The highest of the nine zones houses public amenities: gourmet restaurants, an exhibition center, and enclosed and open observation decks served by the tallest single-lift elevator in the world.

◄
Offices
Zones 2 through 6 are comprised of high-performance offices, all of which are filled with natural light and connect to the atriums with expansive views of the city.

◄
Sky lobbies
Each office zone rises from a sky lobby at its base—a light-filled garden atrium that fosters community and supports daily life. Shops and restaurants in each lobby lower the demand for trips to the ground level, which saves energy.

◄
Retail podium
Zone 1 is the base-level retail podium of luxury boutiques, high-end dining destinations, cafes, and lounges. The hotels' conference, banquet, and spa facilities also occupy space in the six-story podium.



◄ ►
Ground-floor lobbies
Both the office tower and the hotel/conference center functions will be accessed through separate, dedicated lobbies rendered at a scale fitting to the tower.

As a global leader in sustainable design, Gensler designed Shanghai Tower to incorporate green strategies that will long demonstrate the city's commitment to an environmentally responsible future.

SUSTAINABLE TOWER

Shanghai Tower will be one of the most sustainably advanced tall buildings in the world—designed to achieve both LEED® Gold certification and a China Green Building Three Star rating. The sustainability of the tower grows out of Gensler's integrated approach to its design, using simulation studies to optimize overall building performance. Wind tunnel testing of the tapered, asymmetrical tower focused on defining the optimal shape of the exterior skin and showed that reducing wind load makes for a lighter, more efficient structure that conserves natural resources.

A central aspect of the design is the transparent, second skin that wraps the entire building. The ventilated atriums it encloses conserve energy by modulating the temperature within the void. The space acts as a buffer between inside and outside, warming up the cool outside air in winter and dissipating heat from the building interior in the summer. Mechanical equipment is spaced strategically in each zone of the building to provide optimal flexibility, reduce operating costs, and conserve energy. As Gensler's founder, Arthur Gensler, told *The International Business Times*, "We hope Shanghai Tower inspires new ideas about what sustainable tall buildings can be. We've lined the perimeter of the tower, top to bottom, with public spaces, and we've integrated strategic environmental thinking into every move."

◄
The tower's topmost levels will house rows of vertically aligned wind turbines and a spiraling parapet that is integral to a rainwater collection system.

Shanghai Tower is targeted to reduce water consumption by:

40%

Shanghai Tower is targeted to reduce energy use by:

21%

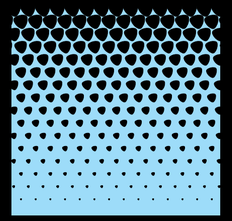
GREEN STRATEGIES

Sustainable design is at the core of Shanghai Tower's development. To achieve the LEED Gold and China Three Star ratings, Gensler incorporated many strategies that will generate a positive environmental impact. The foundation of this approach is state-of-the-art water resource management practices and high-efficiency building systems. A full 33 percent of the site is green space, with landscaping that breathes fresh air into the city and shades paved areas that radiate heat. Locally sourced materials with high-recycled content are being used when available. And the building's heating and cooling systems will tap the power of geothermal technology to deliver energy from fluids maintained at the earth's constant temperature.

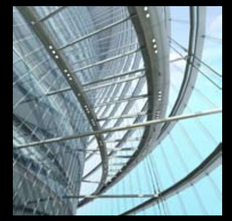
Shanghai Tower's sustainable strategies will reduce the building's carbon footprint by:

34,000 metric tons per yr

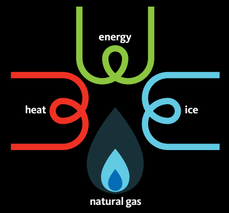
Daylighting
The continuous glass skin admits the maximum amount of daylight into the atriums, reducing the need for artificial lighting. Floor-to-ceiling glass in the office and hotel floors yields similar benefits to those spaces.



Sun-shading
To reduce heating and cooling loads, both the inner and outer curtain walls will have a spectrally selective low-E coating. Fritted glass on the outer wall provides additional sun-shading, aided by horizontal ledges at each floor level that will block high summer sun.



Building controls
Shanghai Tower incorporates intelligent building controls that lower energy costs by monitoring and adjusting systems such as lighting, heating, cooling, ventilation, and self-generated power. Lighting controls alone will save more than $556,000 each year in energy.



Cogeneration system
The 2,200-kW natural gas-fired cogeneration system provides electricity and heat energy to the low zone areas. In addition to providing site-generated power, the system produces 640 tons of refrigeration during the cooling season and heat during the winter months.

Regional materials
The team seeks out building materials that are harvested and manufactured within an 800-kilometer radius of the site. Local sourcing of products is sustainable because it reduces transportation-related environmental impacts and boosts local economies.

Building envelope
The building's two curtain walls create atriums that act like an insulating blanket, reducing energy costs. Used indoor air is circulated through each atrium to temper the space, keeping the sun's heat out in summer and the building's heat in during winter.

Landscaping
One-third of the site will be dedicated green space, with extensive planting to lessen the heat island effect of paved areas. Efficient irrigation systems, combined with plant materials requiring low watering, reduce overall water consumption.

Wind turbines
In keeping with the client's desire to demonstrate cutting-edge technologies, wind turbines at the top of the building will power the exterior lighting for the building and some of the park areas. The turbines will produce an estimated 54,000 kWh/year in renewable energy.

Rows of wind turbines integral to the curtain wall at the tower's upper levels will reduce energy consumption, while the funnel-shaped parapet channels rainwater into large collection tanks.

The Richards Group

Dallas, Texas

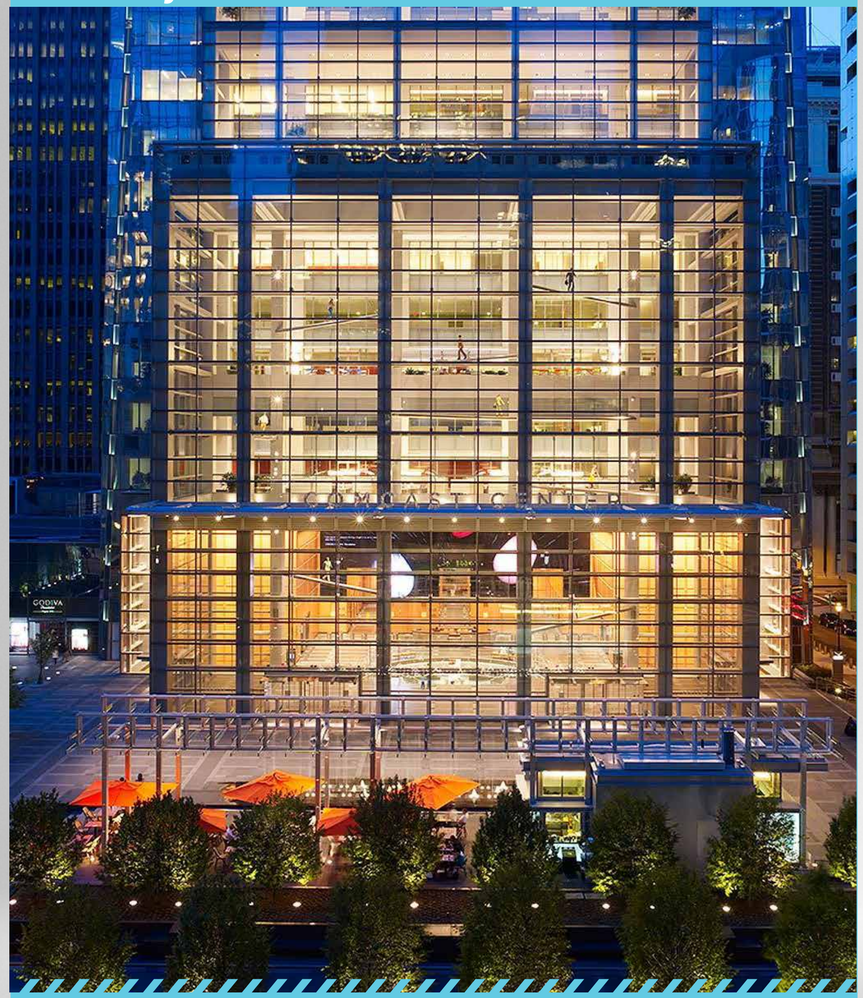
What do you do when your client wants a 100% transparent façade on a limited budget ?

