

Before Change Can Occur It Must Be Imagined



LAND ART
GENERATOR
landartgenerator.org

**RENEWABLE ENERGY
CAN BE BEAUTIFUL**

Tejo Power Station

Various engineers and architects

Lisbon



Thermal Power Plant with Rice Fields

Bruno Barbey

Hadong, South Korea, 2007





U.S. Airforce Solar Installation

Airman 1st Class Nadine Y. Barclay

2007



Tahachapi Wind Farm

Henning Leweke

California, 2001

Hoover Dam

Art Deco Winged Figures of the
Republic, Hoover Dam

Arizona/Nevada (1935) by
Oskar J.W. Hansen.

Photo by Linda Chumbley





What if we built power plants as works of art?

SOLAR HOURGLASS

TEAM

Santiago Muros Cortés

TECHNOLOGIES

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

ANNUAL CAPACITY

7,500 MWh

First Place Winner to the 2014 Land Art Generator Initiative design competition for Copenhagen—LAGI 2014.

LAGI Open Call Competitions

LAGI 2010

Dubai / Abu Dhabi

Typology: Urban Gateways



LAGI 2012

NYC

Typology: Landfill



LAGI 2014

Copenhagen

Typology: Brownfield



LAGI 2016

Santa Monica

Typology: Coastal



LAGI 2018

Melbourne

Typology: Masterplan



LAGI 2019

Abu Dhabi

Typology: City Portal



LAGI 2020

Fly Ranch

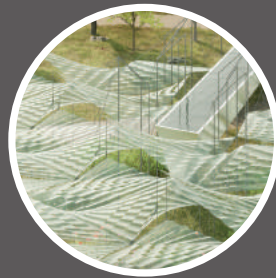
Typology: Desert Systems



LAGI 2022

Mannheim Germany

Typology: City Park



LAGI Invited Competitions



LAGI Glasgow
2015



LAGI Willimantic
2017-2018



LAGI New Mexico
2022

TECHNOLOGY TYPE
polycrystalline solar
panels

Conversion Efficiency
22%

Capacity Factor
15%–20%
(depending on site conditions)



Images from Wikipedia



Uniting the Terrestrial & the Celestial

***Arch of Time* tracks the sun as it moves across the sky — engaging park visitors with a magical light display within a shaded outdoor space.**

ARCH OF TIME

TEAM
Riccardo Mariano

TECHNOLOGIES
thin film photovoltaic

ANNUAL CAPACITY
400 MWh

A submission to the 2019 Land Art Generator Initiative design competition for Abu Dhabi—LAGI 2019.

Economic Impact of Large Works of Art

NYC Waterfalls by
Olafur Eliasson:
a well-studied example
(not a Land Art Generator)

\$15.5
million to
install



\$53 million
income over
four months

According to
the New York
City Economic
Development
Corporation

TECHNOLOGY TYPE

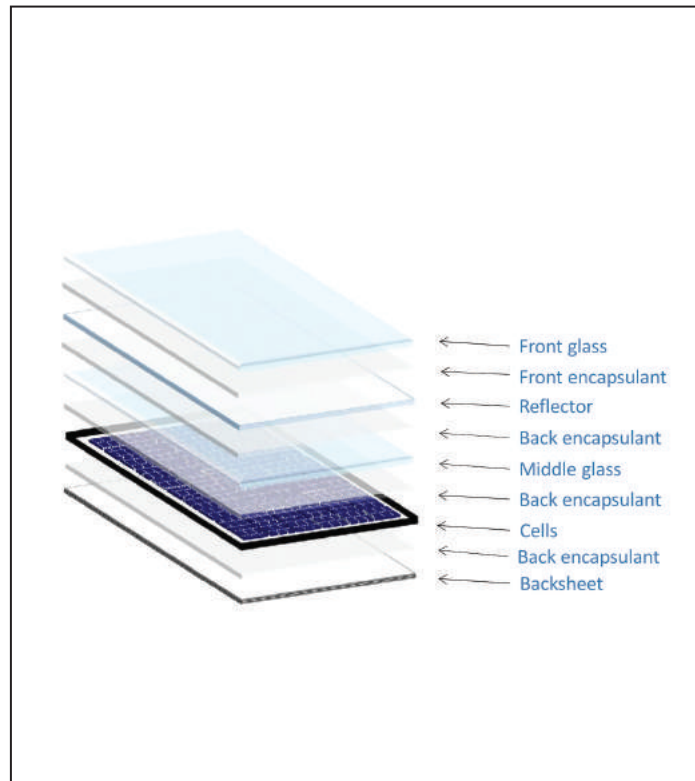
polycrystalline solar panels – color tinted

