

LAND ART GENERATOR INITIATIVE

Elizabeth Monoian and Robert Ferry, Founding Directors, Land Art Generator Initiative



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www.landartgenerator.org

land art generator initiative

Elizabeth Monoian & Robert Ferry



BEYOND THE WAVE

Jaesik Lim, Ahyoung Lee, Sunpil Choi, Dohyoung Kim, Hoeyoung Jung, Jaeyeol Kim, Hansaem Kim

A submission to the 2014 Copenhagen Land Art Generator Initiative competition

Abstract.—The great energy transition will have an impact on our built environment and our visual landscape like no other technical shift since the invention of the automobile. Our cities and countrysides will look different in 2040 than they do today as distributed renewable energy infrastructures expand at a rapid pace. The common perception of these systems is of standard flat blue solar panels and three-blade horizontal axis wind turbines, separated from the public by chain link fences. Many people do not see these as welcome additions to cherished cityscapes and rural viewsheds.

Rather than passively accepting these new energy systems as a necessary but aesthetically unfortunate addition to our cities, we can instead present examples of renewable energy infrastructures that are cultural icons. In doing so, we can excite and inspire people to want more renewable energy, not only because it is a required response to greenhouse gas emissions reduction mandates, but because it is sexy and culturally relevant.

The Land Art Generator Initiative (LAGI) is a part of a global conversation on the shifting aesthetics of sustainable infrastructure. By presenting examples of utility-scale renewable energy infrastructures as public art, LAGI is inspiring the general public about the beauty of our sustainable future, and showing policy makers and city planners that net-positive energy installations can be placemaking tools, economic development drivers, and educational venues while they help to power the grid.

The visual case study demonstrates how LAGI is playing an important role in defining the design influence of renewable energy on our constructed environments.

The logo graphic is contained within a thin grey rectangular border. It features the text 'PUBLIC ART + RENEWABLE ENERGY + LIVING BUILDINGS AND CITIES + INTEGRATED SYSTEMS' in orange, with yellow plus signs between the phrases. Below this, the words '= land art generator initiative' are displayed in a larger orange font, with the equals sign being a yellow double-lined symbol.

PUBLIC ART + RENEWABLE ENERGY + LIVING BUILDINGS AND CITIES + INTEGRATED SYSTEMS

= land art generator initiative

INTRODUCTION

Cities are complex organisms with elaborate and interconnected distribution networks for energy, information, housing, transportation, resources, and much more. As a living organism, a city exists in the natural environment and can be most efficient and healthy when it establishes harmony and symbiosis with that environment. A city basks in the sunshine, it feels the movement of the air, and it intimately experiences the workings of the rain and water flow. A living city is nurtured by its inhabitants and by natural energies. At a slightly smaller scale, all of these ecosystemic relationships exist within each building, streetscape, and park space.

The great energy transition is already having an effect on our visual environment and landscapes, and this is only going to increase over the coming decades. Recognizing the power of public art and creative placemaking in this context, we can take a proactive approach to the influence of renewable energy on our constructed environment, and give planners new tools with which to integrate sustainable infrastructures into urban corridors, waterfronts, public places, and even parks. Interdisciplinary collaborations can spark true innovation in regenerative design, and a social practice approach can ensure that the outcomes of the energy transition bring benefits to everyone.