Variable Opacity Facade

A mutable façade design that can be changed interactively while providing cost, performance, and aesthetic feedback in real-time.

GDL

What they want



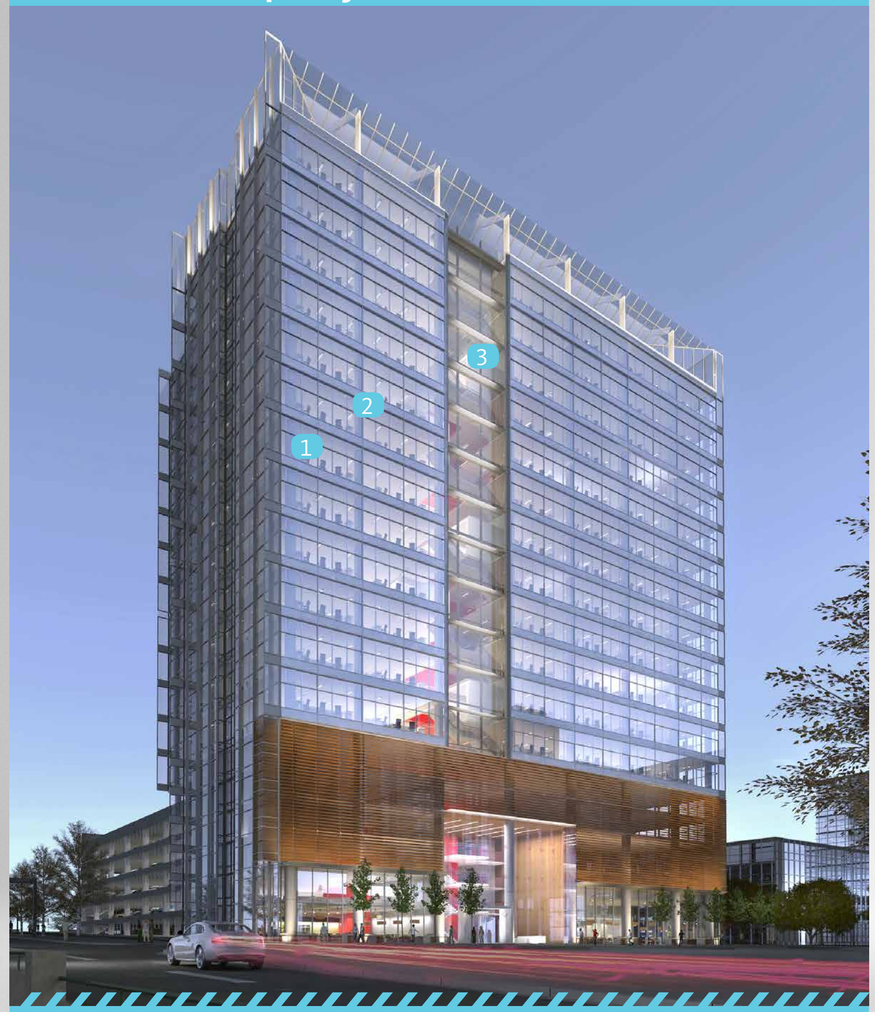
Transparency **100%**

VS

What they can afford

Transparency **<65%**

Conventional Opacity



Key

1 Transparency = 65 % of surface area
2 Opacity is continuos and horizontal. No full height glass
3 Featured Building Element is bounded by hard edges.

Distributed Opacity

Key

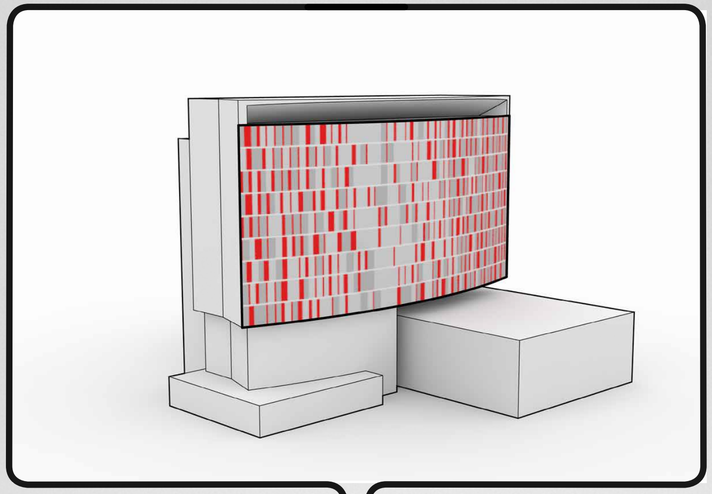
1 Transparency = 65 % of surface area
2 Opacity is distributed Full height glass
3 Featured Building Element is bounded by a soft edge

We used grasshopper to combine interactive design with real-time energy and cost feedback.