Conversion Efficiency

15%–18% (depending on type)

Capacity Factor

15%–20%
(depending on site conditions)



Solaxess coating application can create any color of solar panel with minimal impact on efficiency

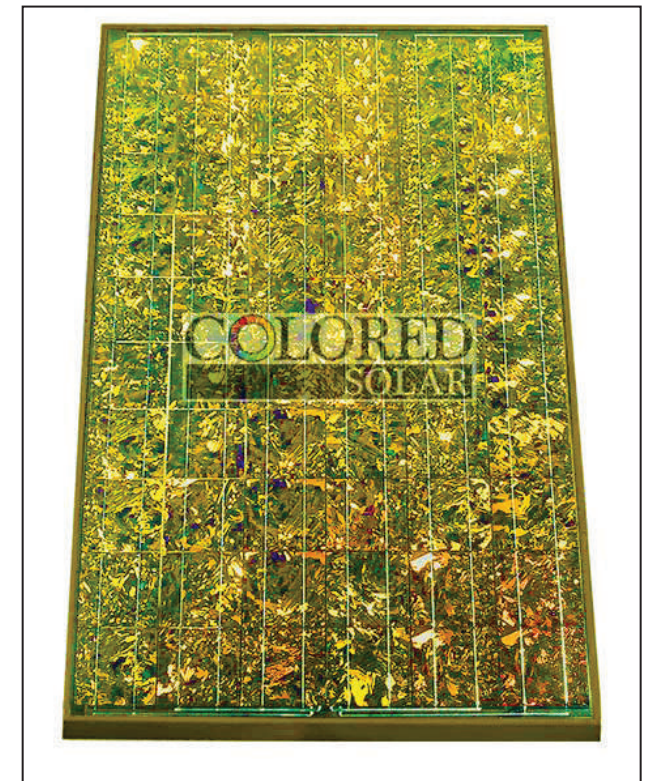


Image from Colored Solar's Product Literature



SOLAR (ECO) SYSTEM

TEAM

Antonio Maccà, Flavio Masi

TECHNOLOGIES

photovoltaic panels

ANNUAL CAPACITY

1,000 MWh

A submission to the 2010 Land Art Generator Initiative design competition for Dubai/Abu Dhabi—LAGI 2010.

LIGHT UP

TEAM

Martin Heide, Dean Boothroyd, Emily Van Monger, David Allouf, Takasumi Inoue, Liam Oxlade, Michael Strack, Richard Le (NH Architecture); Mike Rainbow, Jan Talacko (Ark Resources); John Bahoric (John Bahoric Design); Bryan Chung, Chea Yuen Yeow Chong, Anna Lee, Amelie Noren (RMIT Architecture Students)