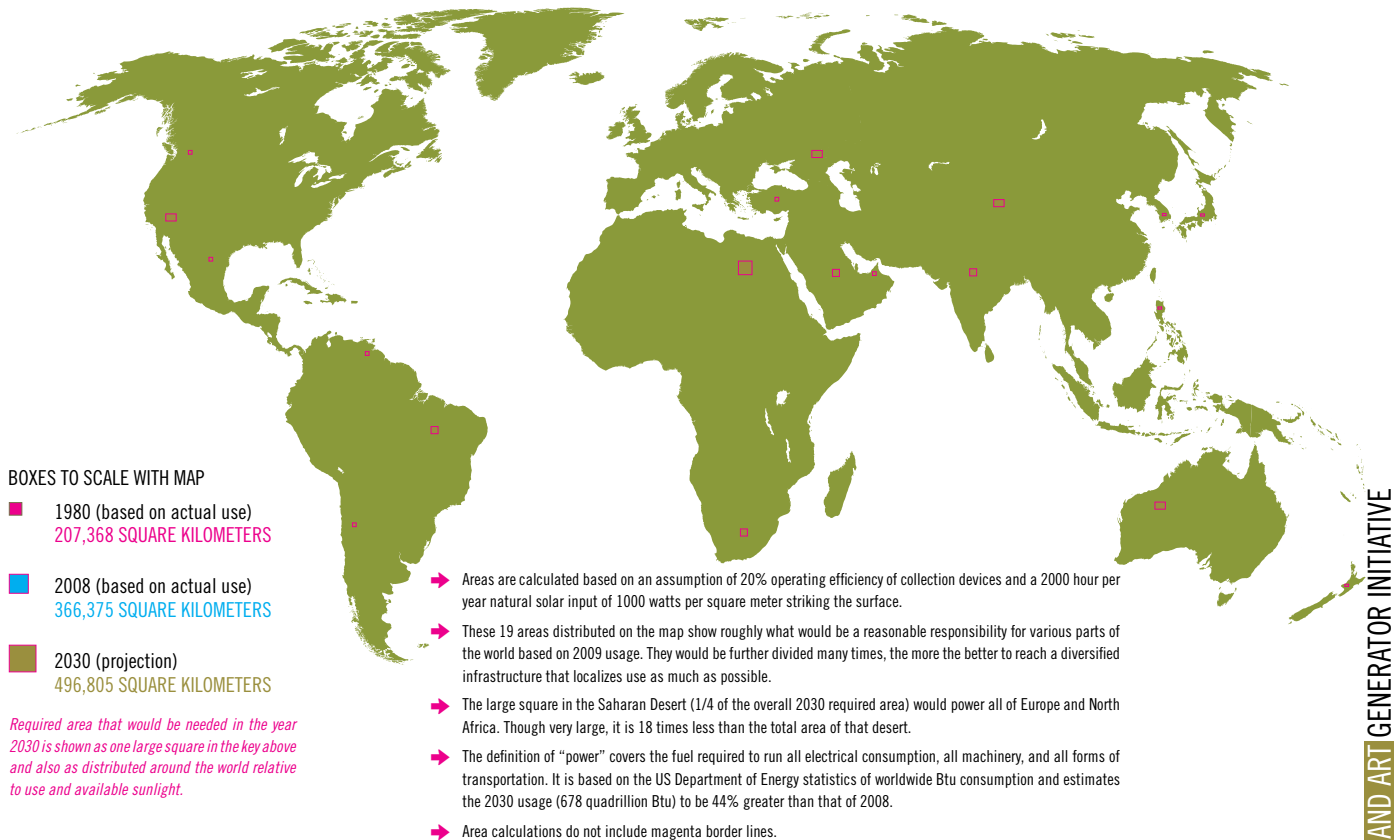
The Land Art Generator Initiative (LAGI) is a worldwide public arts initiative that offers the opportunity for collaborative teams of artists, architects, landscape architects and designers, working with engineers and scientists, to create new ways of thinking about what renewable energy generation looks like. LAGI seeks to broaden public awareness of renewable energy's promise by inspiring and educating through public art about the potential for a sustainable future. The organization can be divided into these six main areas of focus: biennial LAGI open call design competitions, educational materials, community outreach, construction projects, research and development, and consulting with cities and community groups.

LAGI delivers sculptural installations that have the added benefit of renewable power generation. These beautiful objects are designed to distribute clean energy into buildings and/or the utility grid, providing power to neighborhoods and cities while adding visual interest to outdoor spaces—from public parks and streets to private courtyards.

Land Art Generator artworks can be any scale and can power a single family home or the equivalent of hundreds or even thousands of homes in a city.

