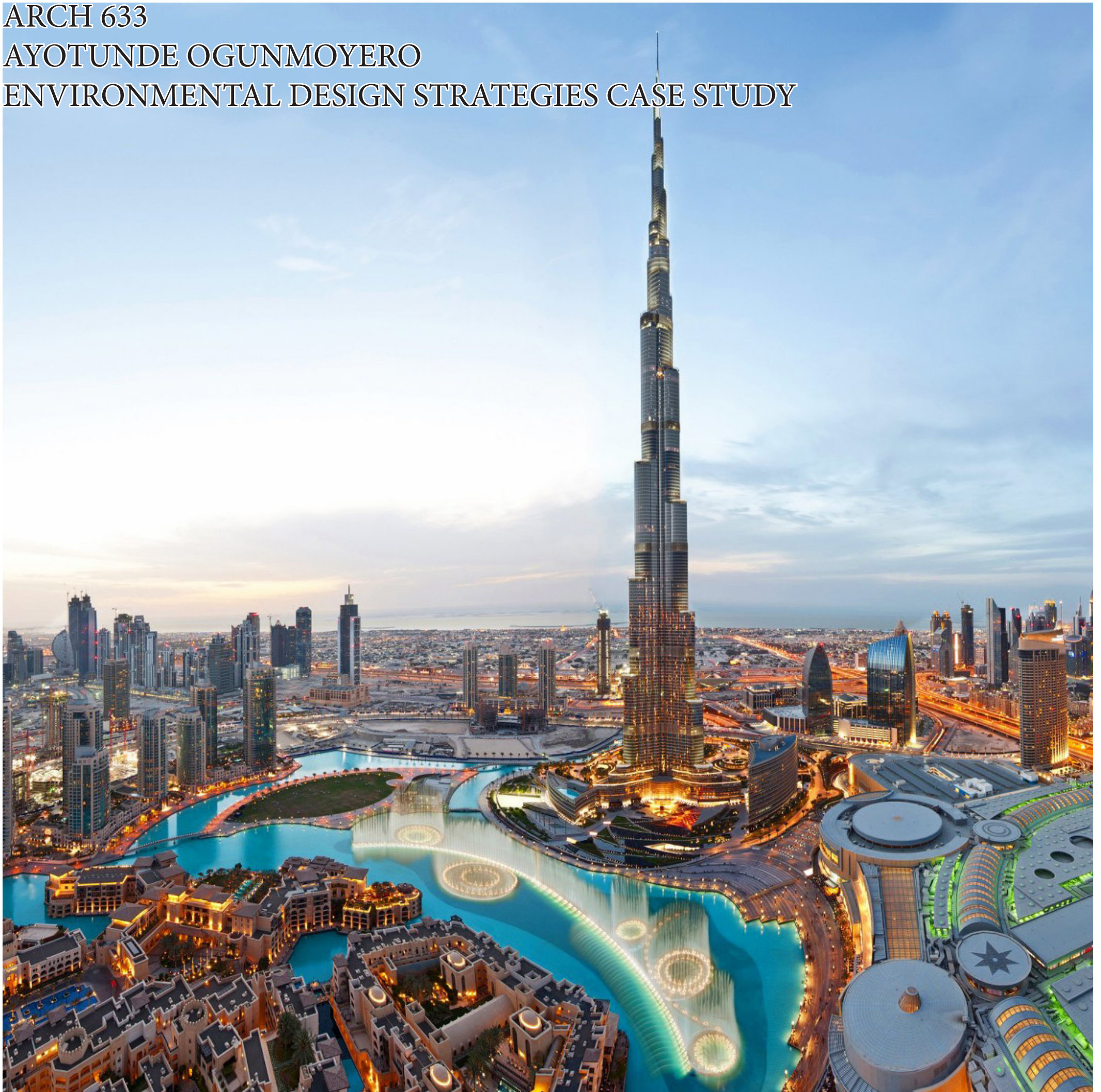


ARCH 633

AYOTUNDE OGUNMOYERO

ENVIRONMENTAL DESIGN STRATEGIES CASE STUDY





BRIEF OVERVIEW OF BUILDING, LOCATION AND CLIMATE

Status.....Complete  
Type.....Mixed-use  
Architectural style.....Neo-futurism  
Location.....1 Sheikh Mohammed bin Rashid Boulevard, Dubai, United Arab Emirates  
Construction started.....6 January 2004  
Completed.....Intended: September 2008; Re-vised: 2 December 2009  
Opened.....4 January 2010  
Cost.....USD \$ 1.5 billion

HEIGHT

Architectural.....828 m (2,717 ft)  
Tip.....829.8 m (2,722 ft)  
Roof.....828 m (2,717 ft)  
Top floor.....584.5 m (1,918 ft) (Level 154)  
Observatory.....555.7 m (1,823 ft) (Level 148)