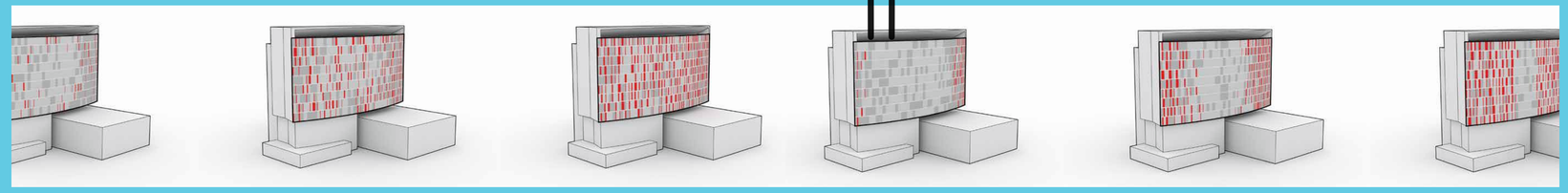
80%
Transparency

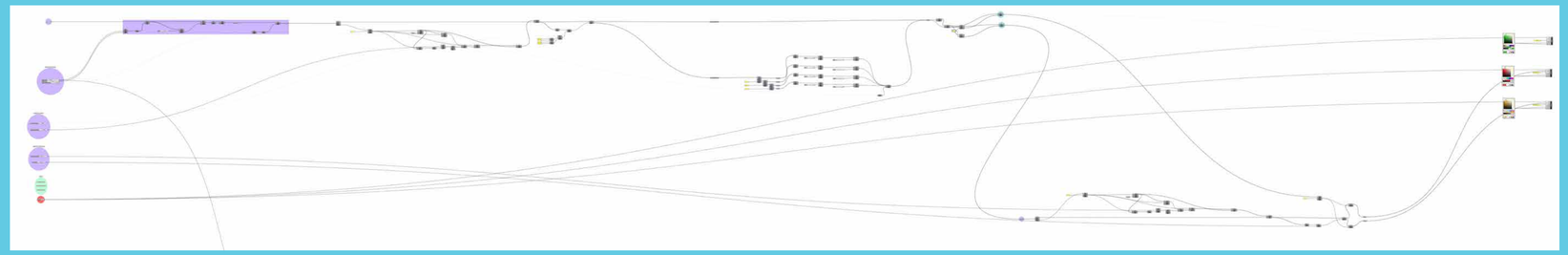
23%
Randomness

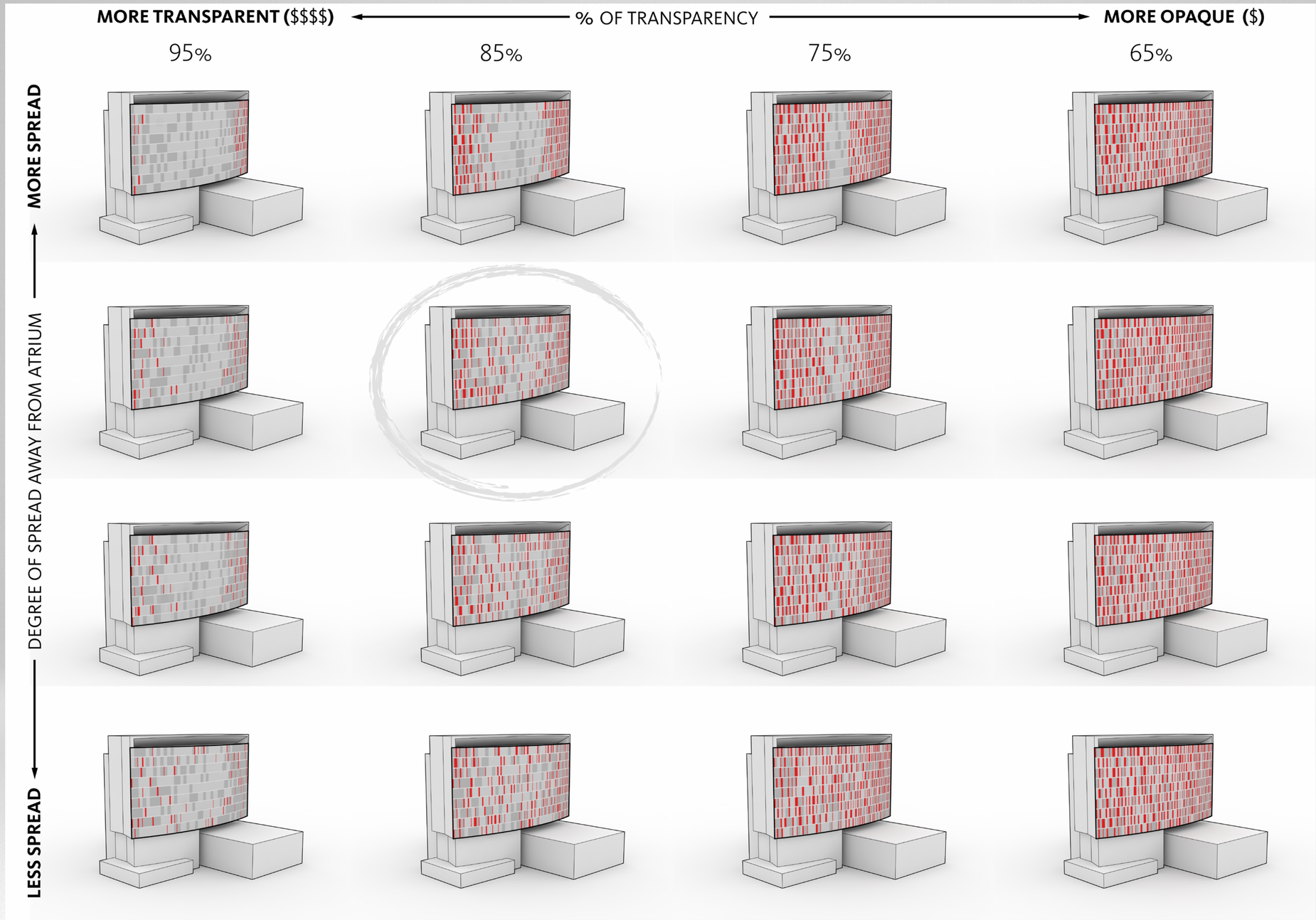
23%
Glass type B

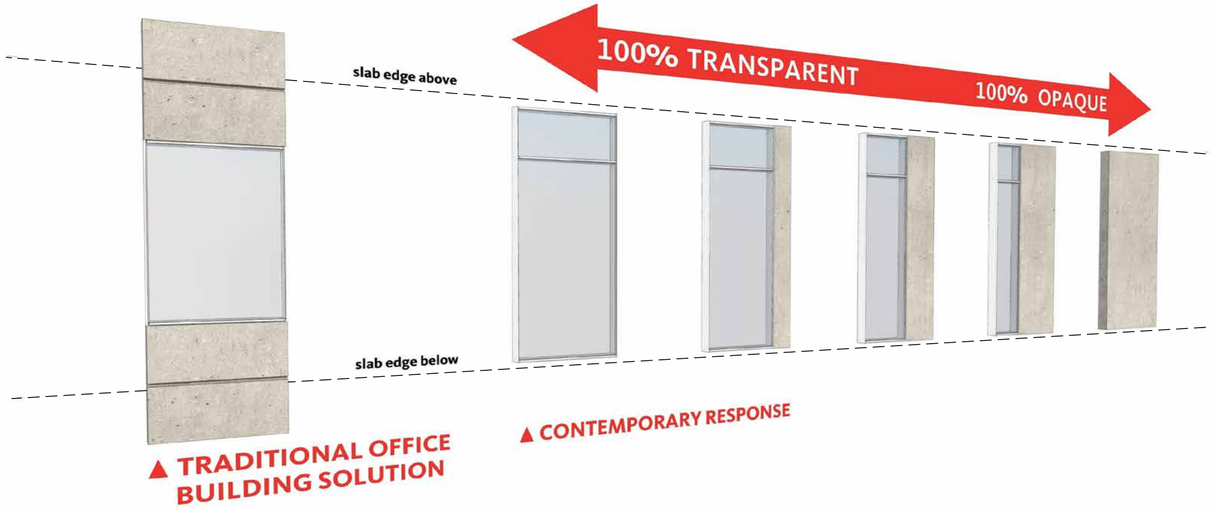


$150/SF
Building Cost






MORE TRANSPARENT ($$$$)
% OF TRANSPARENCY
MORE OPAQUE ($)
95%
85%
75%
65%
MORE SPREAD
DEGREE OF SPREAD AWAY FROM ATRIUM
LESS SPREAD



