Sustainability:

The ambient environment of the UAE creates extremes within which comfort conditioning needs to be made, and this will require a large amount of energy. In the current age where fossil fuel stocks are quickly disappearing, it is imperative that being energy lean, sustainable and generating onsite energy is a first-consideration for the "Sand Dune Clouds".

1- Embedded energy required to • construct the work:

TOTAL: 354 210 170 MJ = 98 391 MWh

2- Estimated amount of clean • energy that can be produced by the work:

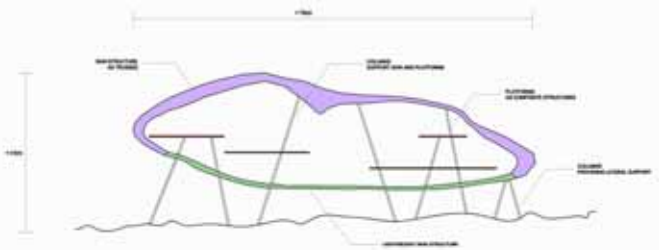
Electrical energy produced by CPV mesh embodied in optic fiber fabric:
184 000m² x 95 kWh/m² x 1.4(**) = 24.472 MWh

600 W wind turbines:
12 000 pieces x 3000kWh/piece = 36.000 MWh

Piezoelectric platforms (on 30% of area of walking area):
1/3 of 77 000m² x 20W/h x 3285h/year = 1.686 MWh

TOTAL: 62.158 MWh

Structural scheme



Structural Concept:

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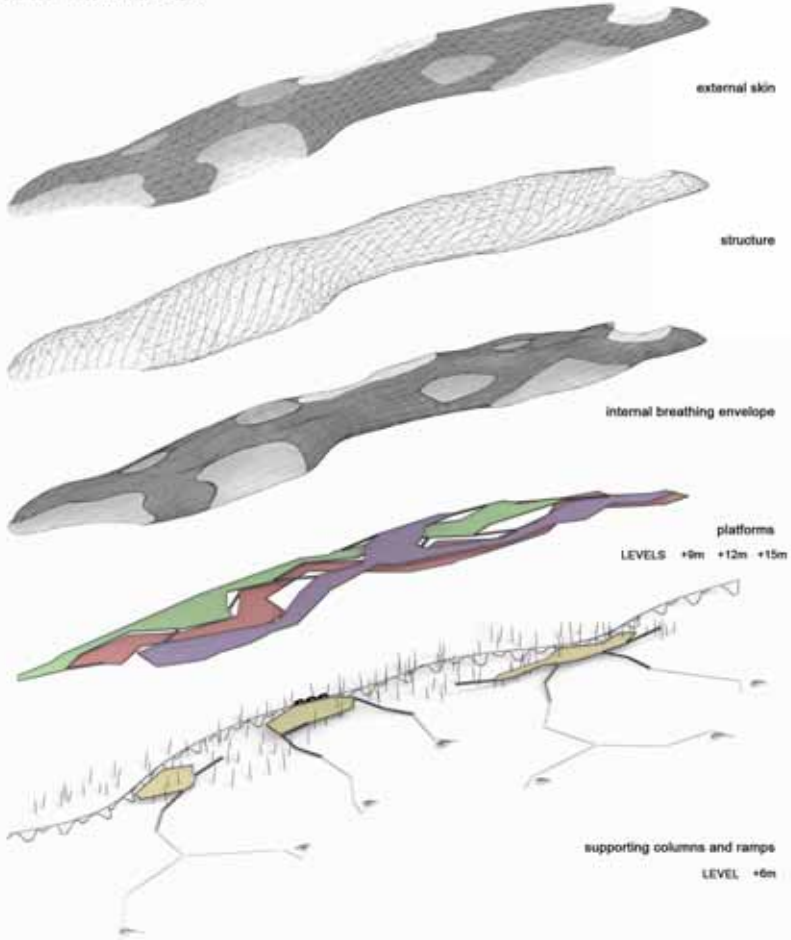
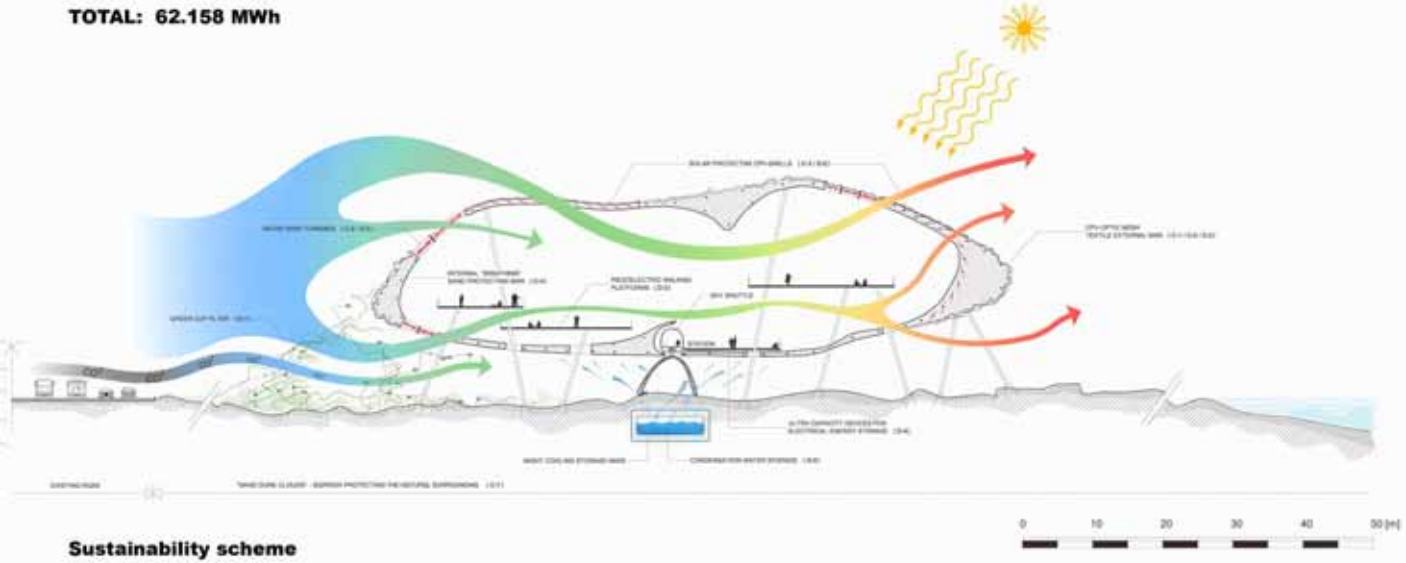
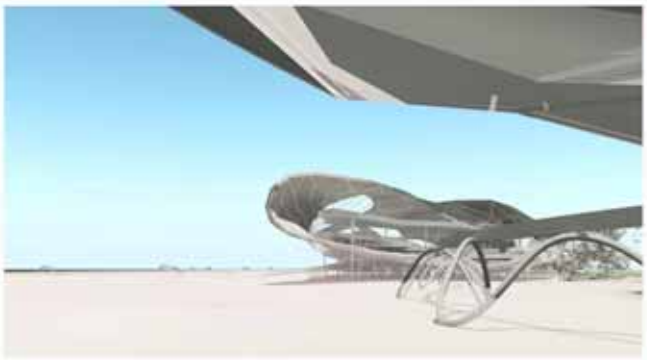
- Structural shell
- Span of skin varies strongly
- Skin material to be timber in low stressed areas and steel in highly stresses areas
- Panels between main structure of the skin to be lightweight materials
- Columns are used to reduce the spans of the structure where necessary
- The columns will support the roof as well as the platform and the base of the skin
- It is suggested to reduce the max. span of the skin to app. 20[m] using columns as supports
- Lateral stability is provided by the skin itself (triangulated elements) and inclined columns providing lateral support
- Platforms to be composite structures
- The geometry of the skin should be optimised to reduce points of high stresses
- Skin structure can be realised as trusses in areas with large depth and as plated girder in areas with reduced depth