SURFACE AREA REQUIRED TO POWER THE WORLD WITH ZERO CARBON EMISSIONS AND WITH SOLAR ALONE

➔ www.landartgenerator.org



VISUAL IMPACTS OF POWER GENERATION INFRASTRUCTURE

If we go back to the beginning of electrification, we find that power plants were by necessity located in the hearts of our cities because transformers were not yet sophisticated enough to raise the voltage for efficient long-distance transmission. As a consequence, these power plants—coal fired and polluting as they were—were designed by architects to be beautiful contributions to public space. Many of them have been restored and adaptively reused, turned into commercial centers and museums, like the Tate Modern in London.

As we were able to raise the voltage high enough to transmit electricity across long distances, power plants came to be built far away from our urban centers and the places that we live and work, and for good reason.

But as these power houses left the city, they also left their relationship to art and architecture. They became instead pure utility—something to drive quickly by, and hazardous to public health. This almost complete divorce of utilitarian power generation infrastructure from design has in many ways continued into the present with renewable energy production. In some cases, this has led to push-back within communities that find themselves in close proximity to large-scale utilitarian solar and wind installations.

Recent trends in public acceptance of renewable energy infrastructure have shown that resistance to a transition from fossil fuel and nuclear dependence often takes refuge in arguments that hinge on questions of aesthetics. These questions are most relevant as installations come into closer proximity with urban centers, residential and commercial districts, and rural scenic and cultural landscapes.

Land conservation groups, who are concerned about climate change and recognize the need to transition away from greenhouse gas emitting energy systems often find themselves on the opposing side of wind and solar farm approvals because of the negative impact that these infrastructures can have. Every day it seems there is a new story about people disapproving of solar or wind installations in their communities. It's not that they don't care about the environment—in many cases the people opposing the installations are self-avowed environmentalists.

What will be the impact on land use when we successfully make the transition to 100% renewable energy? The very low hanging fruit of remote sites for wind and solar installation are getting fewer and far between. But there are ample land resources available. It's just that in some circumstances a little creativity may be required in order to align these new resources with cultural expectations. In some cases there is even an opportunity to create destination sites and use these new energy power plants as mechanisms for tourism and economic development.

THE LAND ART GENERATOR INITIATIVE

By bringing creatives to the design process at an early stage and presenting examples of utility-scale renewable energy infrastructures as public art, LAGI is helping to inspire the general public about the beauty of our sustainable future. LAGI efforts are also showing policy makers and city planners that net-positive energy installations can be placemaking tools, economic development drivers, and educational venues while they help to power the grid. The ability to consider renewable energy in contexts never before possible, like city parks and waterfronts, gives city planners new tools for truly sustainable creative placemaking.

LAGI is a worldwide public arts initiative that offers the opportunity for collaborative teams of artists, architects, landscape architects and designers, working with engineers and scientists, to create new ways of thinking about what renewable energy generation looks like. LAGI seeks to broaden public awareness of renewable energy's promise by inspiring and educating through public art about the potential for a sustainable future.

The organization can be divided into these six main areas of focus: our biennial LAGI open call design competitions, educational materials, community outreach, construction projects, research and development, and consulting with cities.

The long-term goal of LAGI is to design and construct site-specific public art installations that have the added benefit of large-scale clean energy generation. Each sculpture will continuously distribute clean energy into the electrical grid with each work having the potential to provide power to hundreds or even thousands of homes.

The design brief for the LAGI design competition contains the following baseline requirements—the artwork is to capture energy from nature, cleanly convert it into electricity, and transform and transmit the electrical power to a grid connection point to be supplied by the city. Consideration should be made for the safety of the viewing public and for the educational activities that may occur on site. We ask that the design be constructible (rather than theoretical), that it respect the natural ecosystem of the design sites, and we encourage interdisciplinary collaborations because we believe in their power to stir real innovation.

LAGI has held four free and open call international design competitions in partnership with private and public entities. We now have a portfolio of over 800 submissions representing more than 60 countries and four unique site typologies. In order to get the broadest and most comprehensive set of submittals the design sites are chosen based on their international place recognition and relevance to the global conversation about sustainable development.

The following slides provide examples of submissions to our open call ideas competitions organized by technology type. They are representations of what Land Art Generator installations look like.