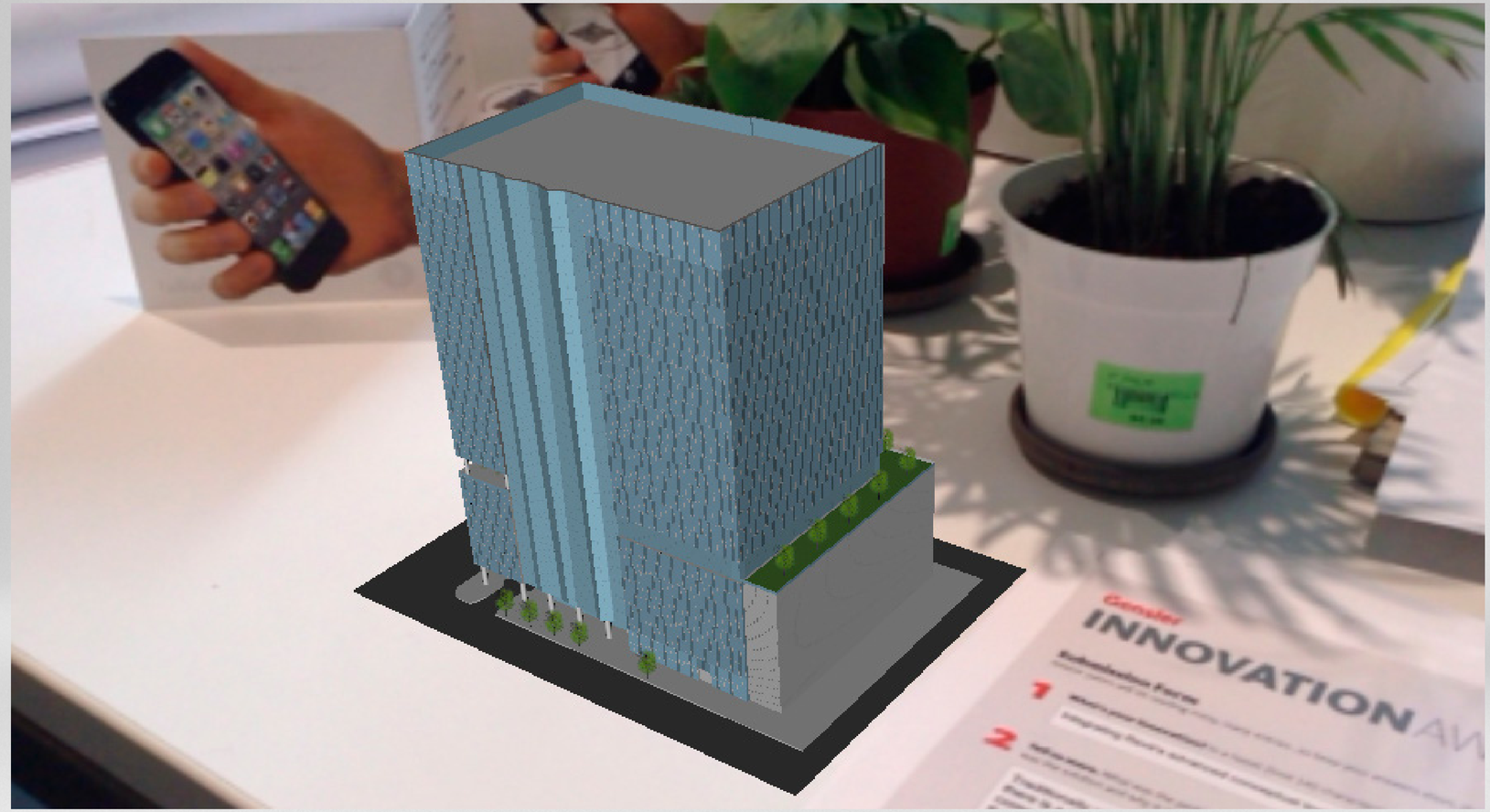
System **Components**

Unitized Curtain Wall Panels allow for the efficiency of modulation with the flexibility to create a random pattern

Result: The central meeting and circulation atrium required the most transparency The rest of the façade consisted of opaque ceramic-faced and glass panels with two grades of reflectivity.

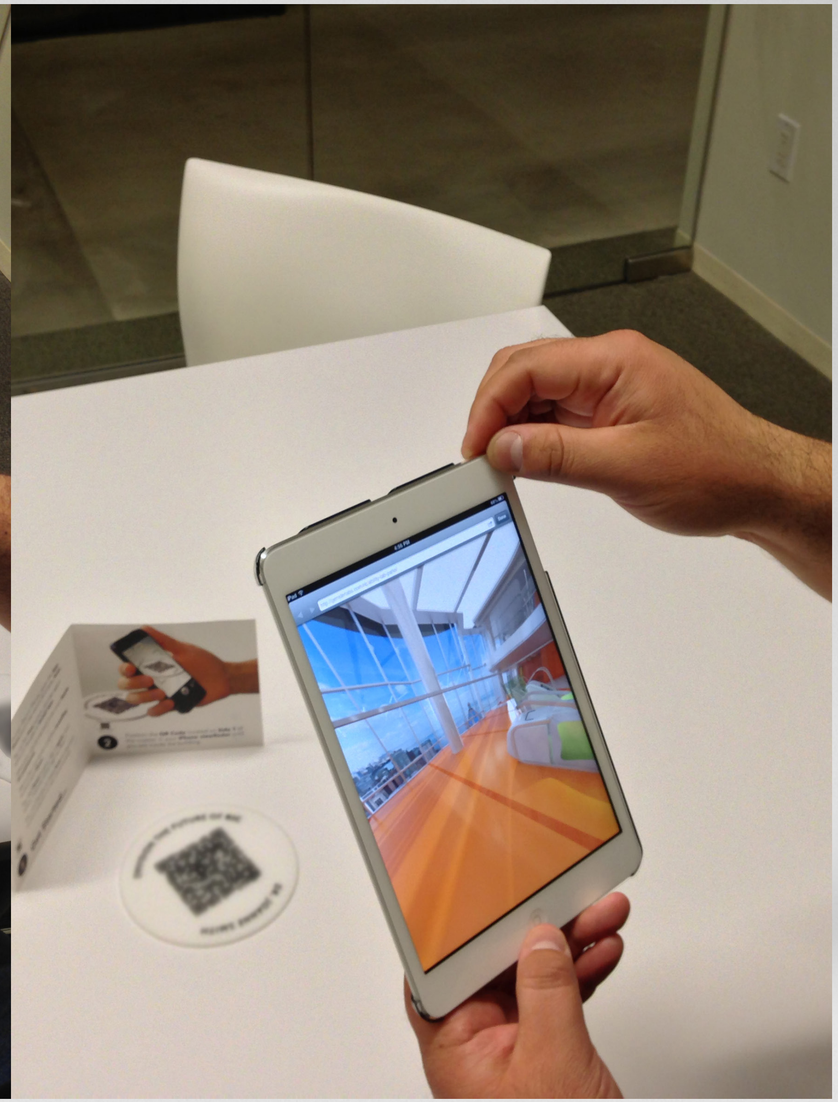
Result: The successful method has now been implemented for another client, this time on a speculative office building wanting to break the conventional expression of a value-market spec building, while maintaining a comparable budget.

Confidential Project




Off
Options
On your iPad or iPhone, open the **App Store** and in the search field type, **Scan**.
Tap on the **Free** button, and tap again when it changes to **Install App**.
When you are prompted, enter your **Apple ID password**.
Wait a few moments until the **Installing** button says **Open**.
Tap the **Open** button, tap it **again**, and select "I would rather sign up later"
You can choose to allow **Scan** to use your current location or not, and proceed.
1 Get Started...
Position the **QR Code** located on **Side 1** of the coaster in your **iPhone viewfinder** until you see inside the building.
2

