LUNGS OF MASDAR

SITE CONDITIONS





STRATEGIES

The Masdar site is located around 20KM north east of Musaffah, the industrail zone of Abu Dhabi

As a result of the industrial activity and fossil fuel power generation happening in this area, the Particulate Matter and Ozone levels are significantly higher than the limits set by the Environmental Agency, Abu Dhabi The wind direction shown indicates the PM and Ozone transmitted from Industrial area to Masdar City. The below table shows that percentage of days in which the emission limits are exceeded.

* Source : Annual air quality report published by Environment Agency

ANNUAL NON-COMPLIANT DAYS PERCENTAGE FOR PM

50 —

MIND MAP TO IMPROVE SITE CONDITIONS



The new green establishes a sub centre that connects and serves the surrounding greens. The result is a connected design both in appearance and program for a diverse new neighborhood. This network of green

ANNUAL NON-COMPLIANT DAY

corridors is part of an integral green public space to help orienting all dwellings and commercial areas in the neighborhood.

This green public space programmed with playgrounds, galleries, meditation areas, aims to facilitate the natural formation of a local community that provides basis to a social, healthy and sustainable lifestyle. The key green space in the planning area is a Park, a linear park stretches from North East to North West. It will become the 'green lung' of the Masdar City. Thus the green park itself becomes the ART which generates and connectes the place, people & activities.

CLIMATIC STUDY





On the Psychrometric chart for Abu Dhabi, the green dots are evenly spread across the central and upper right quartile of the graph. This suggests a general hot arid climate with low levels of relative humidity and high dry bulb temperatures. We can observe that human comfort occurs naturally for only 5.8% of the hours. Cooling is required for 46.3% of the hours and sun shading of windows is required for 31.6% of the hours. Internal heat gain and passive solar direct gain high mass are recommended for 22.6% and 12.1% of the hours respectively, which can be explained by periods of low relative humidity [which makes it feel cooler] and large diurnal temperature shifts. High thermal mass night flushing is required for 9.7% of the hours to ventilate the building at night. A wider range of thermal design solutions [with the emphasis on cooling] will be required to achieve comfort throughout the year.





PASSIVE TECHNIQUES

THERMAL INSULATION

structural stability as well as thermal performance.



WIND CATCH & SOLAR CHIMNEY The tall rising circular towers act as the wind catch. The circular cross section helps to catch air from all various ribs running along the building skin.



EVAPORATIVE COOLING The air trapped by the wind catch is cooled as it travel down by the water sprinklers inside.



VERTICAL NOMADISM

The large volumes allow multiple levels (sub-terraninan & other) conducive of segragated day time & nigh time activities.



SHADED EXTERIORS

The build volumes create mutually shaded streets between. Other open exterior are shaded by vegitation of native trees & plants. This creates a more thermally comfortable exteriors which are otherwise extremely susceptible to harsh sun.



ENERGY & AIR

GREENS

The interior volumes are thermally insulated by thick Planting species known for air purification and dust mud walls often with air cavities which increase the removal capacity such as Epirpremmum aureum (Scindapsus), sansevieria hyacinthaoides, ficus banghalensis (rubber tree), hedera helix (ivy) and viburnum odoratissimum (coral tree)



WIND POWERED TRIBOELECTRIC NANOGENERATES (R-TENG)

R-TENG for precipitation of PM from air inflow directions and are brought to livable zones through through electrostatic methods. To harvest the wind energy, the R-TENG will connected to wind cup structure located within the wind tower.



HOT PRESSED METAL-ORGANIC FRAMEWORK FILTERS

Metal-Organic Frameworks to remove PM from air inflow given their property to polarise PM particles and increase their electrostatic interaction with MOF.



ANELS

Unlike traditional solar panels are bulky and fragile, project uses thin, flexible, and affordable solar panel. These are attached to almost all sun-hit surfaces, whether it be vertical, horizontal or curved, to capture maximum solar energy.