1. Conventional Solar

Everyone loves a duck, so why not make one that powers an entire neighborhood? This playful sculpture set in Copenhagen's harbor will generate enough electricity to power a neighborhood while becoming the city's newest tourist attraction. It also incorporates an energy storage mechanism in its lower hull and shows the relative cost of energy by how high or low it sits in the water.

SOLAR ECO SYSTEM

TEAM: Antonio Maccà, Flavio Masi

TECHNOLOGIES: photovoltaic panels

ANNUAL CAPACITY: 1,000 MWh

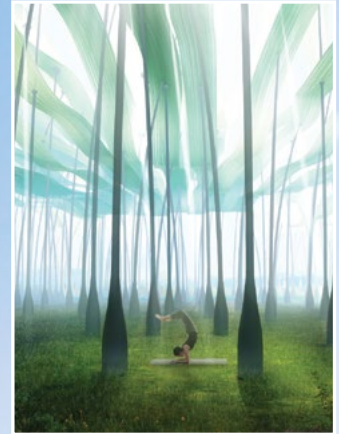
A submission to the 2010 United Arab Emirates Land Art Generator Initiative competition



2. Tinted and Laminated Solar

Tinted Solar Panels are on the market. You can purchase a solar panel that is almost any color you can imagine. There are companies that also laminate the panels to look like solid colors or images. Solar Eco System celebrates the founding of the United Arab Emirates by marking the position of the planets relative to each other. This new photovoltaic sun can power 100 homes.

BEYOND THE WAVE



TEAM: Jaesik Lim, Ahyoung Lee, Sunpil Choi, Dohyoung Kim, Hoeyoung Jung, Jaeyeol Kim, Hansaem Kim

TECHNOLOGIES: organic thin film

ANNUAL CAPACITY: 4,229 MWh

A submission to the 2014 Copenhagen Land Art Generator Initiative competition

3. Organic Photovoltaics (OPV)

Third Generation Flexible Thin Films give artists flexibility and a rich color palette from which to work. Beyond the Wave powers 500 homes. It's a power plant you would want to visit for a picnic.