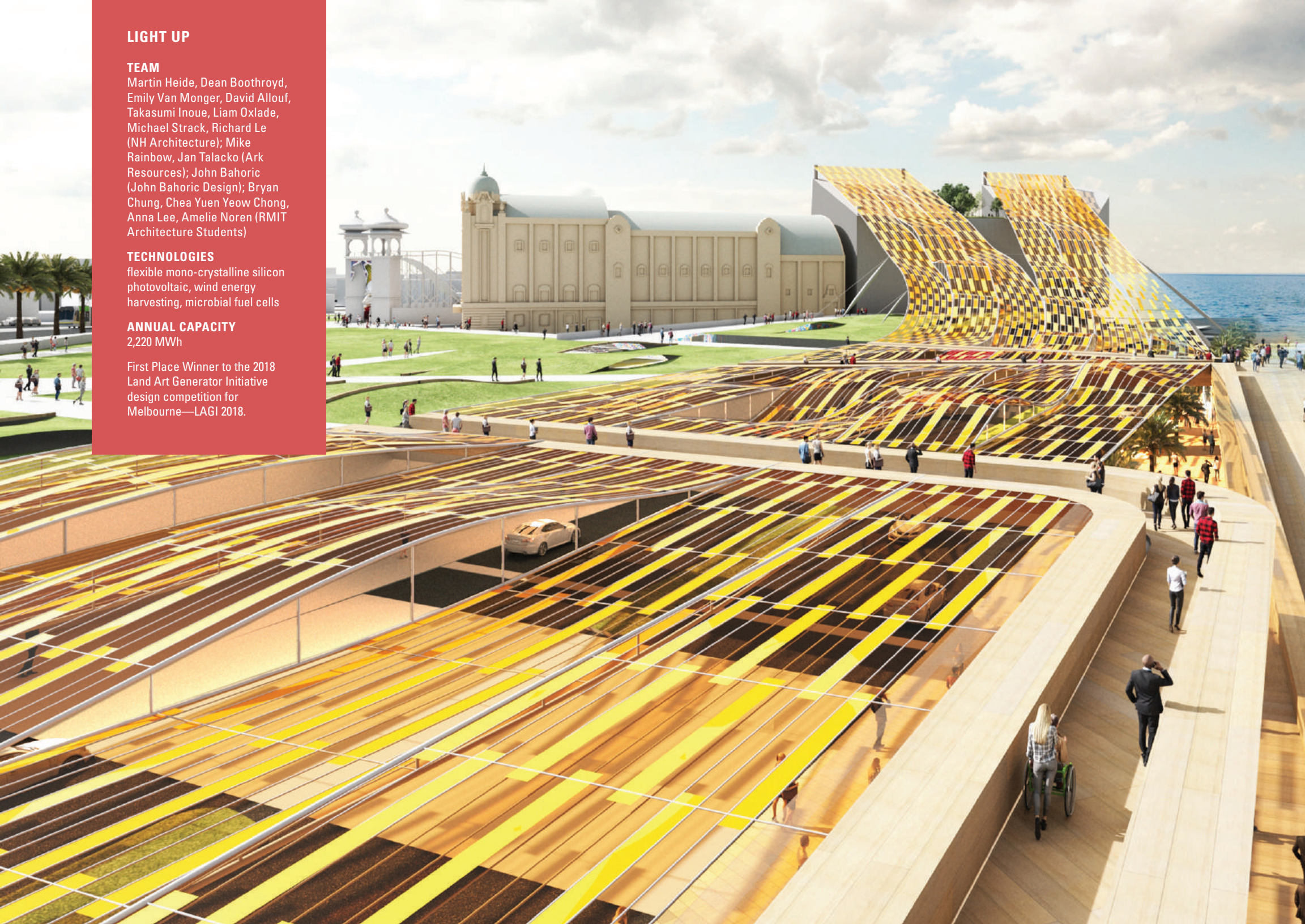
TECHNOLOGIES

flexible mono-crystalline silicon photovoltaic, wind energy harvesting, microbial fuel cells

ANNUAL CAPACITY

2,220 MWh

First Place Winner to the 2018 Land Art Generator Initiative design competition for Melbourne—LAGI 2018.



