Simply electrifying..., the art of sustainability

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An American couple with a plan to change the energy equations of the UAE for good, Robert Ferry and Elizabeth Monoian give Khaleej Times an insight into their landmark Land Art Generator Initiative

A Dubai-based American couple has come up with an ingenious plan to develop a series of land art installations, which would basically be massive aesthetic sculptures that would double up as renewable power generators, with a potential to illuminate thousands of homes.

The unique project, named Land Art Generator Initiative (LAGI), is a brainchild of Robert Ferry, an architect, and wife Elizabeth Monoian, an artist. As a first step towards realising their dream project, the couple has launched an international design competition, bringing artists, architects, scientists, engineers and landscape developers from across the world to collaborate.

The project has already generated massive interest in the artistic and environmental circle and the number of entries received for the design competition in just four months is a testimony to the viability of the project.

“Launched on December 7, 2009, the design competition has received over 600 entries from all over the world. An elite jury of international experts will select the best designs. They will announce the three winning designs after June 4, which is the last day for submissions. After that, we are planning to do educational programming and display the top 25 to 50 entries in international public exhibitions,” said the soft-spoken Ferry, who is the ambassador in the UAE for the Living Building Institute.

As an architect and designer of less-than-zero-impact buildings that double as renewable power plants, Ferry says he has always been interested in incorporating latest technologies of sustainable energy creation into his designs and create buildings that not only power themselves but also the surrounding areas. With his wife also being an artist focused on sustainability, together they set about devising a plan that took the shape of LAGI.

Though buildings with green credentials are catching everyone’s fancy, huge land-art installations are also common in many cities and mega renewable energy projects have been in business in many places as well, a project like LAGI is something unheard of in the realms of architecture as well as sustainability. It is first-of-its-kind — another first for Dubai and the UAE — with the potential of getting into the record books.

“Land art is a growing movement in big cities across the world and attracts millions of tourists every year. We saw the potential in these installations to double up as renewable power generators that would inspire the people who come to see it. This would show thousands of people the importance of adopting sustainable practices,” said Monoian, the more articulate of the two.

The lanky artist, who is a lecturer at the America University of Dubai (AUD), feels that art has the potential to create massive movements and initiate creative dialogues. “The project, when implemented, apart from being a substantial sustainable source of power to the UAE, can prove to be a catalyst towards a major shift in the way art is looked at and renewable energy is produced,” added Monoian, who like her husband is a product of Carnegie Mellon University in the US.

Using sunlight — which is abundant in the region — wind and sea waves — there is no dearth of them as well — the proposed project will have the capacity of generating 5.6 gigawatts of power, fulfilling a third of the UAE’s future energy demands in a sustainable way.

“This part of the world receives the greatest amount of insulation energy from the sun as compared to other regions, behind only to the Sahara desert. In terms of days of direct sun per year, the Arabian peninsula gets one of the highest. There are also seasonal winds which are quite powerful, and we have access to tidal power and wave power from the sea as well, so we have got a good combination of resources which can be tapped into and harnessed to fulfil at least one-third of the local demand to begin with,” said Ferry, elucidating the various sustainable methods that can be used to generate power.

Any artist willing to be part of the project has to consider all the natural elements for his design to succeed. “We have a list of 35 different ways in which energy can be harnessed and we are urging artists to come up with most innovative and out-of-the-box ideas. We have also come up with a set of designs just to illustrate to the artists what the project demands,” added the architect, who has had stints as a

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consultant architect with Abu Dhabi's green Masdar City and ADNOC Headquarters.

So far so good, but their plan to transfer the designs from the drawing boards to fields might need more than just innovative ideas and imagination. It would definitely need enormous amount of funds as well as the official support. That's where many ambitious projects have hit a dead end.

"We have support and backing from municipalities in Dubai and Abu Dhabi; they are very excited about the initiative and are willing play whatever role they can to see it through, but what we are lacking in is the funds to carry on the project. Many corporate organizations have showed interest, but given the current economic climate, it is understandable that no sponsorship is forthcoming. However, we feel it's just around the corner," said an optimistic Monoian, who is the founder and Director of Society for Cultural Exchange, a non-profit arts organisation that is developing exchanges nationally and internationally between communities, academics and artists.

The couple has identified three potential sites in the UAE — one in Dubai and two in Abu Dhabi — to put up the finished installations, which is subject to government approval. A mudflat between Ras Al Khor Wildlife Sanctuary and The Lagoons is the proposed Dubai site and sites near Yas Island and Masdar City are proposed for Abu Dhabi.