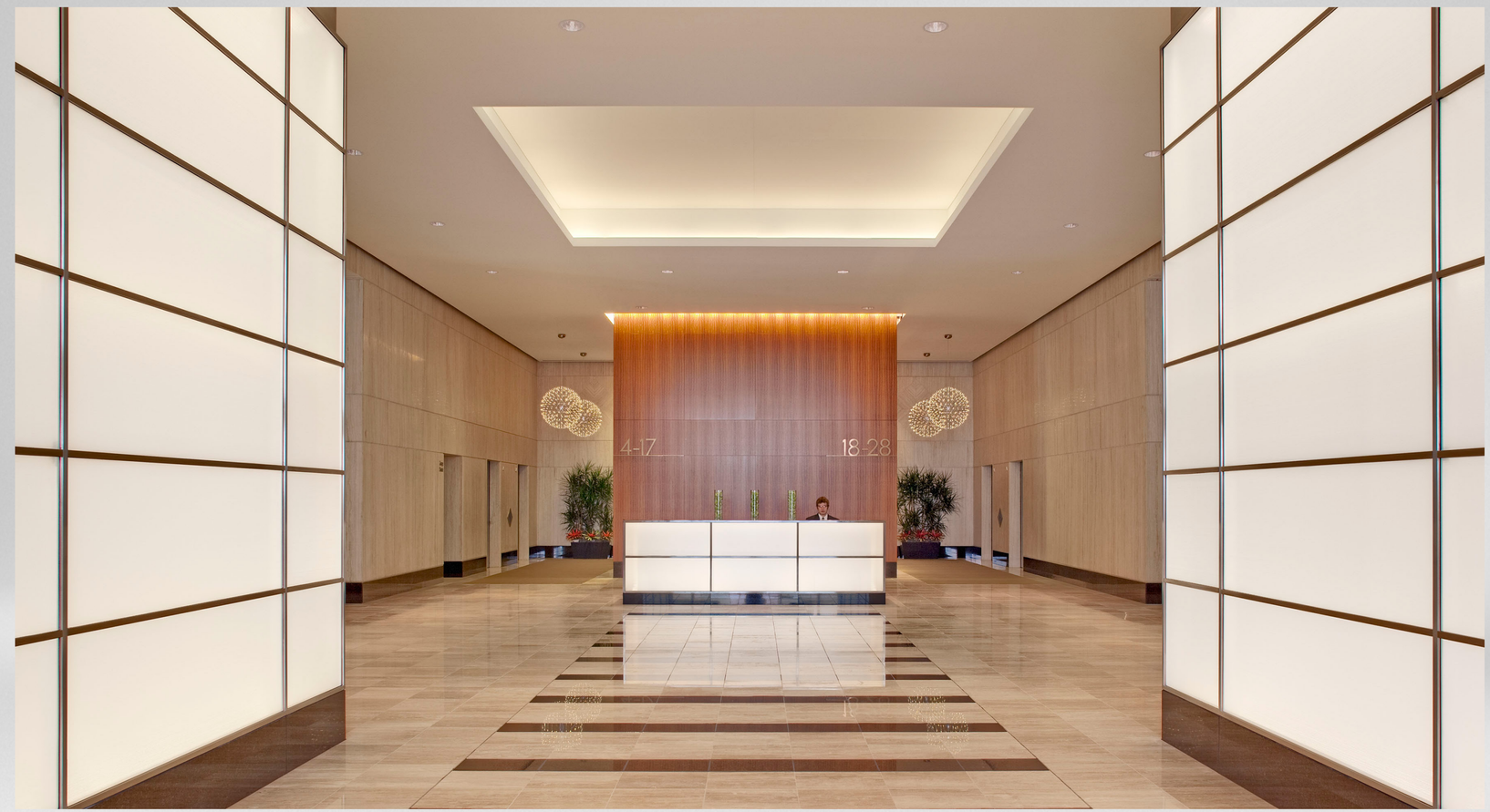

Gensler
INNOVATION
Submission Form
SEE THE NEW BIG




SITE-TEST-270
Details

123 Mission Street - Mission Street Lobby

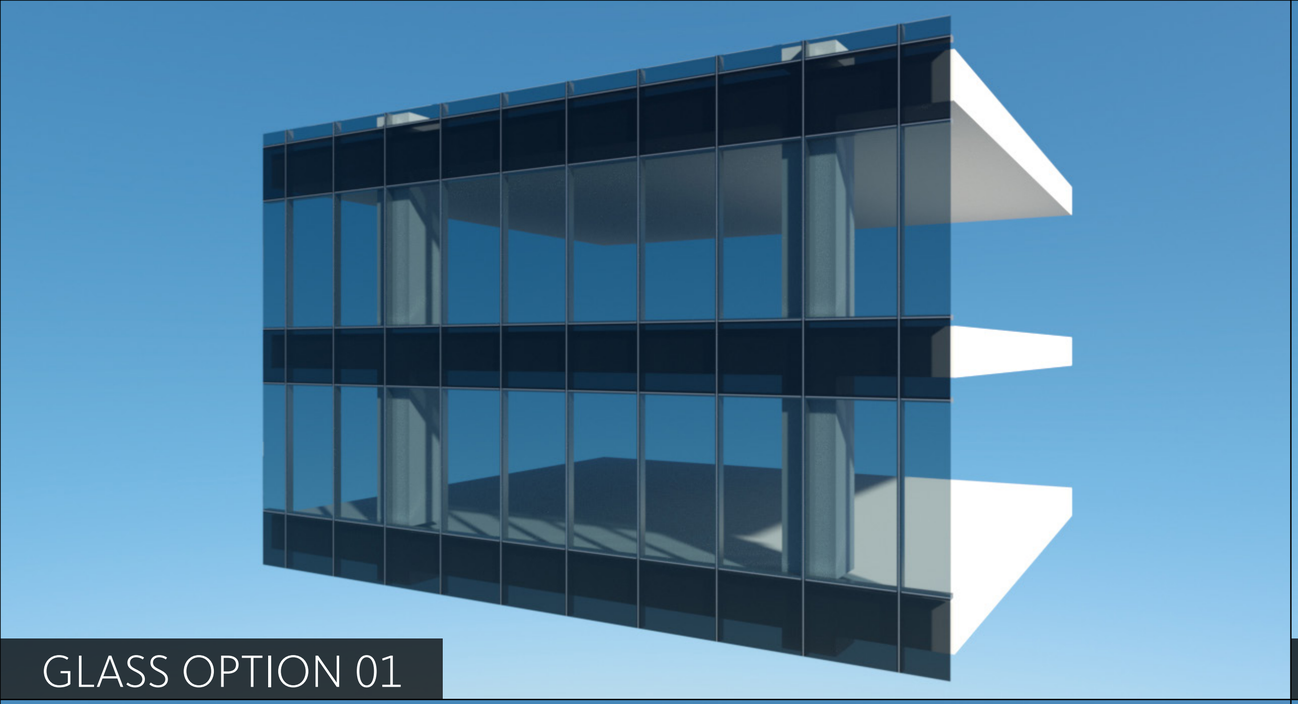
San Francisco, California



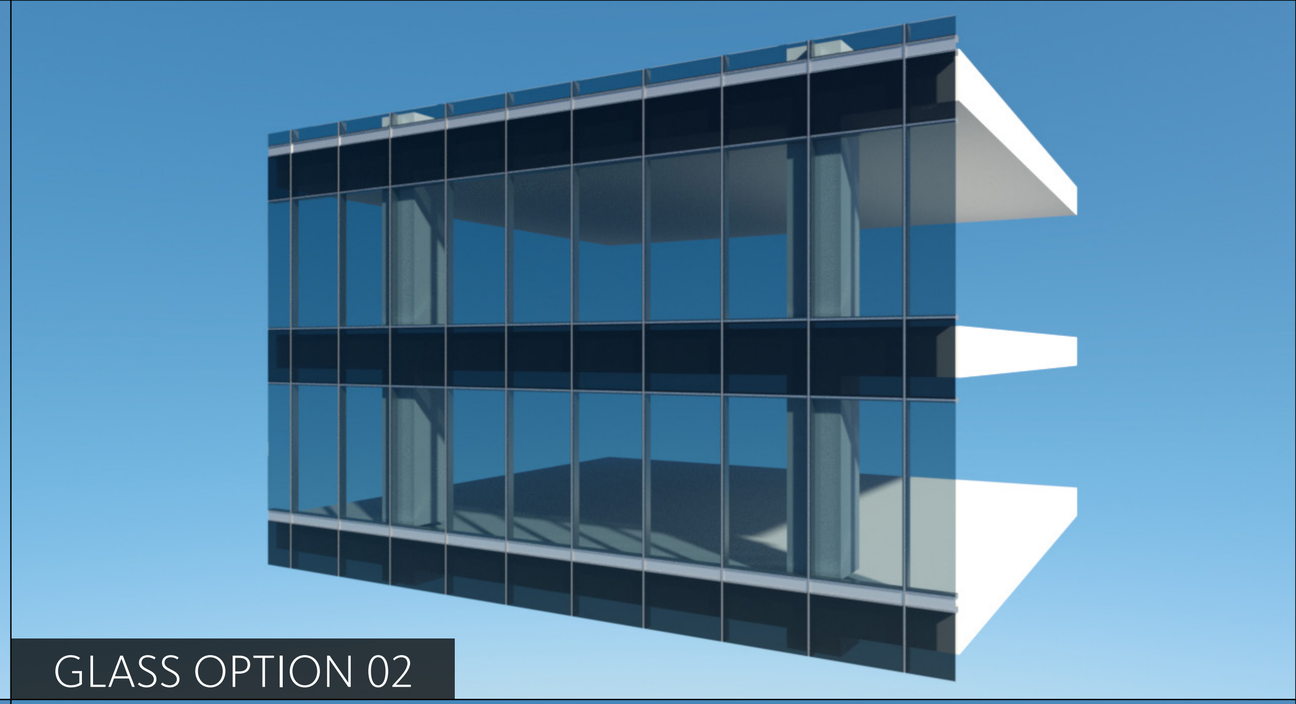

Gensler

SKANSKA - Capitol Tower