Splited components





Sustainability scheme



Master plan
scale 1:2500

eco observation stands

bridged footpath network

sky shuttle line

sky shuttle line

sun protecting green belt

CO^2 green filter

road

segment A

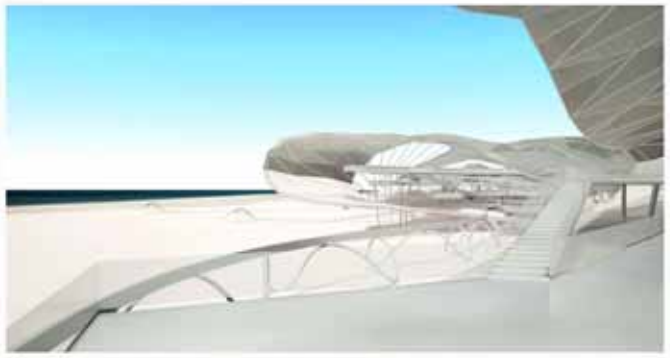
segment B

segment C

Context:

Placing vegetation between the road and "Clouds" will allow for oxygenation of the road side air before prevailing winds carry the air through the installation. This will provide a fresh feeling to the space and can provide a natural air filter, thereby extending the lifetime of the internal fabric filters. Irrigation of this green filter will be via wind- and PV-driven pumps.

The "Sand Dune Clouds" itself creates a specific barrier which aims to protect the natural surroundings from a negative impact of the existing road along the proposed competition site and constitute a symbol of a respectful attitude of UAE citizens towards the Nature.



SAND DUNE CLOUDS

الكثبان الرملية الغيوم

Concept:

The aim of proposed structure is to harmonize existing landscape formed by existing on site sand dunes and vegetation perturbed by presence of the road running along.

The depth of the sky in Abu Dhabi almost blue without any cloud during nearly all the year could be enhanced by the created cloud-like forms, producing for us electrical energy instead of the rain water. This energy based on natural resources (sun and wind) is as necessary for our every day life as the rain water is.

The natural forms of proposed “Sand Dune Clouds” shaped as a cocoon by several levels of optic fiber web fabric composing external skin should appear in the existing landscape as an ephemeral structure softening the hard and artificial image of the existing road.

