

# Environmental Systems

Project 5

Fall 2017  
ARCH 633



# Bahrain World Trade Center

Location- Manama, Bahrain

Height- 50 Floors, 787 feet

Consultant- Atkins

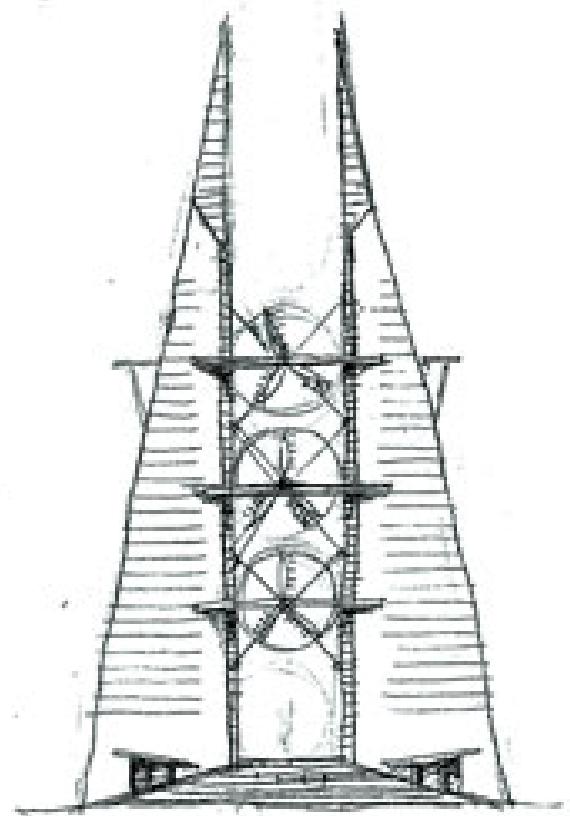
Completion- 2008

Shape- Sail Shaped

Sustainability- Wind Turbines

Bahrain World Trade Center is considered one of the main architectural icons in the Middle East and in Bahrain.

The building consists of two sail shaped figures that span to the skyline of Manama. These two figures are spanned on either side of three big turbines that have a 29m diameter that generate power to the building.



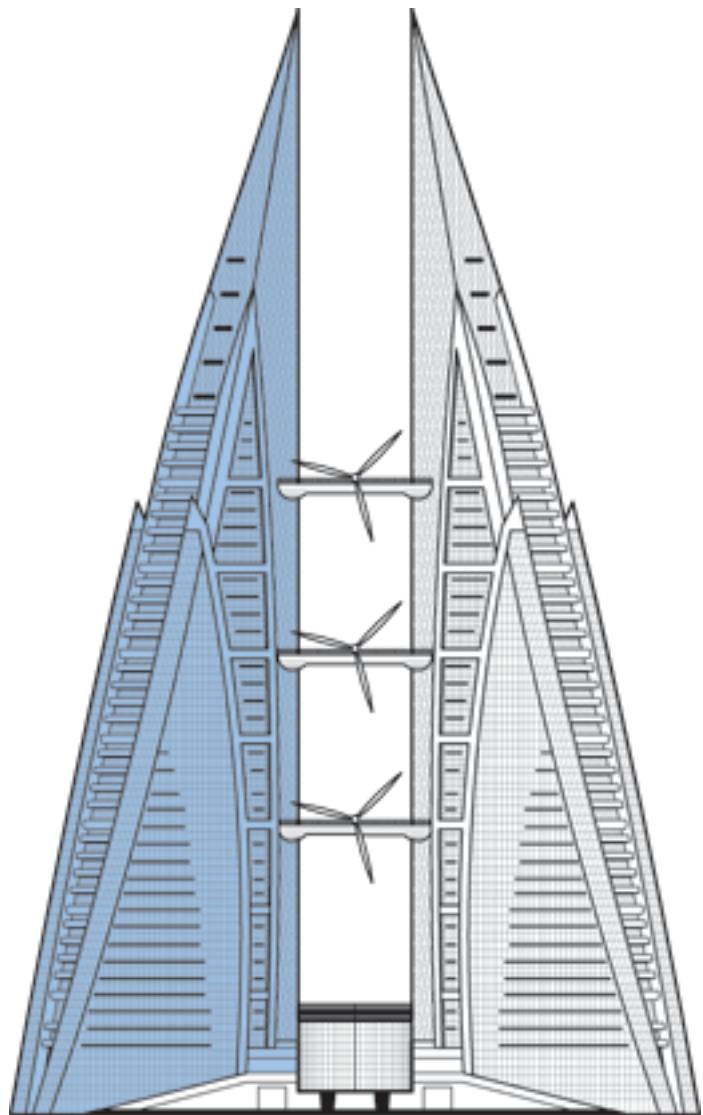


## Sustainability- Solar

The tower uses high resistance value double glazed glass throughout the entire facade in order to reduce the amount of heat that comes in during the year.