TECHNOLOGY TYPE
flexible thin film
(OPV)

Conversion Efficiency
8%–12%

Capacity Factor
15%–20%
(depending on site conditions)

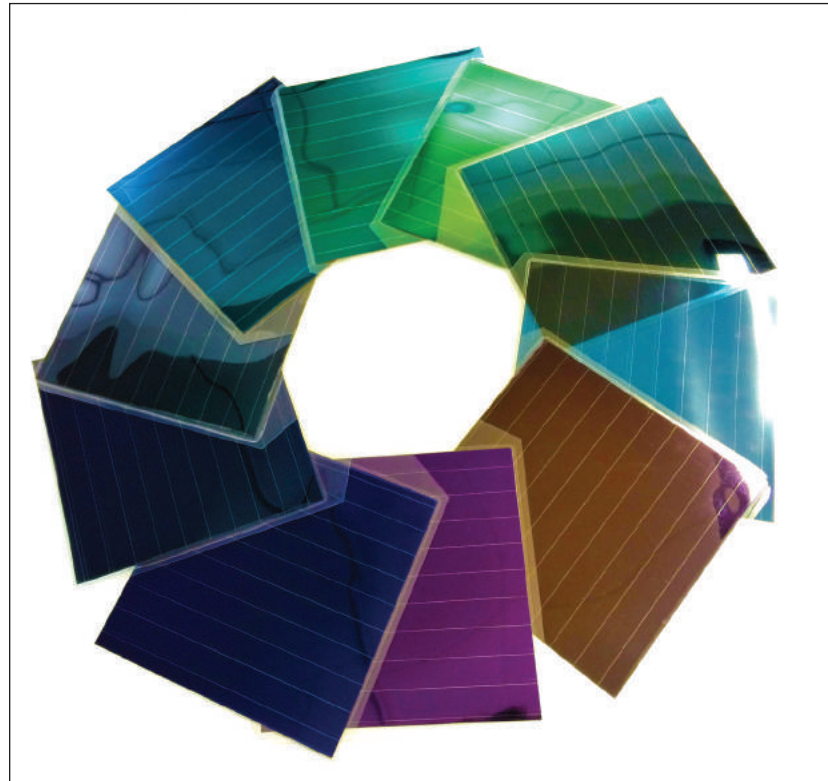


Image courtesy of Heliatek

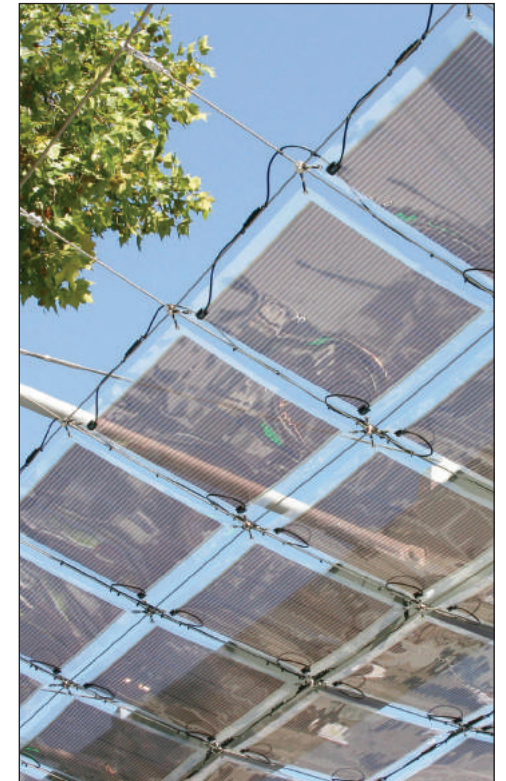


Image courtesy of Belectric OPV (Solarte™)



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 Land
Art Generator Initiative design
competition for Copenhagen—
LAGI 2014.

