









Introduction



This is the Oasis, an ecologic and technological space designed for Masdar City, Abu Dhabi. The city represents the transition from a natural space, to a complex sustainable community, having the Oasis as a representation of the city's history which not only responds to the urban and energetic necessities, but also provides a contemplative liveable environment for Masdar citizens.

The Masdar City's masterplan has been mapped out to respond to the future demand of energy and population without the continuous environmental degradation that causes problems in other cities, so we designed the trace diving it into two zones.

The east side zone expects more transit of people by having a Group Rapid Transit Station, and a Light Rail Transit Station. Meanwhile the west side zone was designed to be a more peaceful environment for rest and contemplation.



Development

Each space and element integrating the Oasis was designed with a conceptual and energetic intention using different technologies and design methods.



First the water, represented by Masdar citizens, providing energy with their own footsteps by walking through the Oasis. We believe "Water" represents life itself.

Pavengen tiles allow us to bring this concept into real energy having 280, 740 modules in the paths of our design. The tiles have a minimal carbon footprint. All the rubber comes from recycled truck tires, and about 80 percent of the polymers used for the other components can be recycled.

The density of population in the United Arab Emirates is 99 pers/km². With an 8 percent of use considering the density of footsteps annually, it's estimated that would provide 983, 713 kWh (983 MWh) in a 75, 800 m² path surface of our design.

For more information: *http://www.pavegen.com/product*



Nature is the next step in the design. Oasis are typically known to be areas where all resources are compacted in one point. Not only does it produce vegetation for aesthetics, but it lowers temperatures in extreme climate environments and removes pollutants from the air.

The Oasis integrates a bioclimatic and biomimetic design to achieve a natural regulator of temperature, using vegetation that are low water use. The temperature can drop from 2°C to 9°C, so is not necessary to use air condition or any related systems to achieve a space with a pleasant climate.

We also designed a biomimetic mobiliary to blend in with the context of the Oasis. The lamp posts were conceptualized from the traditional gas streetlight design to depict a growing plant. The structure is made from steel with 2 lightbulbs in each leaf. Every lamp post has a crystal spherical solar concentrating system of 1m in diameter.

The award in technology winner, Rawlemon provides 220 W/m², being a technology with a low carbon footprint and combining spherical geometry with a dual axis tracking system, can reach up to 70% yield surplus compared to a conventional PV panel. The design contemplates 43 lamp post, each one providing 3027 kWh annually. Which lead us to a sum of 130, 171.56 kWh (130 MWh) per year.

For more information: *https://rawlemon.com/about*



And a leaf shaped bench with 5m of length for citizens to rest and contemplate the Oasis. Predominately, made of low carbon footprint polymers to emulate the form, and a 150mm radio tube of steel which maintains stability.

These components integrate Nature itself in our Oasis.

Finally, we have the Sun as our main resource, sustaining life, providing energy for the Oasis and a climate comfort for the citizens. The abstraction of it in the design, was to remember the citizens that the most powerful source that we have is right in front of our eyes all the time. Under this structure, we designed a specific area where the ground elevates 3m forming an artificial space surrounded with walls dedicated to expose the past and mission of Masdar City as well as a vision to the future of one of world's most sustainable urban communities.



The sun is a steel tensile structure with a one-sheeted hyperboloid base. Over the surface, we locate two ecotechnologies which provides most of the energy that the Oasis generates. The "sun's rays" have a surface of 768.32m² with Flat Solar Panels (1995mm x 990mm x 20inches) on it. Reason why the design incorporates 246 panels of 320W per module, generating together 689587.2 kWh (689 MWh) annually.

Additional to the solar panels, we integrated the Rawlemon system into the surface achieving one 8m diameter spherical panel generating 96859.32 kWh (96 MWh) located at the centre of the sun. And 1,480 smaller panels of 0.50m diameter generating together 2,224,759.68 kWh (2,224 MWh) per year.

In total, the structure of the sun provides 3,011,206.2 kWh (3,011 MWh).

For more information: http://www.sunman-energy.com/pro_38_show.html



Environmental Impact

The total of energy, with the usage of ecotechnologies, that the Oasis provides is 4,125090.2 kWh (4125 MWh) broken down in the next graphic.



The Oasis was intelligently designed to respond to the masterplan from Masdar City with a complete access to the original trace and providing low carbon footprint materials in each ecotechnology chosen to integrate it. The structure of all elements is based in reused steel and the usage of renewable batteries to reduce the negative impact. Accomplishing the mission of a sustainable source of energy for the city.

The ecological impact is developed mainly by the decision of a bioclimatic and biomimetic design into an urban environment, providing a natural regulator of temperature, and the estimated amount of energy per year, enough to light 3,924 lightbulbs (120 W).

Even at a 68% of usage efficiency, caused by any fluctuations in climate or low transit of population, the Oasis would still produce 2,805 MWh.



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OASIS LAGI 2019 ABU DHABI Thank you for your attention