BOUNCE

LAGI 2019

B**O**UNCE

A celebration of art – people – expression – well being - climate awareness.

Bounce aims to meet the energetic needs of Masdar through an inteligent design where the three key pillars of sustainability meet each other, economic, environmental and social. An alluring design is achieved through a purposeful arragement of elements.

The design intent is to create a welcoming space for all. The hard and soft landscaping creates spaces for recreation and social interaction.

Our desire is to create a shaded area form meandering through the park with a unique pattern of shadows and colours inspired by the Arabic floral design and Islamic geometric decorative art.

Bounce, by its name, will gently move up and down from its flexible hanging system. Bounce will benefit from the sun, the wind force and surrounding vibrations becoming alive and vibrant space.

At night the LED lighting within the semi-spheres will maximise the parks function from day and into late evening.

All materials proposed will be recyclable and light in construction. Bounce could be recreated, extended, reduced, designed in other forms or colours in the future. We believe that flexibility should be an important achievement to adapt to the constant transformation of the city and social need.

THE DESIGN INTENT

- Minimal use of existing land
- Connection with the city and people
- Flexibility
- Adequate proportion respect the context and the human scale
- Fast leading time of construction and low maintenance design
- Integrated with the local culture
- Clean energy production
- Return of capital investment over time

We believe that the modular elements proposed will be the best design solution to make a creative, renewable and flexible design for the benefit of the people and the economy with energy production for local developments and the park.

MATERIAL USED AND STRUCTURE

The semi-spheres will be constructed from ETFE, (ethylene-tetrafluoroethylene copolymer). The material is self-cleaning (due to its non-stick surface) low weight and recyclable. It is designed to have high corrosion resistance and strength over a wide temperature range.

Tension metal cables will support the semi-spheres and the ceramic piezoelectric disks.

Inside each semi-sphere, fine metal cables will support the OPV. The organic solar cells have printed esagonal OPV modules are laminated between clear plastic sheets and attached to a delicate steel net, which acts as both structural support and electrical conductor for the energy generated.

Bounce is supported by columns, below each of the supports there is an energy storage battery.

ENERGY PRODUCTION

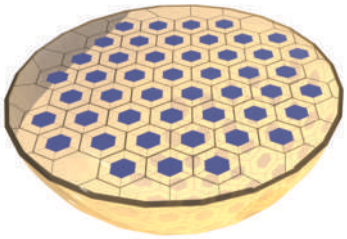
OPV Organic Photovoltaic Cells

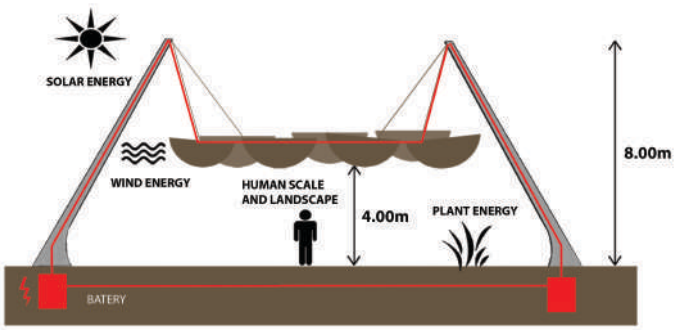
The potential of solar radiation in UAE is significant, with an average annual solar hours of 3568h (i.e., 9.7 h/day), which corresponds to an average annual solar radiation of approximately 2015 kWh/m^2 (i.e., 5.5 kWh/m^2 per day).

This system has an expected efficiency rate of 15%.

Our design incorporates 2000 m2 of OPV with an average electricity generation of 15% of annual solar radiation of approximately 2015 kWh/m2.

Bounce will provide an annual energy gain of circa 604,500 kWh year or 1656 KWh day. (circa 2230 KWp).





Piezoelectricity

Our design will allow the light weight ceramic disks to move with wind action and vibration. The disks will react with a system connected to the semi-spheres and energy generated will trail along the same cables used to transfer heat energy to the battery under ground.

The unit numbers are 3000 disks and we would anticipate that they could potentially generate 5 watts per sq.m. Total energy produced with Bounce with an area of 300 sq.m will be 13140 kWh year or 36 KWh day. (circa 48KWp)

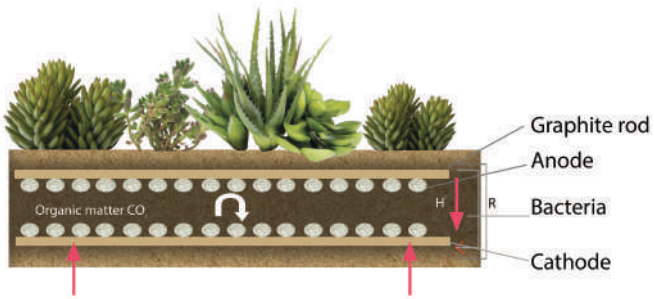
PMFC Plant Microbial Fuels Cells

A plant microbial fuel cell (PMFC) is a novel and sustainable bioelectrochemical technology that takes advantage of the organic compounds released through the plant roots (exudates) to produce power via electrochemically active bacteria. This technology has been implemented in flooded ecosystem; however, *Sedum* species (succulent plants) were tested for their ability to generate energy under non-saturated conditions.

We would anticipate that energy from our plant source within the landscape park environment could generate enough power to light up the art-work system in the evening time.

3.2 W per hour is potential energy generated. Our Plant area within the landscape design is 15000 m2.

It is expected to generate circa 420480 kWh per year or 1152 KWh per day. (circa 1356KWp)



ENVIRONMENTAL IMPACT

The main strategy addressed on the project is to leave as much free land mass as possible for the public use.

Bounce creates an animated and safe space without creating visual, lighting or sound pollution for the residents. Our design has a nominal height of circa 4m within landscape areas and max height of 8m above the road that crosses the site. The habitants would not have any view occlusion but vice versa they will benefit from the translucent colourful and not invasive artwork.

Using LED lighting with the various semi-spheres at night will attract evening use and will also create a pleasant visual appearance for the adjoining buildings. The LED lighting will shine downwards and eliminate light pollution above the park.

Bounce and the surrounded landscape design have visual interest and functionality for residence and tourists. A series of paths, plazas, alternation of soft and hard landscape will connect every side of the park to the city and the surrounding buildings.

The materials used will be fully recyclable at end of life cycle.

Bounce will be recognised as new and attractive landmark for the city of Masdar.

COST BENEFIT

Our proposal is a lightweight structure and simple in design.

We estimate the cost of construction of the main structure, artwork and technologies to be €600,000.00 (2476025.69 AED).

We also estimate that the combined energy sources will generate circa €20,000.00 (82534.19AED) per annum in electricity. (based on an average unit electric costs in the region.)

This would equate to a 30 year payback for the design artwork.

The hard landscaping costs which form the surface finish will be part of the overall design but costs are not considered. The cost analysis is based on the cost of producing the energy generating technologies and the artwork and its long term cost neutral benefit.

The local people and visitors will gain benefit from the park environment and Bounce will add to the sensory nature of the park, a unique character, without additional cost in the longer term.

Bounce is the fusion of culture, art, economy and sustainability. This is our vision that we would like to transmit to the next generation.

Bounce is a celebration of art, people, expression, well being and climate awareness.