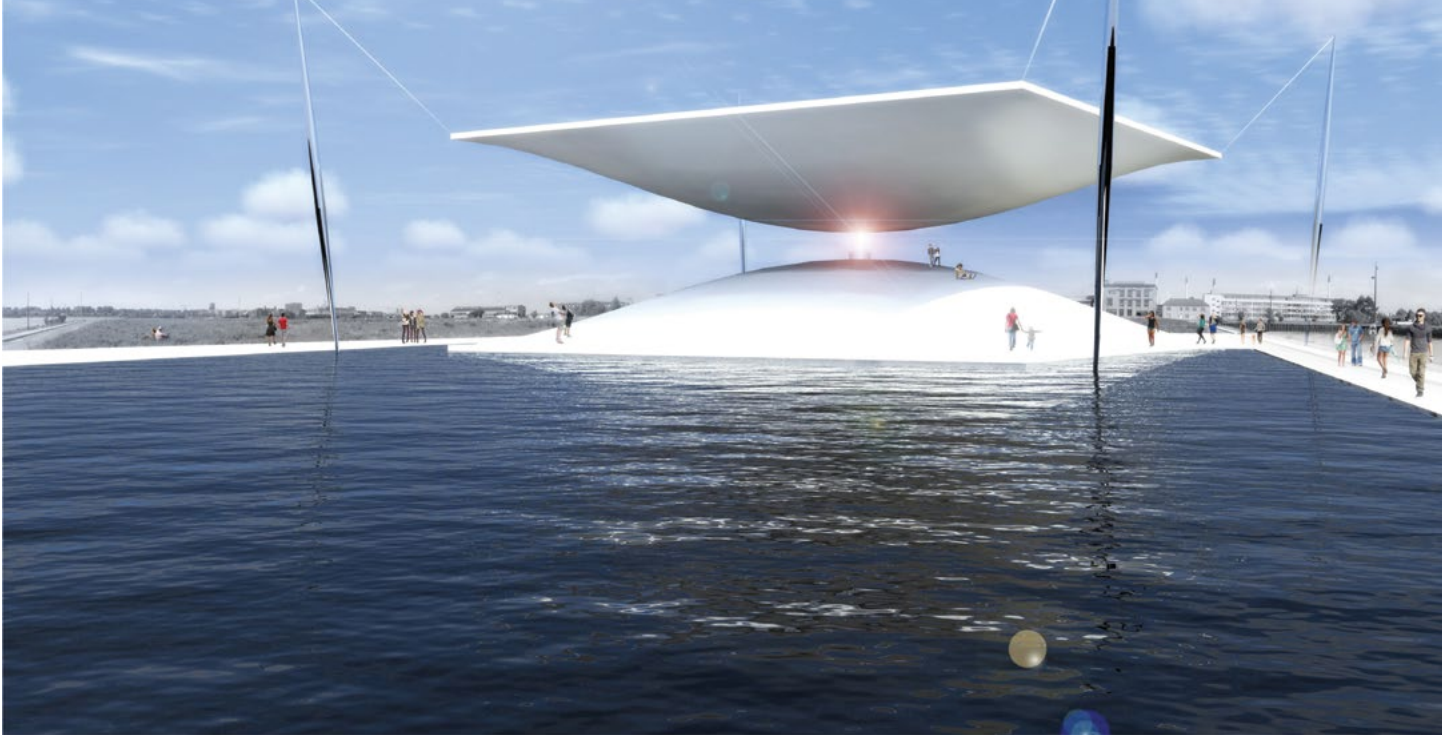
THE SOLAR HOURGLASS

TEAM: Santiago Muros Cortés

ENERGY TECHNOLOGIES: concentrated solar power (thermal beam-down tower with heliostats)

ANNUAL CAPACITY: 7,500 MWh

A submission to the 2014 Land Art Generator Initiative competition for Copenhagen



4. Solar Thermal/Concentrated Solar Power (CSP)

Solar Hourglass uses sun-tracking mirrors to power 1,000 homes in Copenhagen. Visitors can feel the heat from the concentrated beam of light that represents the passage of time.

Its form, an hourglass, also reminds us that we have time to avert the worst effects of climate change if we can quickly act together. The functional artwork provides a positive and inspirational message that can serve as an inspiring call to action.

Abstract climate science messages of gloom and doom (such as red heatmap projections, rising sea level maps, and focus on severe weather events) have failed to instill a true sense of urgency in popular culture. Rather, the overall effect has been to reinforce a general feeling of inevitability and despair about the situation. The overwhelming scope of the problem leaves many feeling un-empowered as individuals to make a difference.

So how do we change this conversation? How do we make renewable energy sexy and interesting? How do we give people a sense of pride and ownership in where their energy comes from?

What if we could steer the conversation towards optimism and hope? Inspire people into authentic desire for a post-carbon world? LAGI strives to give the public something to run towards on the issue of climate, rather than doomsday scenarios to run away from.



FRESH HILLS

TEAM: Designer: Matthew Rosenberg; Structural Engineering Consultant:

Matt Melnyk; Production Assistants: Emmy Maruta, Robbie Eleazer

ENERGY TECHNOLOGY: WindTamer™, Carbon Dioxide Scrubber, SmartWrap™

ANNUAL CAPACITY: 238 MWh

[A submission to the 2012 LAGI competition for New York City](#)

5. Wind

Fresh Hills is a proposal from a Los Angeles team. The idea here is to create natural elements that appear to grow from the earth, but which house an array of compact wind acceleration turbines. The apparatus is generated from the grafting of Fresh Kills wind rose data onto the site, creating a seamless exchange between the site-specific data and the structure used to harness that information.

The expansive surface area at the mouth of the mounds helps funnel wind towards the turbine and takes advantage of the fluid dynamics of air flow. A low-pressure system on the other side of the mounds creates a pastoral central plaza. As if standing at the eye of a storm, the central hub becomes a place to gather, reflect, play, and explore.

Renewable energy is more than just wind and solar, and there are a lot of emerging technologies that participating teams have incorporated into their proposals. These include piezoelectric stacked actuators and methods of converting kinetic motion into energy, like the linear alternator that you might find in your automobile that captures energy from the shock absorber and returns it to the battery.