TECHNOLOGY TYPE

concentrated solar
power thermal
(CSP)

Conversion Efficiency

20%–30%

Capacity Factor

20%–35%

(depending on type and site conditions)



Beam-down point-focus CSP heliostat array at Masdar

Image courtesy of Lens Online from an interview with Marwan Basem Mokhtar

SOLAR HOURGLASS

TEAM

Santiago Muros Cortés

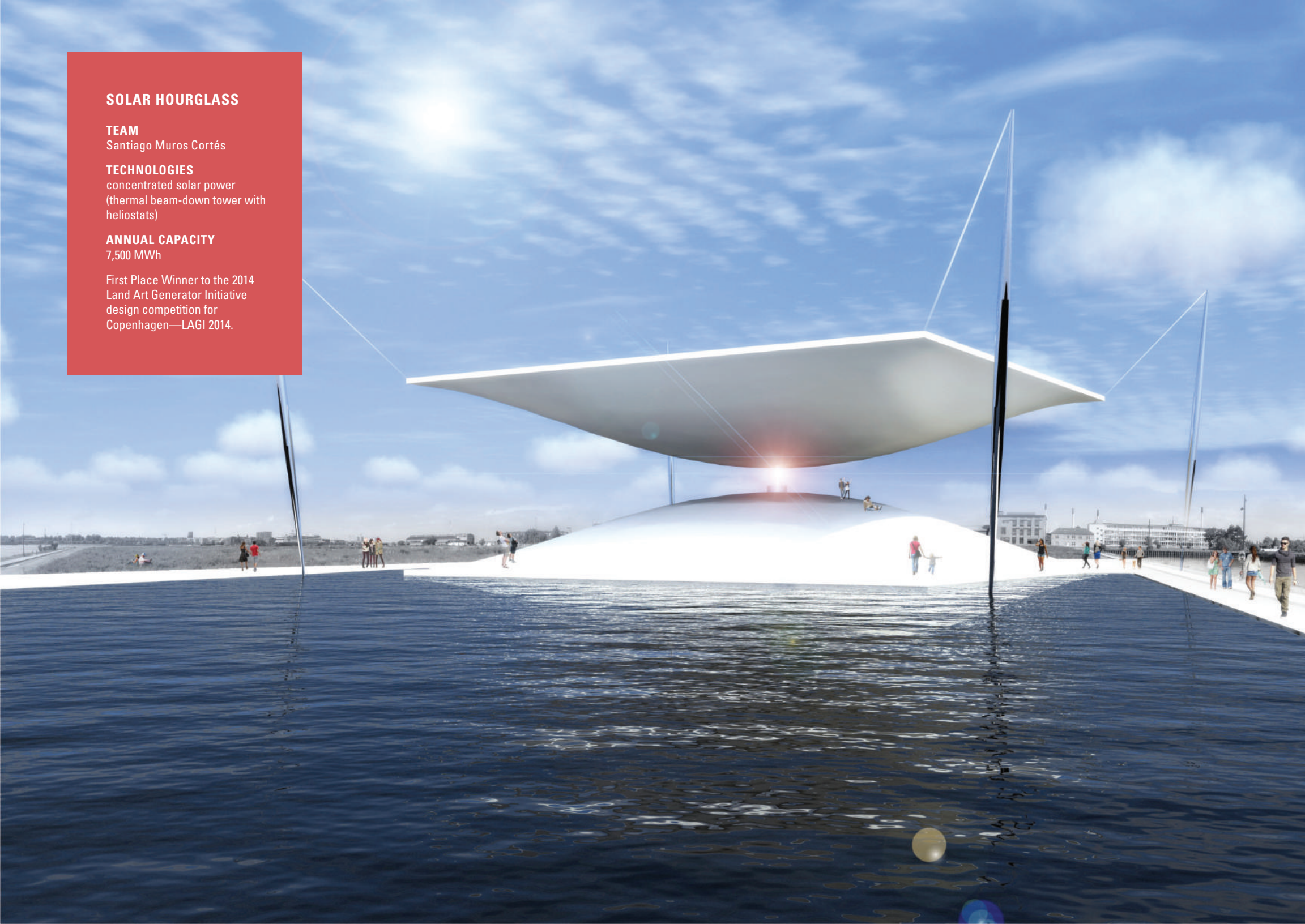
TECHNOLOGIES

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

ANNUAL CAPACITY

7,500 MWh

First Place Winner to the 2014
Land Art Generator Initiative
design competition for
Copenhagen—LAGI 2014.