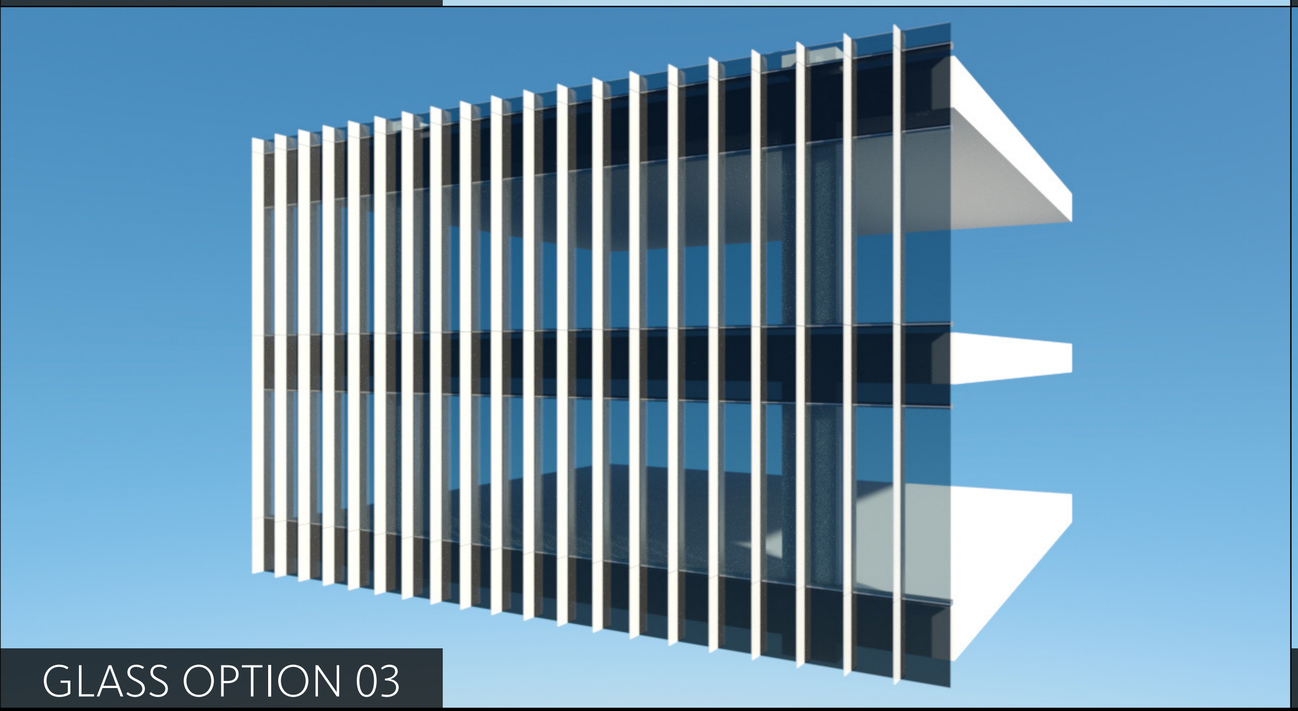
Houston, Texas



GLASS OPTION 01

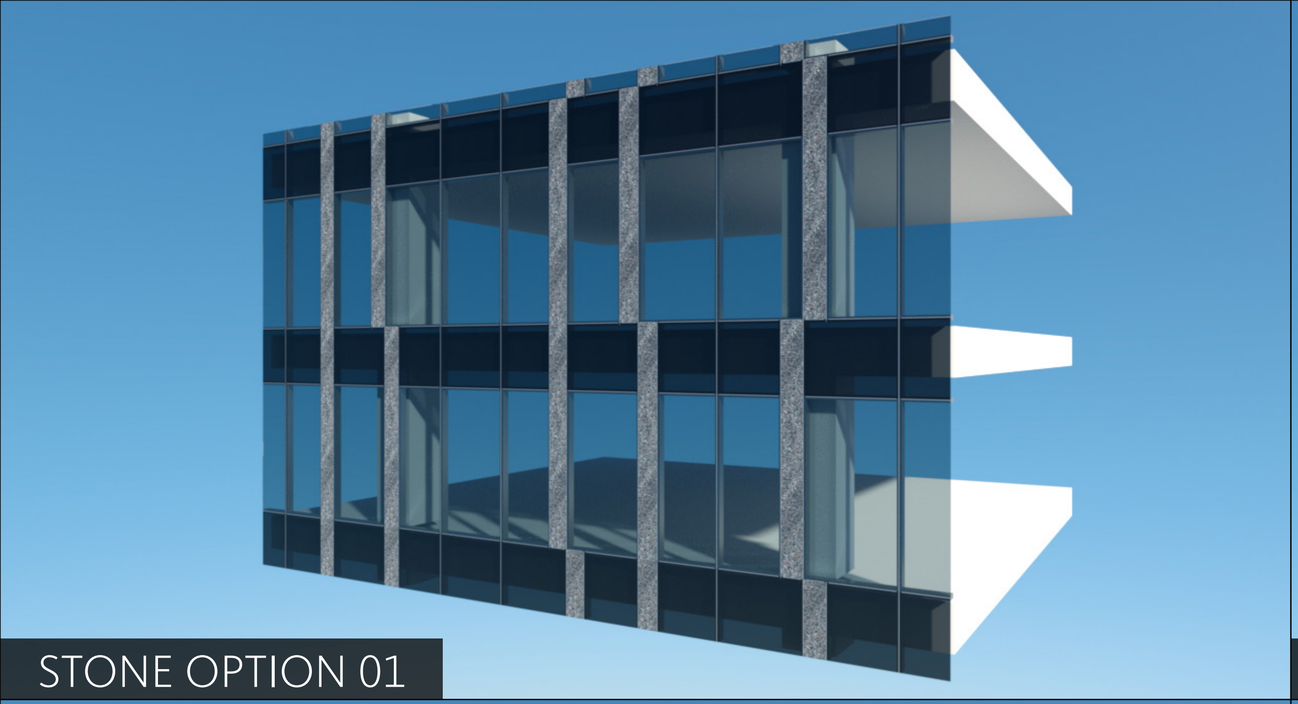


GLASS OPTION 02



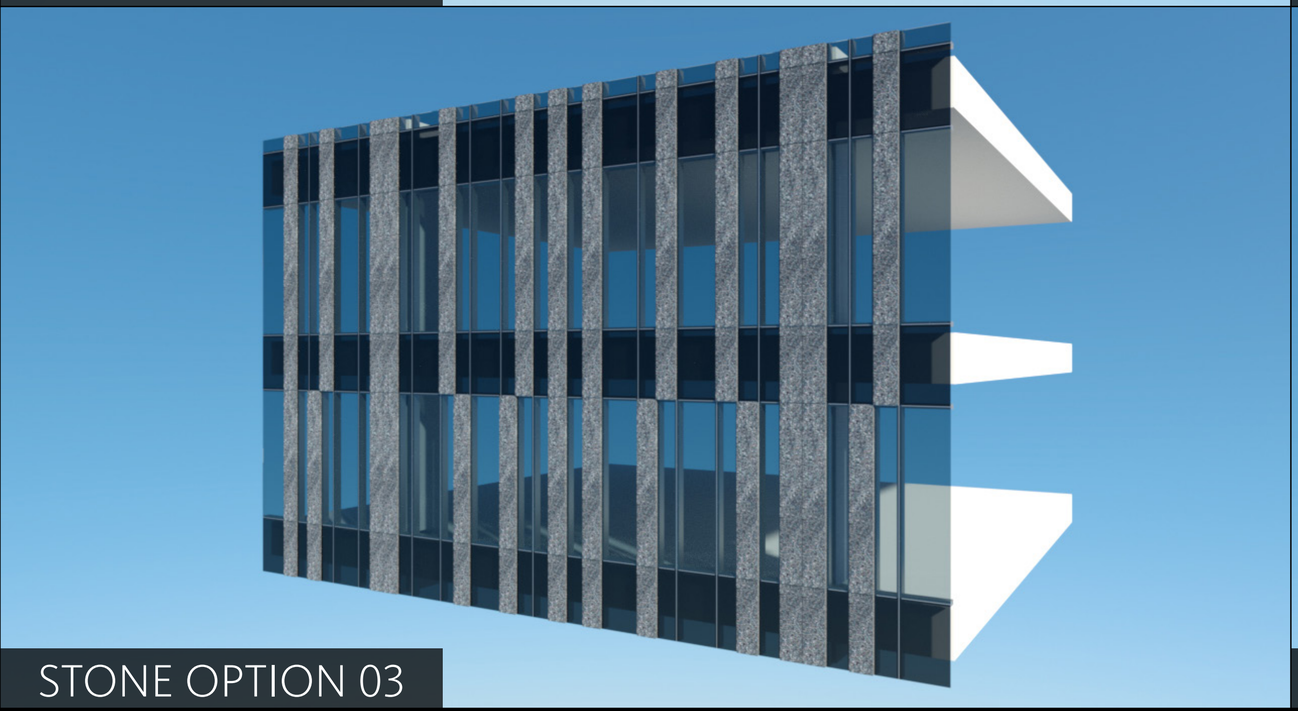
GLASS OPTION 03

GLASS OPTION 04

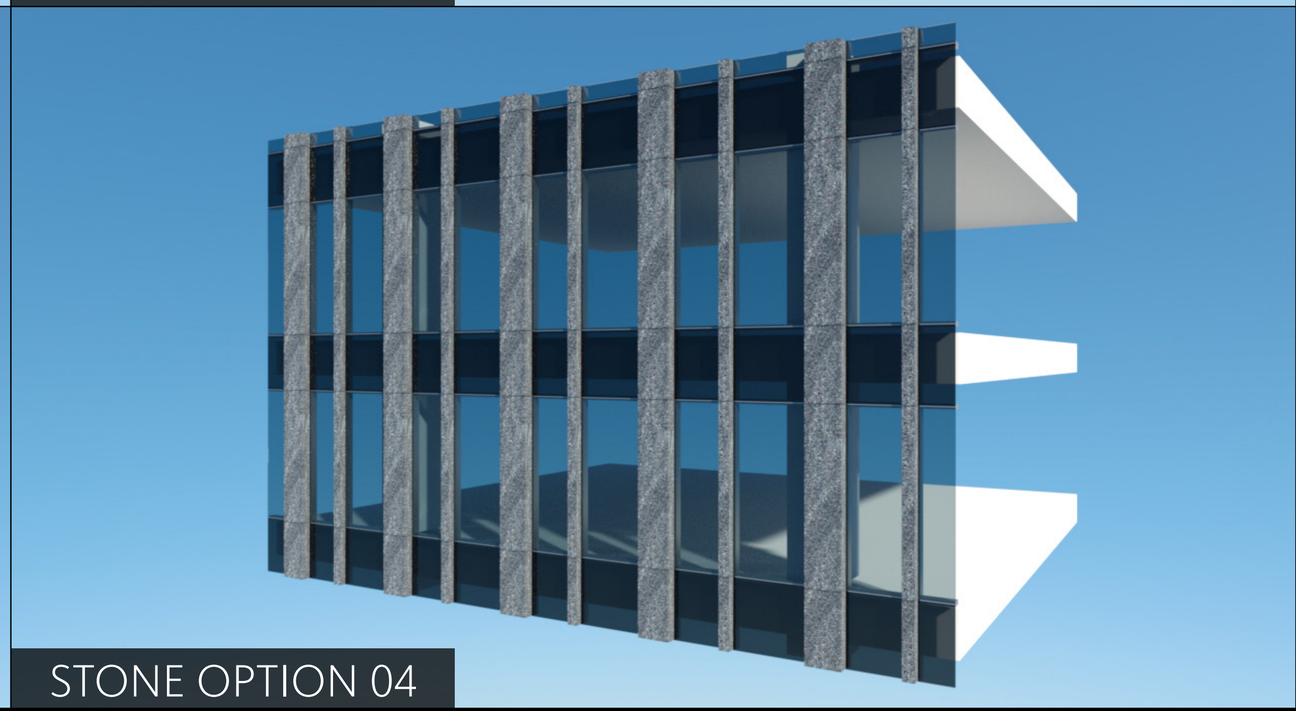


STONE OPTION 01

STONE OPTION 02