TEAM: Concept and Design Atelier dna: Darío Núñez Ameni & Thomas Siegl; Narrative and Poetics Gabrielle Jesiolowski;
Structure and Engineering: ISSE Innovative Structural and Specialty Engineering: Radhi Majmudar PE;
Ecology and Renewable Energy Strategy eDesign Dynamics: Ian Lipsky
ENERGY TECHNOLOGY: piezoelectric discs, linear alternator
ANNUAL CAPACITY: 20,000 MWh

[A submission to the 2010 Land Art Generator Initiative competition for United Arab Emirates](#)

6. Kinetic Energy Harvesting

The Windstalk team, led by Atelier DNA in New York City uses both of these. They were inspired by their observation of nature, specifically the way a field of wheat or tall grass blades wave in the wind. Rather than relying on a rotor with blades attached, they conceived of a set of stalks that would move under the power of even the slightest breeze coming from any direction.



7. Wave

The LAGI 2016 competition brought forth some amazing ideas that combine buoy-type wave energy converters with added cultural amenities adjacent to the Santa Monica Pier, such as Catching the Wave that was inspired by the early 20th century history of the site as a boat harbor.

A submission to the 2016 Land Art Generator Initiative design competition for Santa Monica

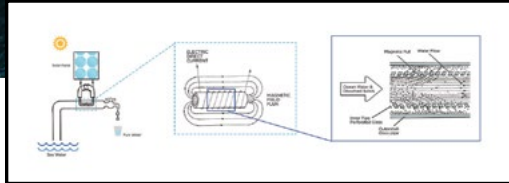
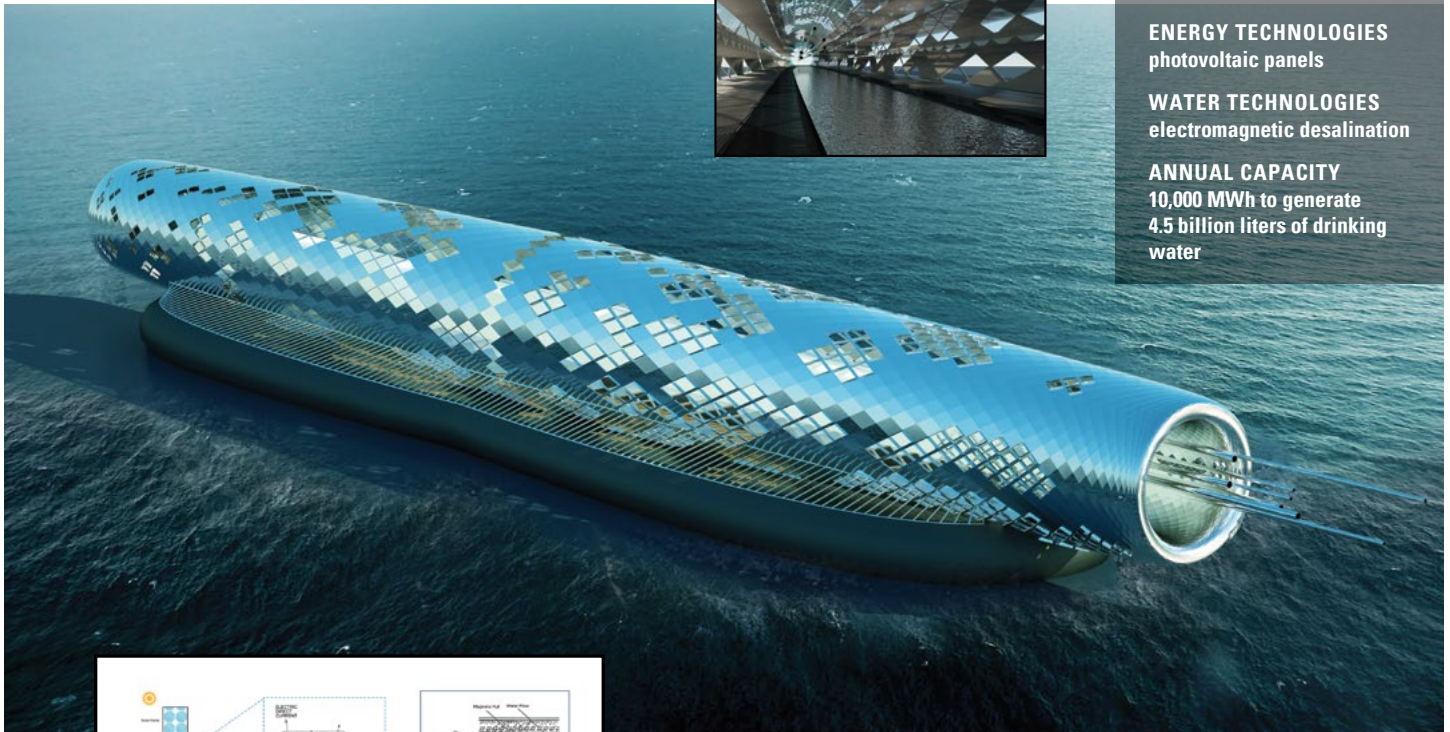
TEAM
Khalili Engineers