For more information, visit www.landartgenerator.org

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UAE energy facts

Currently, the UAE requires about 11 gigawatts of consistent capacity and uses 72 billion kW.h per year—equivalent to the constant use at eight gigawatts while in actuality day/night/seasonal use varies greatly.

UAE Energy Statistics: 15.7 gigawatt installed capacity as of 2007 — almost entirely gas and oil.

Masdar's Shams 1 (under development) has a design capacity of 100MW or about 1 per cent of the total UAE capacity needs.

The four nuclear reactors planned with the Korean consortium have a combined capacity of about 5.6 gigawatts which would add 35 per cent more to the total capacity of the country.

But the needs of the UAE are estimated to double by 2020 so there is still room for more renewable sources to fill the gap and especially with an eye to the more distant future when the gas and oil fired plants currently in operation will become more expensive than RE power due to both gains in renewable energy technology efficiencies and to the greater expense of heavier and more difficult to extract crude oil.

What is LAGI?

A landmark initiative that will place the UAE as a world leader in both art and sustainability.

Who are behind it?

Robert Ferry, an architect, and Elizabeth Monoian, an artist, both from the US based in the UAE.

What is Land art?

Land art is an art movement where the land becomes the canvas. Aesthetic structures are built into the landscape and the permanent installations can be visited by all.

What are the benefits?

Sustainable Energy and infrastructure investment: The artworks will provide green energy and pay for their own construction overtime

Tourism

The unique installations will attract tourists and art lovers from around the world. Site entrance fees can provide revenue to cities in the UAE.

Global leadership

The UAE will be seen as world leaders in sustainability, arts and culture.

Arts and culture

As a cutting-edge movement in the arena of public art, the project will endow the supporting cities with the honour of being the first to see its implementation.

Precedents

While many large land art installations exist around the world, none of them generate power. The UAE project will be the first in the world to do so.

Examples of land art*The Lightning Field* – built by Walter De Maria in Quemado, New Mexico, US in 1977.

***Spiral Jetty* –** built by Robert Smithson in Great Salt Lake, Utah, US in 1970.

***Storm King Art Centre* –** built in New York's Hudson Valley

As the principal artists and the brains behind the LAGI project, the couple has come up with some extremely innovative yet aesthetically beautiful and practically appealing designs of land art-generators. Here are some of the examples:

Khorfakkan Necklace: 30MW

Consists of 832 wave energy collecting devices that resemble in their above-water sculptural form, the individual ornaments of a necklace.

The long tendril shapes that they form follow the flow of the waves to the shore and are as ever-changing as the movement of the water. It is this movement of water that creates the energy inside the body of each amulet where fluid is pressured to run a turbine generator. The energy is then transmitted to the outermost band and to the shore where it is fed into the energy grid where it has the potential to power approximately 15,000 households of this east coast city.

Some of the devices to be used in the design are developed at the Ohio State University in the US and are proven and tested to generate power at the capacity they are supposed to.

Ibn Al Haytham Pavilionfor Mushrif Park: 150KW

The first camera obscura was built by Arab scientist Abu Ali Al Hasan Ibn Al Haytham, born in Basra (965-1039 CE), who carried out practical experiments on optics in his 'Book of Optics'. In his experiments, Ibn Al Haytham used the term Al Bayt Al Muthlim, translated into English as 'dark room'. In the experiment, he undertook to establish that light travels in time and with speed, he wrote: "If the hole was covered with a curtain and the curtain was taken off, the light travelling from the hole to the opposite wall will consume time."

He reiterated the same experience when he established that light travels in straight lines. A revealing experiment introduced the camera obscura in studies of the half-moon shape of the sun's image during eclipses which he observed on the wall opposite a small hole made in the window shutters.

Concentrated photovoltaic (CPV or HPVC) technology concentrates sunlight through a lens onto a high performance solar cell, thus increasing the electricity generated over conventional PV panels.

Typical photovoltaic panels only convert about 10 to 15 per cent of the incoming light into energy. CPV cells utilise multi-junction photovoltaics which can reach efficiencies of 40 per cent. Typically, the CPV solar cell lies directly beneath the fresnel lens or parabolic mirror concentrator.

In the Ibn Al Haytham Pavilion, the system is modified to create beams of vertical light with the power of 800 suns by concentrating sunlight through fresnel lenses at the roof. These beams are then reconcentrated at the raised floor level by a second Fresnel lens field and onto the CPV cells which are arrayed in a naturally cooled plenum space at the ground level.

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