In Bahrain the weather is hot through 9 months of the year, therefore keeping the heat out as much as possible is useful to reduce the energy costs of the building.

Balconies extended in order to act as a shading device to the floors underneath is useful in order to protect from the direct sunlight



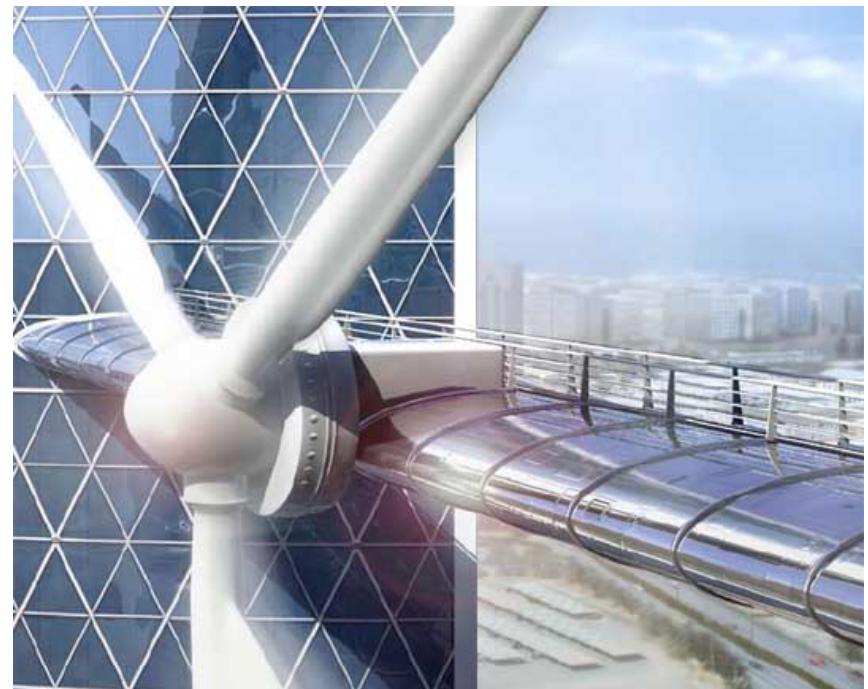


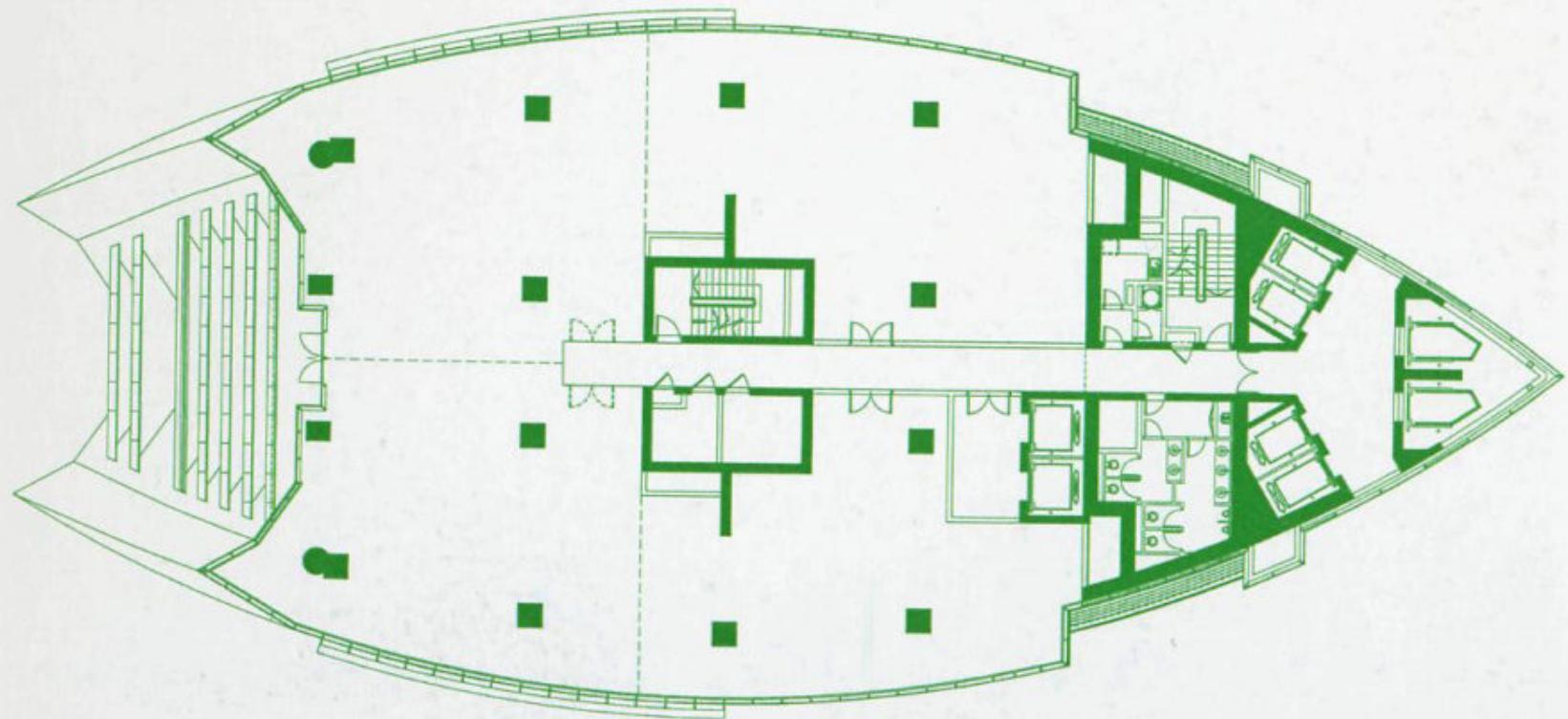
## Sustainability- Ventilation

Bahrain World Trade Center has a sail shaped facade on both towers that