TEAM LOCATION
Vancouver, Canada

ENERGY TECHNOLOGIES
photovoltaic panels

WATER TECHNOLOGIES
electromagnetic desalination

ANNUAL CAPACITY
10,000 MWh to generate
4.5 billion liters of drinking
water



The Pipe

8. Desalination

The Pipe produces 4.5 billion liters of drinking water from the power of the sun, while attracting visitors to swim in its saline water pool.

La Monarca

A SOLAR MURAL ARTWORK



Artwork by Cruz Ortiz

PARTNERS



SUPPORTERS



OTHER LAGI PROGRAMMING

In addition to the open call design competition, LAGI works in a variety of models, consulting with communities, developers, schools, and institutions, helping them to design their own energy landscapes in ways that are culturally relevant and engage the public.

Solar Murals

With the advent of solar panel customization, art in public space stands ready for a revolution. Solar Mural artworks celebrate local culture, provide new opportunities for artists, and make communities more vibrant and livable, all while reducing the carbon footprint of our cities as part of the solution to climate change. In sustainable cities of the very near future, murals will be fabricated from photovoltaic panels as often as they are created with paints.

La Monarca is the world's first Land Art Generator Solar Mural artwork, unveiled at the November 2017 Luminaria: Contemporary Arts Festival in San Antonio. The La Monarca image was designed by San Antonio artist Cruz Ortiz with creative direction by Penelope Boyer.

ART + ENERGY CAMP (2015)

People think Homewood is a bad place to be, but the kids and builders are making a solar panel artwork so that people will not judge Homewood because of some other stuff that happens. We are opening a door of opportunity for Homewood and as a community we are trying to make Homewood a better place.

Terrell Williams (age 11)

“Renaissance Gate” means to me that once you walk through it you will come into a completely new Homewood. A new community without fear, without poverty, and without violence.

Jordan Blackwell (age 14)



ART+ENERGY CAMP 2015 WAS A PROJECT OF
Land Art Generator Initiative
Conservation Consultants, Inc.
Homewood Renaissance Association

WITH GENEROUS SUPPORT FROM
Heinz Endowments
Google Community Grants Foundation
RK Mellon Foundation
Three Rivers Community Foundation

STEAM Camps and Educational Outreach

The Art+Energy Camp that we held in Pittsburgh in 2015 gave 20 kids an education in energy science, climate science, art, design, and solar power installation.

These experiences were then applied to benefit the local community. The campers designed a public artwork utilizing solar panels to generate renewable energy. Fifteen standard roof modules have been installed in an arrangement that was conceived by the students with the principles of the Land Art Generator Initiative in mind. They were inspired by the shape of a violet flower and by Japanese Torii gates.

As 14 year old Jordan Blackwell put it, “Renaissance Gate means to me that once you walk through it you will come into a completely new Homewood. A community without fear, without poverty, and without violence.”