TECHNICAL DETAILS

Material.....Glass, steel, aluminium, reinforced concrete

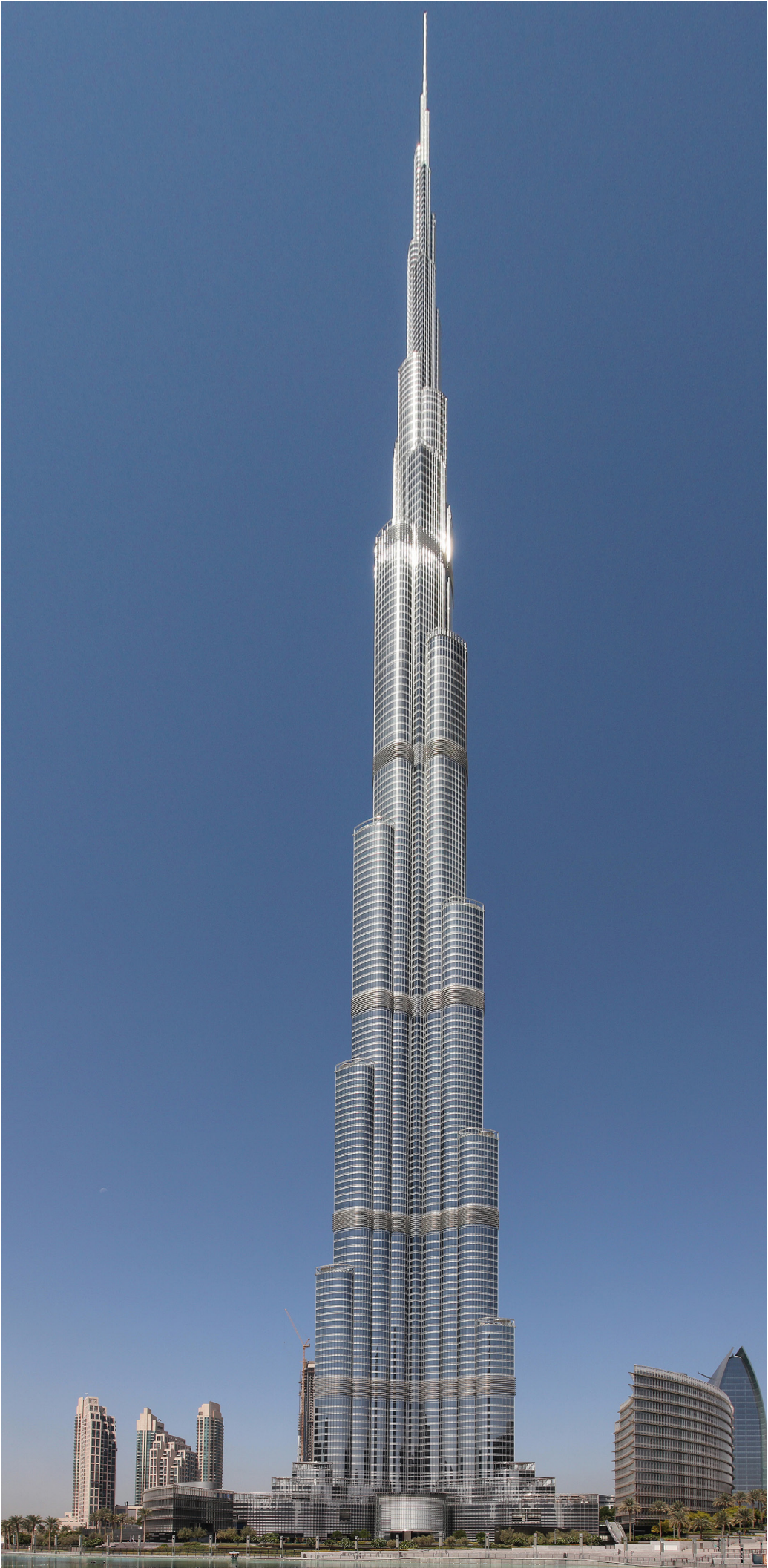
FLOOR COUNT

163 above ground. 153 usable floors plus 9 maintenance levels (46 spire levels) and 2 below-ground parking levels

CLIMATE

Dubai has a tropical desert climate because of its location within the Northern desert belt. Summers are extremely hot and humid, with an average high around 41 °C (106 °F) and overnight lows around 30 °C (86 °F). Most days are sunny throughout the year. Winters are warm and short with an average high of 23 °C (73 °F) and overnight lows of 14 °C (57 °F). Precipitation, however, has been increasing in the last few decades with accumulated rain reaching 150 mm (5.91 in) per year. The weather in Dubai can bring short and irregular rainfall as is typical for the Middle East. Most of the rainfall occurs in the December to March period. The weather between December and March remains warm and is considered to be the most comfortable climatic conditions of the year.

