Masdar's Eyes

"The part is the same as the whole. All points on the straight line correspond to arbitrary points on the circumference except the north pole N on a one-to-one basis. That is, a straight line extending infinitely left and right is like a figure minus a point on a circumference that is too short to compare with this. This characteristic is that the sunlight emitted from a limited surface corresponds to an infinite space, and on the contrary, a very small sphere can hold the world."

The site for the Land Art Generator initiative (LAGI) is located on the green axis (North Green Finger) across Masdar City to northwest-southeast, separated by two by road.
The essence of design is the two spheres leaning on each other across the road. Mathematically, a sphere is Platonic solid that can have the largest surface area while occupying the minimum ground. It only requires one small point for contact with the ground, so it needs only the smallest ground to support the largest surface area.
Each sphere consists of a lens, a shell, a nucleus (reflector), and a ramp. The lens is a passage that accommodates sunlight, and its size forms an angle of 45 ° with the center of the sphere considering the average sunshine hours (4 hours). The outer and inner surfaces of the shell play a different role. The mirrored outer surface captures the entire Masdar City as a monument to enhance the role of Land Art. The inner surface covered by the flexible solar cell captures the sunlight that the mirrored nucleus reflects in all directions to enhance the role of the Generator. The reflector suspended from the cable moves to the optimal position by adjusting the cable length according to the altitude of the sun. The ramp across the two spheres provides visitors with the opportunity to enjoy the feast of light inside the sphere, visually and physically linking the sites disconnected by the road.
As a result, Masdar's Eyes for LAGI maximizes the area of solar cell and green space, while revealing the hommage of the sun, the source of energy.

Technical Assessment
The photovoltaic system using the inner surface of the sphere is similar to the structure of the eye. As the light passing through the lens forms an image on the retina, light passing through the lens of the sphere is reflected on a mirrored nucleus in the center to reach a flexible solar cell on the inner surface. Using a spherical reflector to mediate sunlight and solar cell prevents exposure of the solar cell and has the advantage that the area of the solar cell exponentially increases as the size of the sphere increases. The inner surface area (28.420㎡) of Masdar's Eyes is 1.5 times larger than the site area (19.200㎡), and annual capacity is approximately calculated to be 8000MWh.

Environmental Impact Assessment
The sphere is Platonic solid that can have the largest surface area while occupying the minimum ground. It only requires one small point for contact with the ground, so it needs only the smallest ground to support the largest surface area. In other words, the area of the green space and the solar cell can be increased at the same time. Overcoming architectural violence against nature, Masdar's Eyes contributes to promoting renewable energy using solar energy and reducing greenhouse effect through huge green space.

1. About part and whole

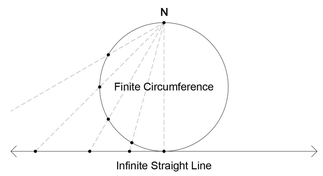

Diagram showing relationship of finite circumference and infinite straight line
All points on the straight line correspond to arbitrary points on the circumference except the north pole N on a one-to-one basis. That is, a straight line extending infinitely left and right is like a figure minus a point on a circumference that is too short to compare with this.

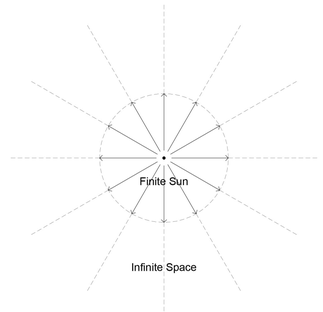

Diagram showing relationship of finite sun and infinite space
The sunlight emitted from a limited surface corresponds to an infinite space, and on the contrary, a very small sphere can hold the world.