allows for the wind to pass through using the angles and the way the building plan is designed.

It also allows for the wind to pass between both the buildings at a higher pressure that is then picked up by the wind turbines to generate energy to the building.

Windows are allowed to be open to a minimum amount during the winter when the weather on the outside is optimal to reduce the energy costs.





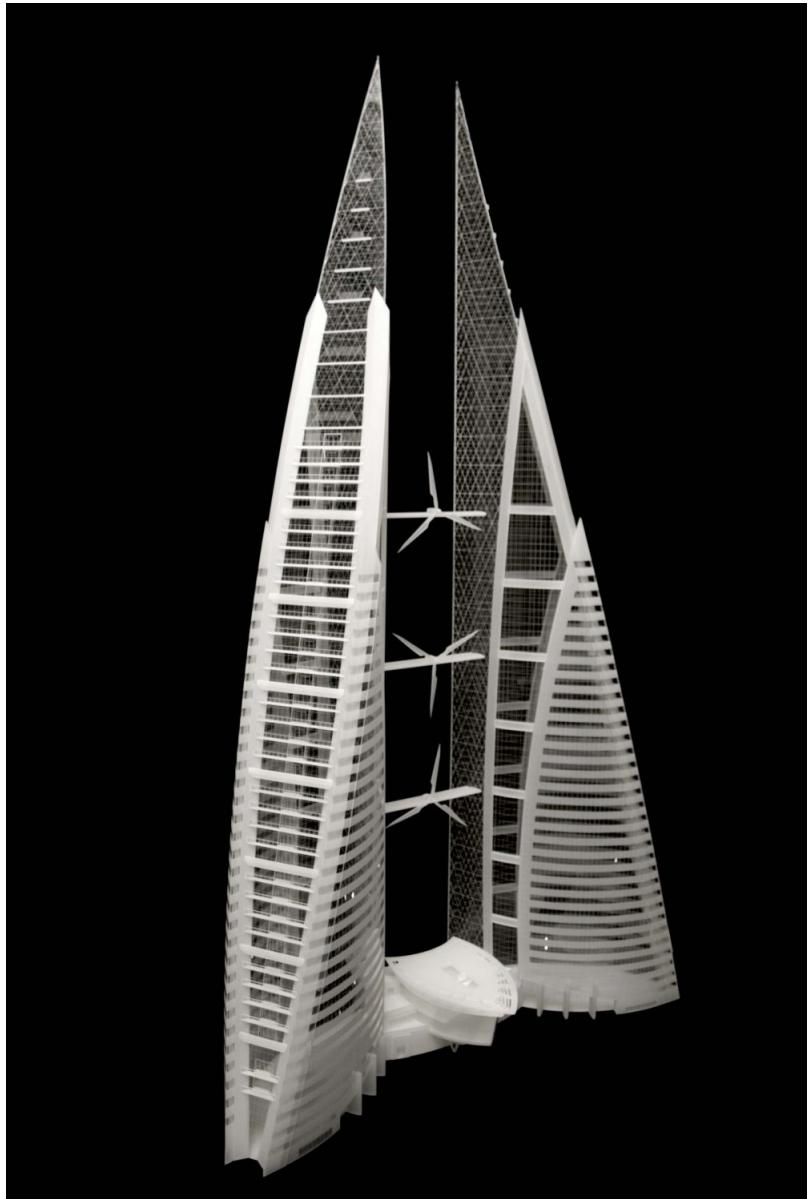
# Sustainability- Conduction, Infiltration