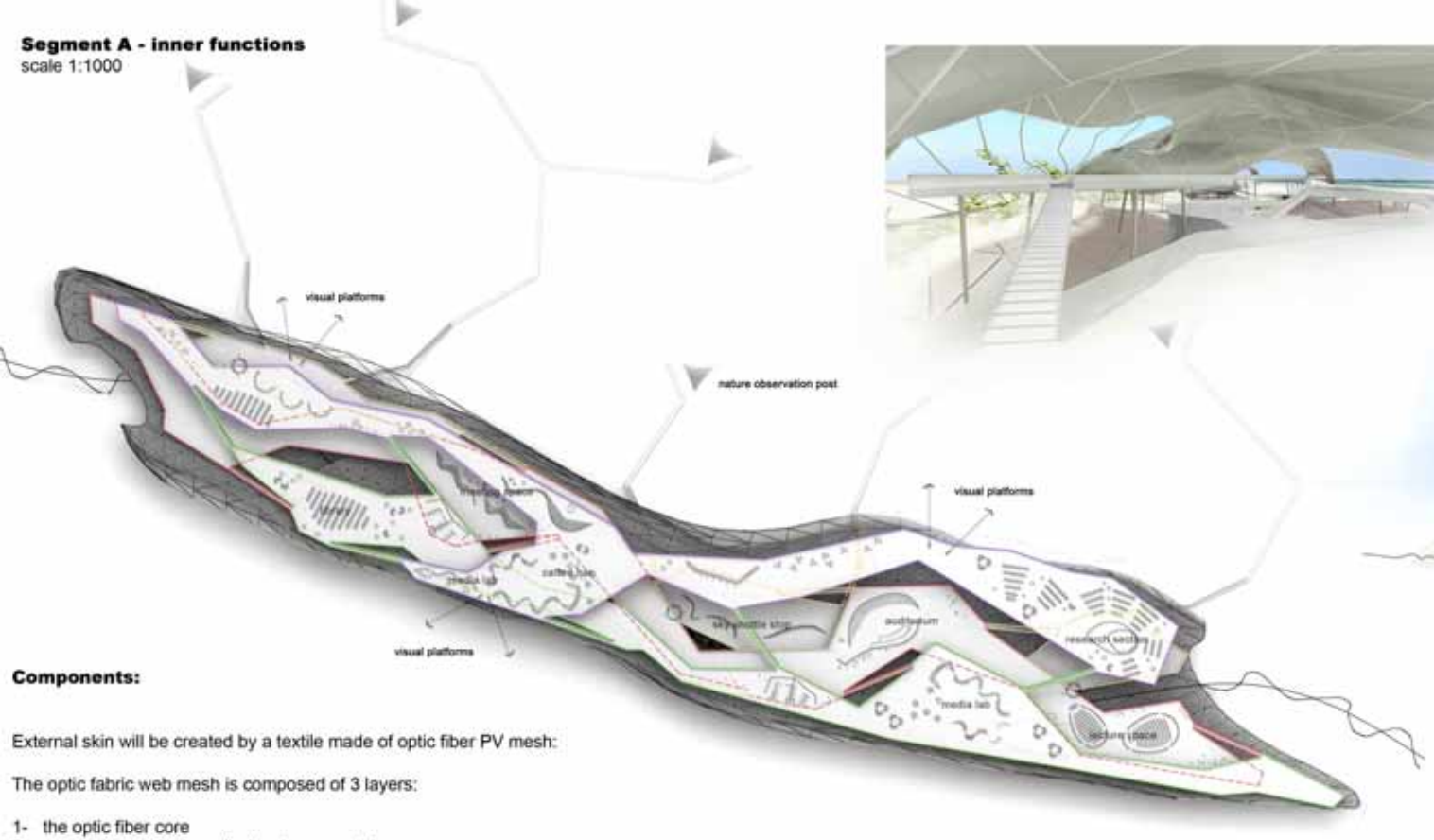
Purposely we do not extend our composition to the water limits to respect the natural existing condition of the shoreline and aquatic ecosystems but we offer an opportunity of observation of this unique natural area from the integrated to the Sand Dune Clouds volumes and from the extended bridged timber footpath network.







Segment A - inner functions
scale 1:1000



Functions:

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1- Eco-Lab and Nature Observatory for UAE Students enhancing their sensibility to the environmental ph
enomena and the importance of the creativity in Arts and Science.
2- Observation platforms for researchers and visitors
3- Conference rooms and auditoria for both, students and visitors
4- Cafeteria and meditation spaces
5- Shuttle-eco-monorail stations connected to the urban area communication web.

typical cross section

Components:

External skin will be created by a textile made of optic fiber PV mesh:

The optic fabric web mesh is composed of 3 layers:

1- the optic fiber core
2- covered by a single walled carbon nanotubes,
3- Protected by the external layer of optic fiber material.

On the dominant winds north-western side, the external elevation fabric will be equipped with the micro wind turbine-dynamos for to enhance the electric power production and bring the necessary refreshing natural ventilation.

The south-eastern side of the external skin composed partially by the solar protecting PV shells and north-western side, will be equipped with the memory metal made springs, which will regulate their open-closed position, depending on external temperature. .
This device will regulate the natural cooling and ventilation system without the need of external energy. (See scheme).
These shells will be made of self cleaning translucent material.

Internal breathing textile envelop will serve as a sand protecting skin, forming inner spaces.

Communication:

1- Visual communication:
1.1- from the road
1.2- from Yas and Tidal Channel Islands
1.3- from the « Sand Dune Clouds » platforms

2- Physical communication:

2.1- bridged paths system between the tidal dunes edge and « Sand Dune Clouds ».
2.2- Sky Shuttle between « Sand Dune Clouds », Yas Marina and Abu Dhabi green areas.

Conclusion:

The encounter of Sun, Sand and Water produce a dynamic relationship, in which our land art participate adding a complementary value creating a light and refreshing ambience in a natural way