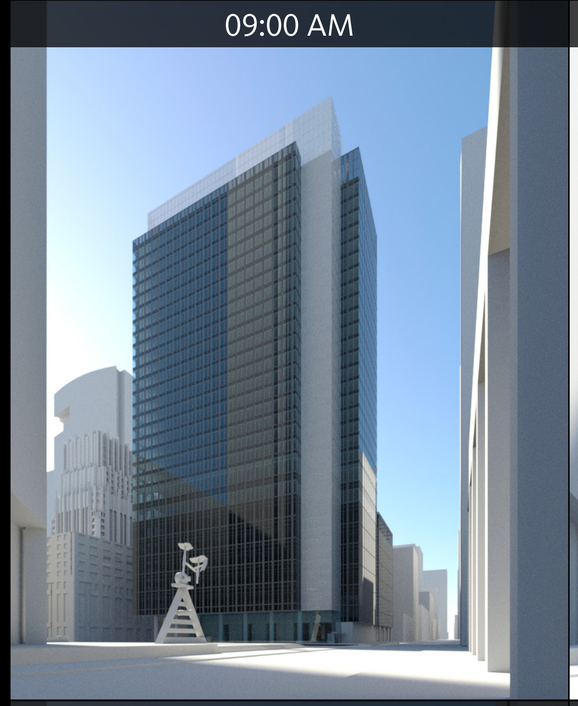


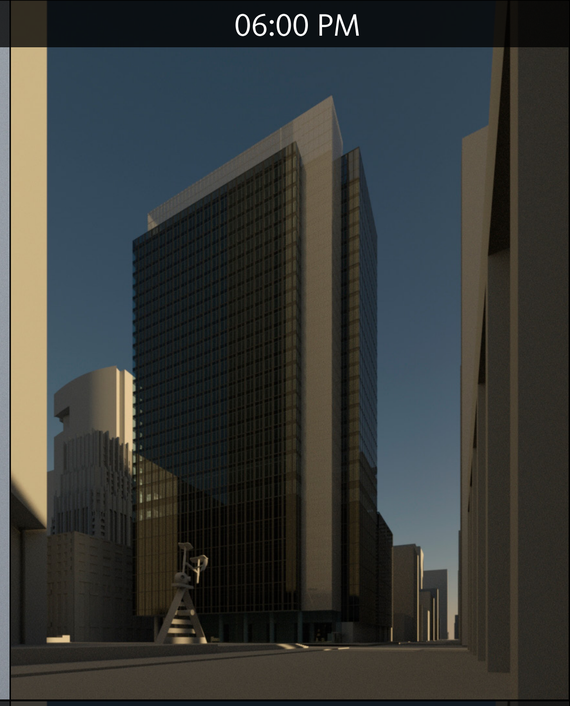
STONE OPTION 03



STONE OPTION 04

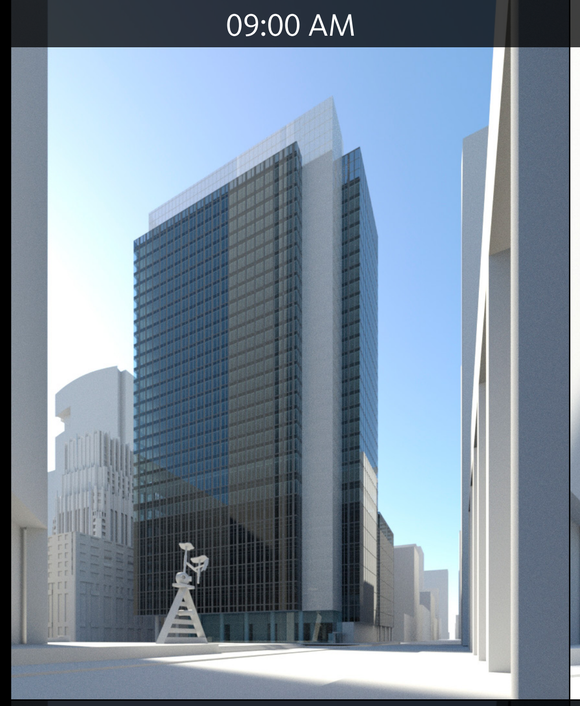
03

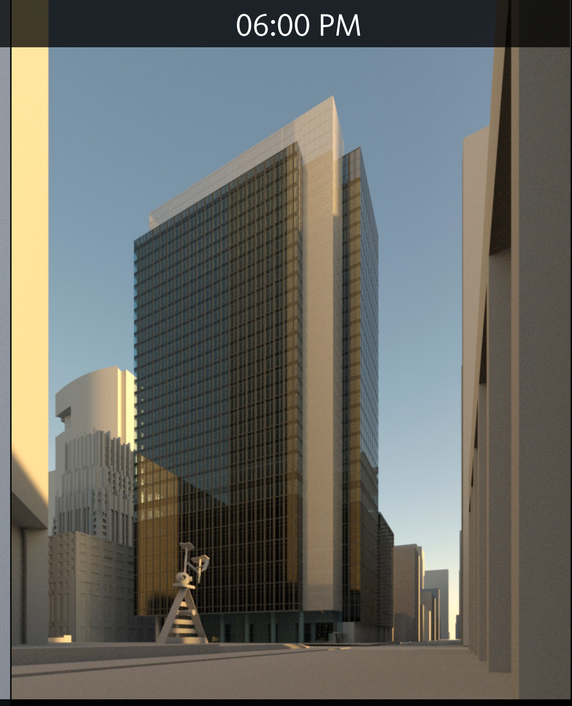




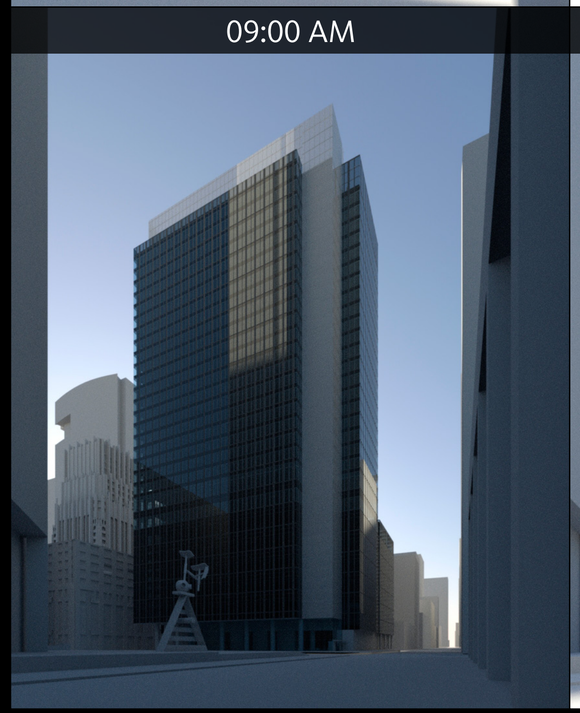
06

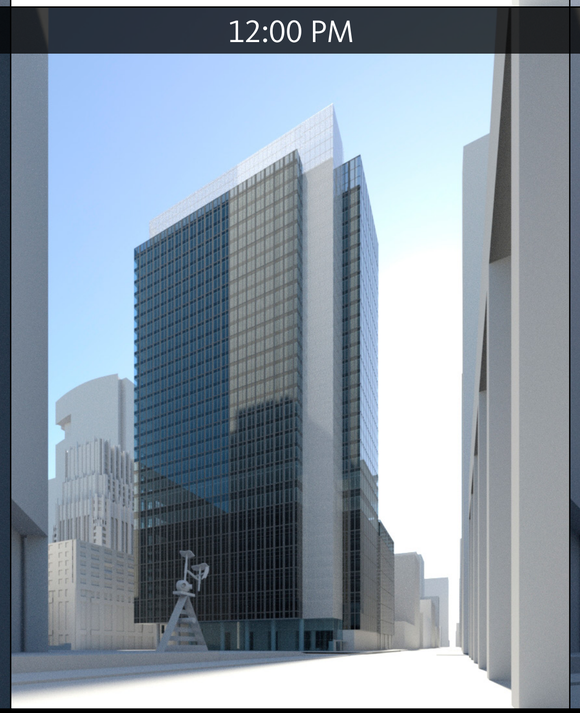
09