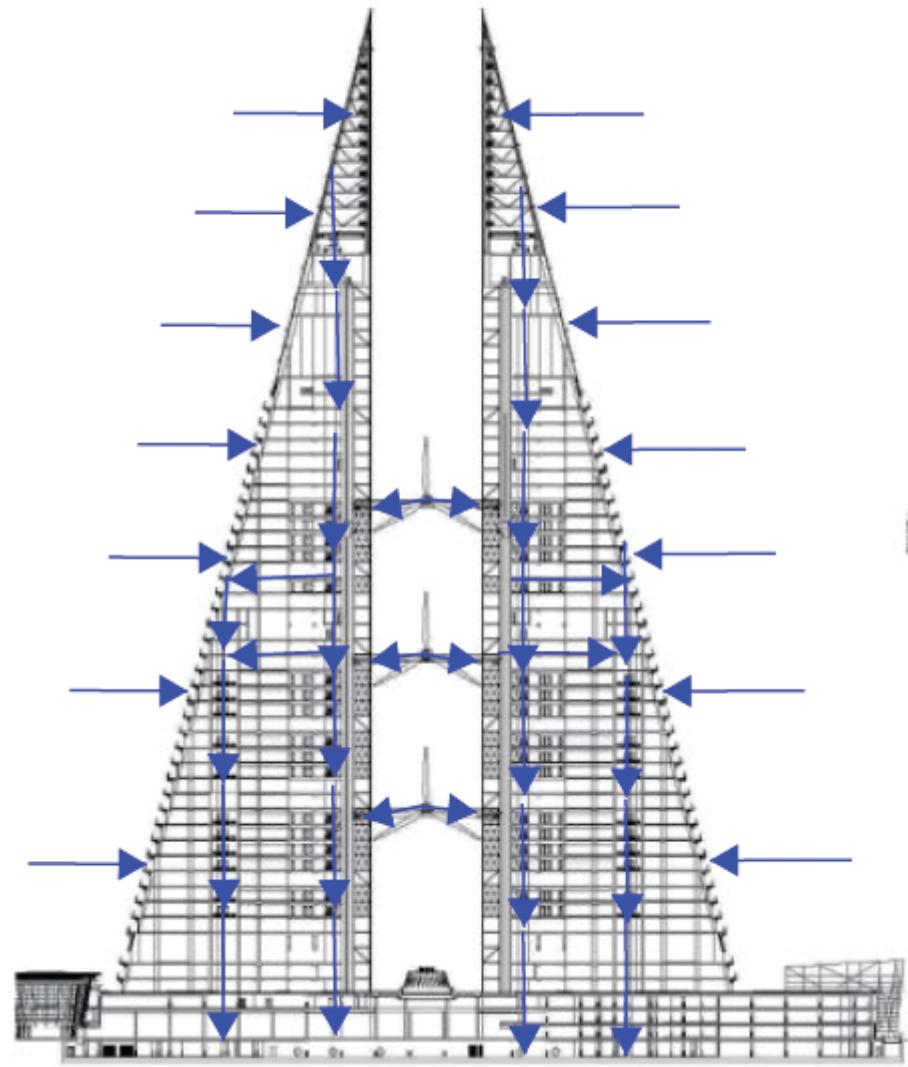
Deep gravel roofs in a few locations to provide an insulation due to the gravel being heated by the sun and the warm air rising against the direction of the windflow.

Enhanced thermal insulation on the exterior fabric of the building

Chilled water pump used in order to allow the hot air from the outside to mix with it to cool down before entering the building.

Low Leakage openable windows that allowed to be open to infiltrate the air and get better temperature air from the outside in the cold weather.





# Sustainability- Evaporation, Internal Gains

High use of computers and digital devices in the building that allows for more heat gain in the building when it is not needed.

Large number of people visit the building everyday for different reasons that add to the internal gains.

Few restaurants and cafes that are open create a high internal gain of heat that increases the temperature of the building.

Extensive landscaping and reflective pools located at the building entrance to provide local evaporation cooling method.



Based on the explanation of what the building is trying to achieve, there are many issues that it is attempting to address. However does the building perform as much as it was planned to do?

Do the turbines work properly? and do they generate enough energy to cover part of the high energy costs that are required to cool down the building since it is in such a high climate and also the internal gains of the building are way too much.

## Final Result

If I was in charge of the project, I would try and use the high internal gained heat from the restaurant to be used in the bathrooms to heat up the water in all the 50 floors.