SOURCE: [wikipedia.org/wiki/Climate\\_of\\_Dubai](https://en.wikipedia.org/wiki/Climate_of_Dubai),  
[wikipedia.org/wiki/Burj\\_Khalifa](https://en.wikipedia.org/wiki/Burj_Khalifa)

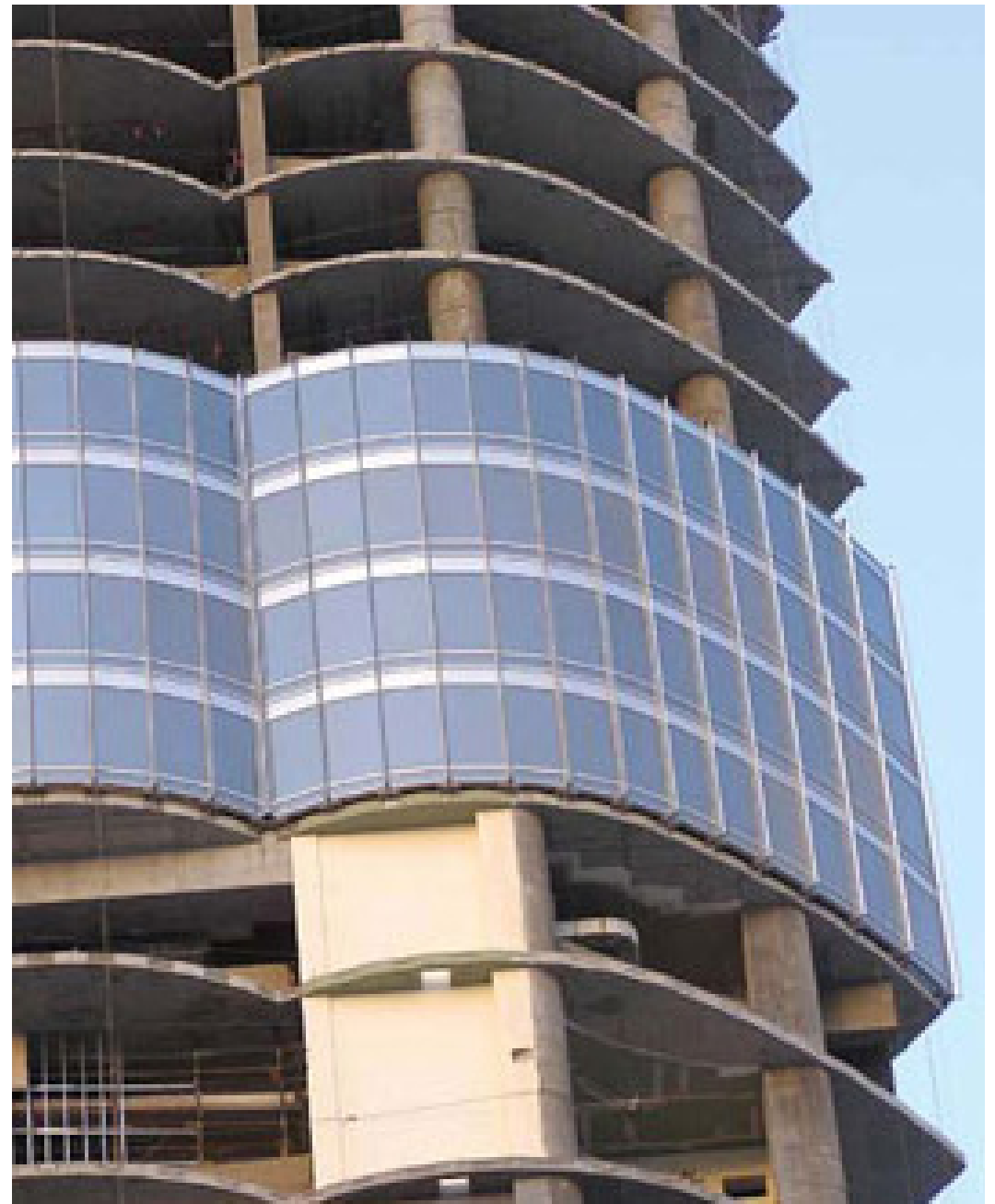




# SOLAR/CONDUCTION

High performance glass all around the building protects the building from strong winds, high temperatures and high radiation from the sun.