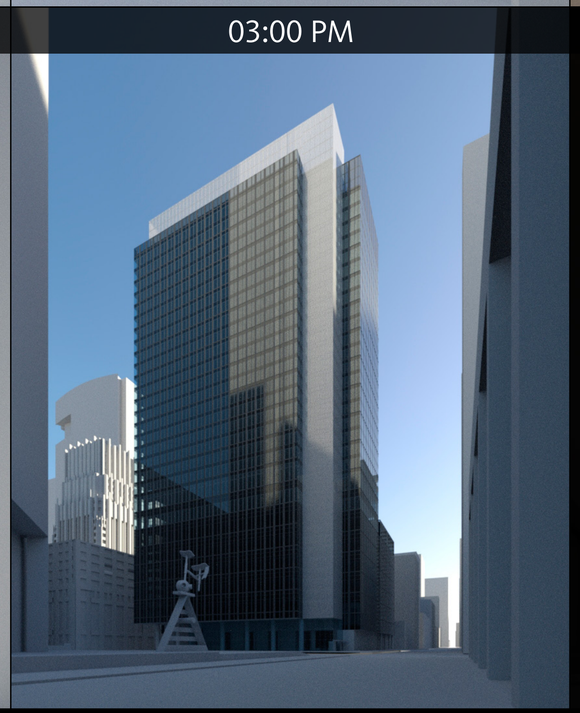


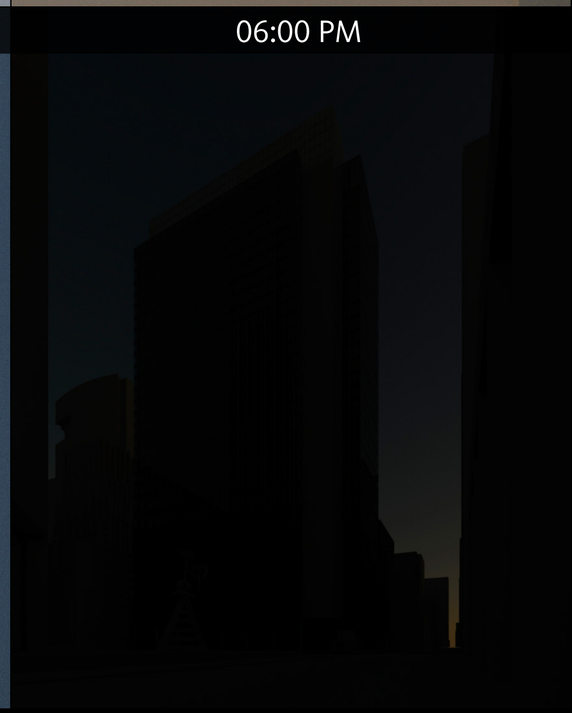


12










iRAY


Mental Ray


Facade Option 01


Facade Option 02


Facade Option 03


Facade Option 04

Recap:

Shanghai Tower
The Richards Group
Augmented Reality Project
123 Mission Street Lobby
Capitol Tower

Q & A