**SPARK**

* *“Spark”: a canopy of sensors that move according to the sun – mirroring its rays, reflecting and concentrating them in a sinuous S-line streaking across the sky.*
* *A digitally controlled artwork that generates solar power, creating outdoor comfort in the new walkway of the park of MASDAR.*

*A modern mashrabiya that combines technological innovation with the traditions and culture of the U.A.E.*

* *A flux of clean energy contributing to climate change adaptation.*

*An innovative installation projected into the future of Masdar, the most sustainable city in the world.*

*An innovative artwork that aims to represent and make visible the purity of the Abu Dhabi sunlight.*

* *A luminous sinusoidal "spark" in the sky, lighting up in the night and imposing itself as the new symbol of Masdar.*

*A sign in the sky – the form of the light wave in an oscillation-period.*

* *The ideal half of a specular infinite: a symbol of hope for the future of mankind.*
* **S-PARK**
* The project describes an S-shaped park representing both the movement of visitors in the park and the flow of the sunlight energy conveyed to the collector. It represents an S-curve to ideally continue with its luminous line the sinusoidal movement of the paths of the adjacent park.
* The reflective canopy overlays the park and forms an open pergola. Its geometry recalls the dynamic pattern of the traditional sunscreen of arabian architecture and acts as a filter to protect the visitors from the sun. The mirrors, varying their inclination, ensure shade and protection from solar radiation. The rotation of the reflectors create a constantly mutating atmosphere with a vibrant play of lights and shadows.
* The covered pedestrian walkway offers a new place of socialization and recreation under which it is possible to walk, relax or organize events in a comfortable climate. A new comfortable outdoor space in wich tradition and innovation convey in complete respect of the local anthropological (i.e. cultural) habits, to give life to a singularly suggestive *S-PARK*.

**S for Source**

* Masdar means "source" in Arabic.
* The park represents itself a new energy source for the future local generations, potentially powering nearly 360 homes in Masdar.

**S for Sensor**

* The specular canopy is a solar responsive sensor composed of linear mirrors digitally controlled to direct the sunlight in every moment of the day into the collector. All the mirrors are equipped with a single-axis tracking system to ensure the sunlight to be always concentrated on the fixed receiver situated in the common focal point of the reflectors. They constantly and gradually rotate around their main axis changing their inclination in relation to the position of the sun, forming a parametric filter sensitive, like a sunflower, to the rays of the sun.

**S for Specular**

* The project exploits the Linear Fresnel Reflector technology. The canopy is a solar field composed by flat linear mirrors that reflect the sun rays, conveying them into the superior line of the absorber of solar power subsequently to be converted into electricity for the community. An artwork that “reflects” a great sensitivity both to the environment and to the people living in it.

**S for Sun**

* The installation is a metaphorical representation of the sun.
* It is composed by the upper "spark", an undulating bright flow composed of solar rays that represents the different wavelengths of the solar light, and by the specular canopy below, with a golden bright sun-like appearence.

S.park exploits exclusively sunlight – the source of the life on our planet and source of the renewable energy per excellence.

* **S for Structure**
* The art installation has a steel structure composed by columns supporting a shading canopy with mirrored lines with a triangular section. The columns are absent in the central part and at the ends due to the presence of roads or pedestrian zones.
* The S-curve has a modular structure composed of 66 equal sectors.
* The power block is hidden in an underground area. It includes the equipment and the support facilities necessary to convert the solar energy captured by the receiver into electricity, further delivering them to the utility grid.
* The canopy has a median line of length equal to m 330, a width equal to m 28, an area of 9.240 m2. It consists of 66 modules with a width of 5 m. Each of the module is composed of 34 parallel primary mirror lines with a length of 5 m. and a width of 0.55 m., for a total of 2.244 mirrors. The mirror stripes above the walkway have a minimum height of 7.2 m and a maximum height of 10,8 m, the space between their axes having a width of 0,82 m. The receiver has a lenght of 330 m; its height above the primary mirrors is equal to 15 m.
* The annual heat production for the whole system is approximately calculated to be 1.800 MWh/y.
* **S for Simplicity**
* The constructive simplicity of the structure leads to economic advantages, due to the easy assembly process and low operation and maintenance costs. The embodied energy required to construct the work is maximally low. The simplicity of the structure in relation to the energy it produces each year leads to a fast return on capital investment.
* The artwork approximately do not exceed $ 20 per watt of installed capacity, in relation to the construction simplicity and the low investment costs needed to use a proven technology.
* The Linear Fresnel Reflector plant has a digitally controlled structure: depending on the position of the sun all the mirrors that compose it rotate on their axis jointly, changing orientation and reflecting the solar rays towards the collector. The mirrors of every sector have different angular positions, but they move at the same angular velocity. Being the changes always the same, the mirrors can be connected with a simple mechanical coupling and driven by one single motor and one transmission gear, simplifying their tracking movements.
* The orientation of the mirrors axis gradually changes from north-south to east-west, being possible to orient the Fresnel solar field in whatever direction. The central part is east-west oriented, while the areas at the opposite ends are north-south oriented and have different features: north-south orientation has a higher annual energy yield and a more equilibrate energy yield over the day, utilizing the solar radiation after sunrise and before sunset, while east-west orientation has highest power peaks and a more equilibrate energy yield over the year.

**S for Sustainability**

* SPARK is a sustainable art installation for Masdar, the global capital of sustainability projected into the era of a post-carbon future: a catalyst for renewable energy development to reach the goals for decarbonization in the 21st century.

Environmental Impact assessment:

* The project defines its technical specificity in explicit enviromental responsible awarness.

It aims not only to preserve, but also to improve the physical and cultural resources of the site in all its costruction and operation phases.

* It has minimum impact on natural habitat, ecology, land and air quality, water resources, existing flora and fauna. The permeable surface of the cover allows light, wind and rain to gently pass through.

SPARK does not impact on community health and safety, producing energy at a safe distance from people concentration. The space below the canopy has a high land use efficiency, offering the possibility to make a multiple use of the area. The power block hidden in the underground area does not impact on noise levels.

* SPARK does not emit substances that might have impact on the environment, on local and regional ecosystems.
* The shaded walkway creates a protected outdoor climate comfort space.
* The mirrors have small wind loads, with a good structural stability and optical precision.
* The project is constructible, scalable and uses proven technology.
* **S for Serendipity**
* *A scratch in the sand, a brush stroke in the sky. While writing the world: you look for clean energy, you find nature and art.*