ART + ENERGY CAMP

4–6 weeks
Field trips
Lessons in energy
science
Lessons in energy justice
+ energy democracy

Design process
Guest presentations
Hands on with
construction of a
renewable energy artwork
Final outcome:



The solar artwork now provides clean electricity to help offset the demand load of the Homewood Renaissance Association facilities and provides a unique cultural amenity for the community. The kids were a driving part of the entire process. They have helped with documentation, social media, design, meetings with consultants, and installation. When challenges presented themselves, the campers were there helping us to brainstorm solutions. The outcome for them goes beyond this particular solar artwork. In a sense, we have graduated project managers. It's our hope that they'll be able to apply this experience in all walks of life.

CONCLUSION

In closing, we would like to point out that the capacity of public artwork (especially large-scale and high-profile works) to increase economic activity is well-documented. According to the NYC Economic Development Corporation, The New York City Waterfalls by Olafur Eliasson cost \$15.5 million to install (privately funded) and brought an estimated \$53 million in incremental spending from visitors who came to see the installation over the nearly four months that it was in operation. That's an extra \$483,000 per day to Manhattan businesses as a direct result of a public art installation.

Imagine a permanent work of art of a similar scale and with similar economic stimulus benefit. And now imagine that this work of art educates hundreds of visitors every day about the technology that it employs, while contributing clean energy to the electrical grid equivalent to the energy consumed by hundreds or even thousands of homes. It is our hope that cities of the future will seize on the opportunity and efficiency that may come from the interrelationships between equitable renewable energy infrastructure and art in public space.

Today, tourists can visit the Hoover Dam and see the monumental works of Art Deco architecture integrated into power infrastructure. Those artworks stand as a testament to that important time in American history when we came together around a massive public works program that literally paved the way for the economic dominance of the US through the second half of the 20th century. Someday, tourists of the future will visit the energy landscapes that we build today as we embark upon the great global energy transition. Will they, too, be greeted with inspiring works of art that help to celebrate this important time in history?

ARTWORKS CITED

Energy Duck

A submission to the 2014 Land Art Generator Initiative design competition for Copenhagen

Artist Team: Hareth Pochee, Adam Khan, Louis Leger, Patrick Fryer

Energy Technologies: photovoltaic panels, hydraulic turbines

Annual Capacity: 400 MWh

Solar (ECO) System: December 2nd, 1971

A submission to the 2010 Land Art Generator Initiative design competition for Dubai and Abu Dhabi

Artist Team: Antonio Maccà, and Flavio Masi

Energy Technologies: various types of photovoltaic panels of differing reflective hues

Annual Capacity: 1,000 MWh

Beyond the Wave

A submission to the 2014 Land Art Generator Initiative design competition for Copenhagen

Artist Team: Jaesik Lim, Ahyoung Lee, Sunpil Choi, Dohyoung Kim, Hoeyoung Jung, Jaeyeol Kim, Hansaem Kim (Heerim Architects & Planners)

Energy Technologies: organic photovoltaic (OPV), kinetic harvesting (piezoelectric)

Annual Capacity: 4,229 MWh

The Solar Hourglass

1st Place winner of the 2014 Land Art Generator Initiative design competition for Copenhagen

Artist: Santiago Muros Cortés

Energy Technologies: concentrated solar power (thermal beam-down tower with heliostats)

Annual Capacity: 7,500 MWh

Fresh Hills

Second Place winner of the 2012 Land Art Generator Initiative design competition for New York City

Artists: Matthew Rosenberg, Matt Melnyk, Emmy Maruta, Robbie Eleazer

Energy Technologies: WindTamer™, carbon dioxide scrubber, SmartWrap™

Annual Capacity: 238 MWh

Catching the Wave

A submission to the 2016 Land Art Generator Initiative design competition for Santa Monica

Artists: Christina Vannelli, Liz Davidson,

Matthew Madigan

Energy Technologies: point absorber wave energy converter (similar to CETO™ by Carnegie Wave Energy)

Annual Capacity: 16,000 MWh

The Pipe

A submission to the 2016 Land Art Generator Initiative design competition for Santa Monica

Artists: Abdolaziz Khalili, Puya Kalili, Laleh Javaheri, Iman Khalili, Kathy Kiany (Khalili Engineers)

Energy Technology: Photovoltaic Panels

Water Technology: Electromagnetic Desalination

Annual Capacity: 10,000 MWh to generate 4.5 billion liters of drinking water

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