**Sun Ray**

*"Sun Ray" (S.R.):*

*a new symbol of renewable energy for the zero-energy target of the State of Victoria, a cultural attractor for Melbourne.*

*A celebration of the local environmental, both historical and geographical, resources.*

*The challenge: to reduce the dependence on fossil fuels with their painful impact on climate.*

*The solution: a source of clean energy, exployting the natural light of the sun.*

*An investigation of light as physical and symbolic source of illumination of our life.*

*An artwork, in its essence:*

*a luminous sign making solar energy visible – one single Ray composed by the infinite rays of our Sun.*

*Almost a ray of sunlight radiating from a gap in the clouds:*

*the dangerous clouds of our irresponsible contemporaneity?*

*A "specular sun" mirroring the Sun, living symbol of the passage of time.*

*A "Light-house" in the sky, showing the way to the future of energy,*

*i.e. of human life in our planet.*

**Brief description of the project**

The S.R. clean power project exploits the Linear Fresnel Reflector technology.

A round solar field (almost a "specular sun") composed by parallel flat mirrors reflects the sun rays conveying them into the superior line of the S.R. absorber of solar power – the fixed cardinal linear receiver situated in the common focal point of the reflectors.

The power block, hidden in the lower area of the master plan, 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 solar field is a dynamic canopy composed by linear mirror rows with different angular positions being constantly and gradually modified in relation to the position of the sun. Each mirror line is equipped with a single-axis tracking system to ensure the sunlight to be always concentrated on the fixed receiver.

The floating canopy overlays the park projected by the co-design process,maintaining its topography and landscape and forming an open pergola which acts as a filter for light effects, air and atmospheric phenomena. The changeable light under the canopy creates a constantly mutating space featured by the rhythm of the mirrors varying their inclination: their seductive play of light and shadows creates a welcoming public space bathed by optical vibrations and integrated into the surrounding environment and landscape.

Its lighty and airy pergola, emphasizing the views from the Esplanade towards the St Kilda Beach and the Port Phillip Bay horizon, realizes the wish to give the city of Melbourne a new viewpoint to enjoy the spectacle of the sea.

The S.R. complex in its totality thereby defines itself as a multi-purpouse place for socialization that can house different activities, allowing the ground to be left clear for outdoor life like walking, playing, meeting or for family picnics**.**

It can also become an outdoor theatre or an open auditorium for concerts, screenings and festivals to be staged on the lawn.

In the night-time, its peremptory luminous line might impose itself in the dark, as new artistic and ideologic symbol of the place.

**Technical assessments**

The L.F.R. plant has a steel structure composed by columns supporting a shading canopy with mirrored lines with a triangular section.

* The "specular sun" of the canopy has a diameter of 85 m, an aperture area of 5.675 m2 and consists of 50 parallel primary mirror lines, with a width of 0,8 m each. The mirror stripes above the lawn have a height of 10 m and the space between their axes has a width of 1,70 m. The receiver has a lenght of 85 m and its height above the primary mirrors is equal to 25 m. Its solar field is possibly oriented north-south, thus permitting more equilibrate day energy and bigger annual energy yields. The annual heat production for the whole system is approximately calculated to be 1.100 MWh/y.
* (Note: the round shape of the plant permits different solar field orientations).

**Environmental Impact assessment**

S.R. defines its technical specificity in explicit enviromental responsible awarness:

- it does not impact on climate and natural habitat, ecology, land quality, community health and public utility/intrusion, safety, noise levels, water resources, air quality, existing flora and fauna: these are some of the unavoidable components to be considered while projecting a structure aiming not only to preserve, but to improve the physical and cultural resources of the site, both during the construction and operation phases of the S.R. project;

- it does not emit substances that might have impact on the environment, on local and regional ecosystems;

- the semi-shaded space below the canopy has a high land use efficiency, offering the possibility to make a multiple use of the area;

- the alignment of the mirror stripes in one plane has small wind loads, with a good structural stability and optical precision;

- S.R. is scalable and uses proven technology.

The constructive simplicity of the structure leads to economic advantages, to an easy assembly process, to 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.