**MASDAR “SOLAR HELIX”**

***the Helix Shape illustrates continuous rotation, which symbolizes the conservation law of energy which is transformed or transferred from one form to another.***

Masdar is an independent city with plenty of facilities. SOLAR HELIX inspired by the main goal of Masdar City’s vision and mission; to be the energy source of a sustainable life. Its ‘S’ form is derived from the adaptation of Masdar City’s Logo which converge to a center point, and developing to transfer the energy to its precincts.

The ‘S’ shape come from adaptation from Masdar city Logo, which is simplified and fit the site. Then lift the shape to make a room below and a bridge above to connect the the west and east area. The shape of the canopy is also a place for solar panels because of its high position adjusting the surrounding buildings. The S shape makes a helix shape canopy which twisting and facing the center of the reflector, while there is a canopy of small wind turbines in the plaza area.

The ‘S’ form also adapts to the existing landscape concept based on Masdar City’s masterplan. These surrounding landscape are planned to function as Open Green Area. We adapt that form to its landscape so that the layout form created will be in a harmony line

as an integrated district.

SOLAR HELIX hopefully can be Masdar City’s icon as an independent city. Also acts as a landmark that functioning as a public space and city’s park and garden besides its exceptional function as an energy generator. SOLAR HELIX will be the heartbeat of energy icon in Masdar City where the citizens can gather and have a walk there. So this object will not only acts as an electrical energy generator but also acts as human energy connector. By that, we dream that these designed area will be a more lively place in the city.

**BUILDING CONCEPT**

the existence of a site in the middle of the city as a public space makes this site a meeting point of busy activities around it, an oasis of relaxation. so that in the future it can be a place for various public activities.

The building that lays beneath the solar panel installation and pedestrian pathwalk will have rooms that accomodate public activities such as exhibition, retailing, food courts, praying area, toilets and bicycle parking area.

**CIRCULATION CONCEPT**

Circulation inside the site prioritizes pedestrians and cyclists, so that they can enjoy open spaces safely and comfortably. There is a ramp that has access to the top of the tunnel and as a bridge connecting two sides. Circulation paths in the area are differentiated based on the user. There are 4 main different circulation paths; for people (pedestrian), for cars, for bicycle, and for transportation pod (self-driving car).

**MATERIAL CONCEPT**

The materials that applied in this object are adapted to the climate condition of Masdar City. As Masdar is located in the desert area and categorized as typically middle eastern city climate; it can be very hot during the day and very cold during the night. There are extreme difference of temperature that commonly happen daily.

**RENEWABLE ENERGY CONCEPT**

“SOLAR HELIX” uses three source renewabele energy, solar energy, wind energy, and water harvesting. The system of collect the solar energy is using reflector tower to collect sunlight from all directions to the solar panel. All along day the solar panel will work to generate the soalr energy into electricity. “S” shape extend from side to side to maximalizing the area of photovoltaic panel and collect the solar energy from all direction all the time. Solar Helix has 25 rod of solar panel transverse from side to side. Each rod of solar panel has 10m wide and 19 m length. The surface area of solar panel is 190 m2. The average solar irradiance in Masdar in a year is 250 W/m2. It will produce approximately 8850 MWh. Solar Helix has 25 rod of solar panel transverse from side to side. Each rod of solar panel has 10m wide and 19 m length. The surface area of solar panel is 190 m². The average solar irradiance in Masdar in a year is 250 W/m2. A 5050 m² photovoltaic solar of monocrystalline silicon glass will produce 2025kWh daily and almost 1000MWh annually.

In addition, Masdar city have wind velocity which can be maximalized used for turbine energy. Shelter as a shade and also as a wind turbine system. The shelter consist of thousand wind turbine arranged spread into the surface of the shelter. The wind turbine form from helix plate arranged in pipe that connect to generator. When the wind blow the helix plate will rotate the generator and produce the electric energy. The maximum wind velocity in Masdar is 60 km/h, the power of each energy generating unit is 3.0kw/h. We set an energy conversion rate of 80% and each metal blade can generate 2.4kw/h of electricity. With 3,500 helix plate this installation will produce approximately 840kWh daily, and almost 350MWh annually.

The last energy is water harvesting, when rain is falling the “S” shape of the canopy let the rainwater flow to water tank, which collect water from rainwater. The water is collected in water tank in garden. Then the water is used for gardening the landscape in landart area.

**ENVIRONMENTAL IMPACT STATEMENT**

This generator does not produce emmissions greenhouse and waste product, because the material use “green concrete”. “Green concrete” is eco concrete which must be used in Dubai and its surrounding. The wind turbine’s helix plate is made from recycled metal and designed for clear deconstruction. The height and shape of installation is scalable for its surrounding building. Therefore the installation has minimum impact on environment ecosystem, which is full of desert. Other side the installation has open space which can balance the building and green space.

**COST OF INSTALLATION**

* Solar panel

The estimation of solar panel panel installation is $10/m². Total area of solar panel is 5050 m², therefore the installing of solar panel requires $50,500. Beside that for solar panel systems requires at least $15/MW. The solar panel system produces 1000MWh with an efficiency of 0.18%, so solar panel systems require around $2700 per year.

* Wind Turbine

The shelter of wind turbine need cost to generate electricity around $2.6 per watt. Therefore wind turbine system require cost around $2685.