**Goya**

*the aesthetics of renewable dreams.*

[Goya is an untranslatable Urdu word that refers to a momentary suspension of disbelief that occurs when fantasy is so realistic that it temporarily becomes reality. It is usually associated with good, powerful storytelling.]

The life.

Goya is a proposal of a performative art in public space, and a provocation to the aesthetics and philosophy around renewable energy.

It unfolds on the vast area of the site like a dune park populated with outlandish sun-creatures. These kinetic creatures guard pockets of human relief. Human life comfortably happens “underneath”, in protected caves of comfort. But giving life in the belly of the project is also a gesture of modesty, letting the productive system be the protagonist, flaunting its movements and kinetic skins in a seductive ritual. It has breath, a rhythm synced in with the natural forces, it is alive, breathing in radiation and breathing out energy. It lives in a colony that works together, but rather than a life form, it is a form of post-humanism life. Goya is a statement of human capabilities. Innovation has always pursued inspiration in nature, constantly trying to mimic and disappear more and more into the natural landscapes, seamlessly integrated into existing life.

Goya is about re-defining that life, making the artificial natural, man-made systems becoming alive, becoming relevant organisms, rather than prosthetics to human-life. By this recognition, of the artificial as a common part of the Earth, it becomes a connected and integral part of the existing systems, it becomes a species. It has a place, a purpose, an identity and a responsibility. Thus, man-made materials and ideas are naturalised. These new species of the Anthropocene, may be born out of necessity, but also out of man’s capability of creation of beauty and re-interpretation of what is the new natural.

The site.

24500 square meters become public space and a public refuge. The outside skin consists of natural sand dunes held together by locally adapted vegetation. A few pathways and high points are highlighted and designed, as well as entry and exit points and resting areas, but the vast majority of of the plot is left for the wind to design and optimise. High points are devised in order to give views to the nearby Al Raha Creek. On the site live energy productive solar systems that also serve to provide local shade on the upper layer, and local light in the manufactured “caves”. More than a park, the proposal is a conversation between inter-species materiality. Man is invited to contemplate these productive giants and rejoice under their protection.

The cave.

The cave is a micro-habitat of non-native climate. Completely shielded by solar radiation, it is a pocket of biodiversity, allowing moss to grow and maintain a comfortably low temperature with pockets of transformed natural sunlight provided by the fibre optic light cables. Moss here also lives to serve, become another productive and connected system. The caves are a peak into the organism of this new species, a gift of insight into these sun-creatures. But more-so, the caves showcase the capabilities of man towards creation and healing. It is a place to contemplate the possibilities of climate change, a window into one optimistic future for oncoming generations and hopefully an inspiration of how maybe the new sources of energy is within human-intervention.

The caves act as a metaphorical teleportation devices. Both through space, from one climate to another, and time, from one present to a possible future.

The systems (energy statement).

The proposal is a productive system made by combining photovoltaic panels, hydrogen production, fuel cells and biological fuel cells.

Goya is a simple creature, that unlike the human (that has 12 main systems working together), it is merely comprised of 4: a circulatory system, a skeletal system, an integumentary system and an immune system.

Part of the circulatory system are solar sensitive elements, like the solar balloons and transparent solar panels.

Solar balloon made by photovoltaic fabric filled with hydrogen float high above. During the day they harvest solar energy and convert it to photovoltaic current which is stored in batteries. The batteries are protected underneath the outside layer, seamlessly integrated into the landscape. A small part of the generated current goes to active fuel cells that decompose water into hydrogen by electrolysis. The caves are fitted with lagoons, which are essential for both maintaining the climate and humidity of the cave, but also the serve as tanks of water for the fuel cells. This produced hydrogen keeps the solar balloons afloat. During the night the process reverses, The fuel cell recovers its hydrogen and as it reacts with oxygen, it starts producing water and electric current.

The plot is fitted with 6.000 square meters of solar balloons, estimated to produce 231.000 kWatts.h per year.

The translucent solar panels cover larger areas of the plot, and beyond providing a significant amount of energy production, it acts as a light shader for both humans and the tops of the caves, where the batteries are stored. It is a fail-proof system of energy production that acts as a back-up and discharges directly in the local power grid. The 17.500 square meters of transparent solar cells are estimated to produce a 343.600 kWatts.h per year.

The skeletal system the structure of it all that becomes gradually lighter as closer to the surface as it gets. Starting from the main steel structure that shaped the dunes and creates the caves, it then converts into groups of thin steel pillars that hold together a network of cables onto which the transparent solar panels are placed. These pillars also double down as connectors for the circulatory system, providing the route for the cables to the batteries. Lastly, the highest elements are the fibre optic light cables that lightly hold into position the Solar balloons. These cables provide extra light in the caves during daytime.

The integumentary system is the skin of Goya, both outer, the sand-dunes, and inner, the moss from the caves. They are the creatures largest organ, and work together as a protective and a productive layer. The moss covers a surface of approximately 3.000 square meters and has the lowest production of them all, an estimated 4.200 kWatts.h per year, but provides enough to light the caves by night and power up the immune system.

The immune system is comprised of the sensors, checking temperature, radiation acidity, production, air quality and more. They are very visible inside the caves, floating in the lagoons, sticking out of the moss, dutifully collecting data, but less visible in the outer-skin, seamlessly integrated in the other systems.

Environmental impact.

Goya aims to redefine the natural context and uses in large proportions locally sourced materials in order to reduce the negative footprint that transportation leaves on the environment. More-so, Goya proposes the creation of a new micro-habitat in order to encourage biodiversity, in both fauna and flora, and add to the local richness. The entire site is left open and purposed as a public park, where all kinds of life can thrive.

Energy production calculations:

**Yearly irradiation**

70 kWh/m2

**Energy production per transparent cell cloud**

area 1.750 m2

efficiency 28%

10 clouds

**energy coming from clouds.** 10 x 0.28 x 1.750 x 70 = 343.600 kWatts.h

**Energy production per balloon group**

area 600 m2

efficiency 55%

10 balloon groups

**energy coming from balloons.** 10 x 0.55 x 600 x 70 = 231.000 kWatts.h

**Energy production per moss**

1.000 m2 per cave

3 caves

1.4 Watts.h / m2.year

**energy coming from moss.** 3 x 1.000 x 1.4 = 4.200 kWatts.h

**total production 578.800 kWatts.h / year**

**installed capacity 330 kW**

**Cost estimation**

Terrain movements

950.000 usd

Cave structures

900.000 usd

Paths and bridges

500.000 usd

Moss and vegetation treatment

400.000 usd

Pools

250.000 usd

PV Balloons

1.000.000 usd

PV Clouds

1.200.000 usd

Inverters and batteries

450.000 usd

Data network and sensoring

650.000 usd

**total 6.300.000 usd**