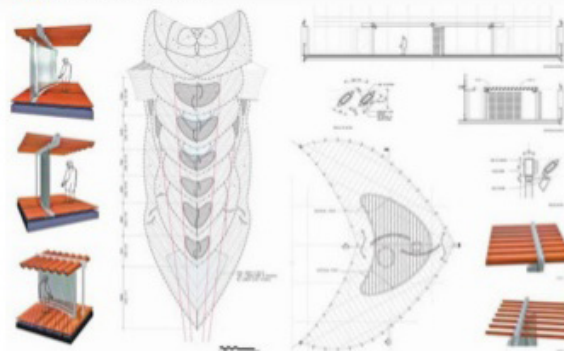
The glass acts as insulators from the high temperature thanks to its Low E coating. The glass also rejects/reflects dangerous UV rays thanks to the outer layer coating



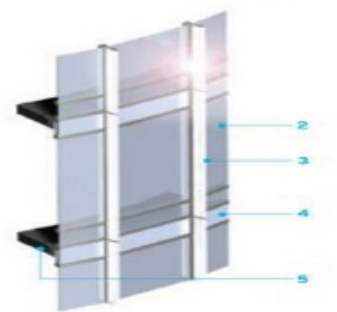
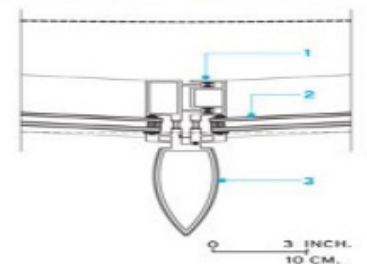
## Cladding System details

### Curtain-Wall Detail

1. aluminum vertical mullion.
2. clear reflective insulating vision glass.
3. stainless-steel vertical fin.
4. horizontal spandrel panel.
5. concrete slab.



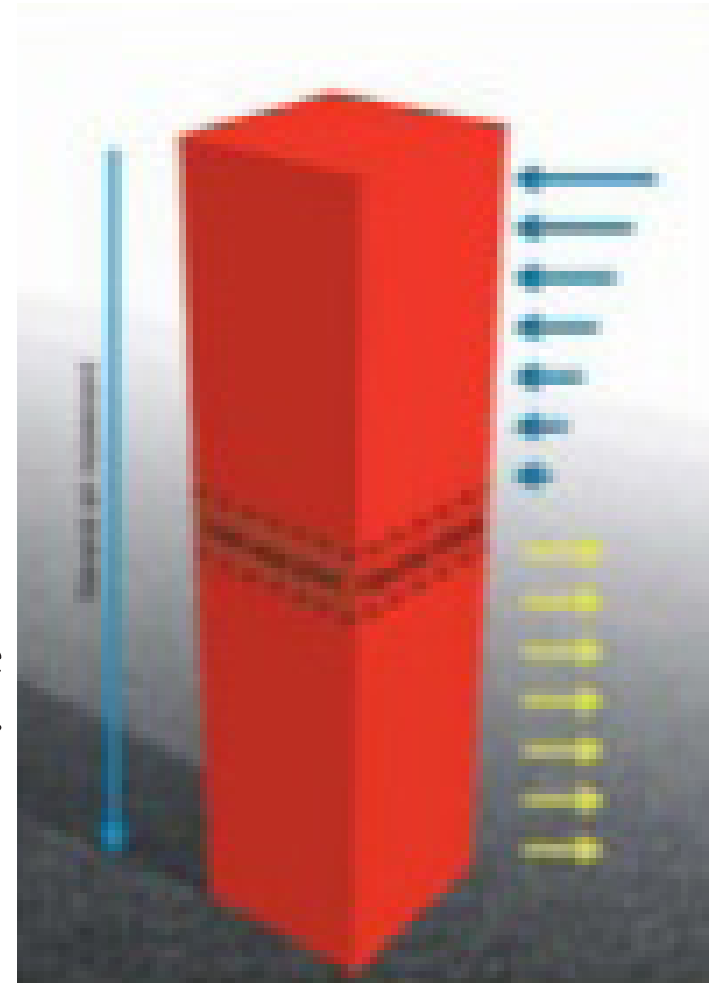
Cladding System plan



Cladding System detail

# VENTILATION

The majority of the natural ventilation is achieved by using the reverse stack effect. That means that the cooler air enters the building at the top, cools the building and the remaining 'hot' air exits the building at the bottom. This happens because the cool air is dense and wants to drop thereby cooling the tower. Another way the building is cooled is by the HVAC installed into the building. The HVAC system also uses the cooler top air by collecting it and spreading it within the building to cool it.



# CONDENSATION

The hot climate on the outside combined with the air conditioned inside thanks to the HVAC creates a lot of condensation. Actually 15 million gallon worth of condensation. The water is drained and collected in the basement and reused.

IF I WAS IN CHARGED I WOULD HAVE CHANGED?...

I would increase the amount of natural ventilation the building gets. I would create more openings and more operable windows to allow night cool air to enter and exit the building.