WINDNEST

DESIGNER

Trevor Lee, Suprafutures

TECHNOLOGIES

compact acceleration wind turbine, thin film solar

ANNUAL CAPACITY

30 MWh

A submission to the 2010 Land Art Generator Initiative design competition for Abu Dhabi—LAGI 2010.

Re-imagined and built for SEE MONSTER a part of the UNBOXED UK Festival.

2015 prototype supported by Heinz Endowments, Henry Hillman Foundation, Horne Family Foundation, and the National Endowment for the Arts.





Community Solar Installation Image Credit Photo by Gleb Garanich, REUTERS



SOLAR MURAL ARTWORKS

ART + ENERGY CAMP

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)

A PROJECT OF
Land Art Generator Initiative
Conservation Consultants, Inc.
Homewood Renaissance Association

“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)

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



Land & Ocean Areas to support a **100% Renewable, Zero-Emissions, Regenerative** Global Economy

PWh of energy supply per year

Area Required for Energy Generation

Area Required for Energy Generation

0.13 Tidal Energy

718 km²

0.38 Wave Energy

4,376 km²

0.89 Geothermal

509 km²

6.39 Hydroelectricity

101 km²

2.56 Utility CSP

18,565 km²

Concentrated solar power thermal

26.71 Utility Solar Photovoltaic (PV)

283,081 km²

Energy Landscapes

92,586 km²

PV Modules Only

The green area shows the additional space between solar modules in rural energy landscapes installed at 60 MWac/km².

16.61 Commercial Rooftop Solar PV and Thermal

123,043 km²

Energy Landscapes

57,590 km²

PV Modules Only

Installed density of 85 MWac/km² (panels placed end-to-end equals 182 MWac/km²).

15.33 Residential Rooftop Solar PV and Thermal

113,580 km²

Energy Landscapes

53,160 km²

PV Modules Only

Equal to 17 billion residential (60-cell) modules or solar on 1.5 billion single family homes.

46.00 Onshore Wind

860,086 km²

Energy Landscapes

53,755 km²

Wind Turbines Only

Based on GE 3MW-137 with a 137 m diameter rotor and a 3.6 MWp nameplate at 40% capacity factor and a 4 rotor diameter on-center spacing. The green area illustrates that farming co-exists with onshore wind.

12.78 Offshore Wind

482,799 km²

Energy Oceanscapes

11,787 km²

Wind Turbines Only

Based on Siemens SG 11.0-200 DD with a 200 m diameter rotor and a 11 MWp nameplate at 45% capacity factor and a 6.4 rotor diameter on-center spacing.

128.00 pwh Total Primary Energy Supply (TPES)

How much energy?

The total primary energy supply of the world within our fossil-fuel powered economy circa 2021 is 170 Petawatt-hours (PWh) per year. This is equivalent to around 70 PWh of electricity due to the greater conversion efficiency of electricity. For the purposes of this map we have assumed **128 PWh** of total primary energy supply, allowing for economic growth and broadly shared prosperity.

Projection

This map uses the Web Mercator projection for its conformality. It avoids the deformation of equal-area projection. The energy landscape squares are therefore to-scale along the equator.

population centers

We have already paved over or built structures on **800,000 km²** of the earth (the area of the pink square).

The same 800,000 km² area is also shown on the world map at matching scale.

Using **276,266 km²** of land and **16,881 km²** of ocean we can power the regenerative global economy of the 21st century using only wind, water, and solar.

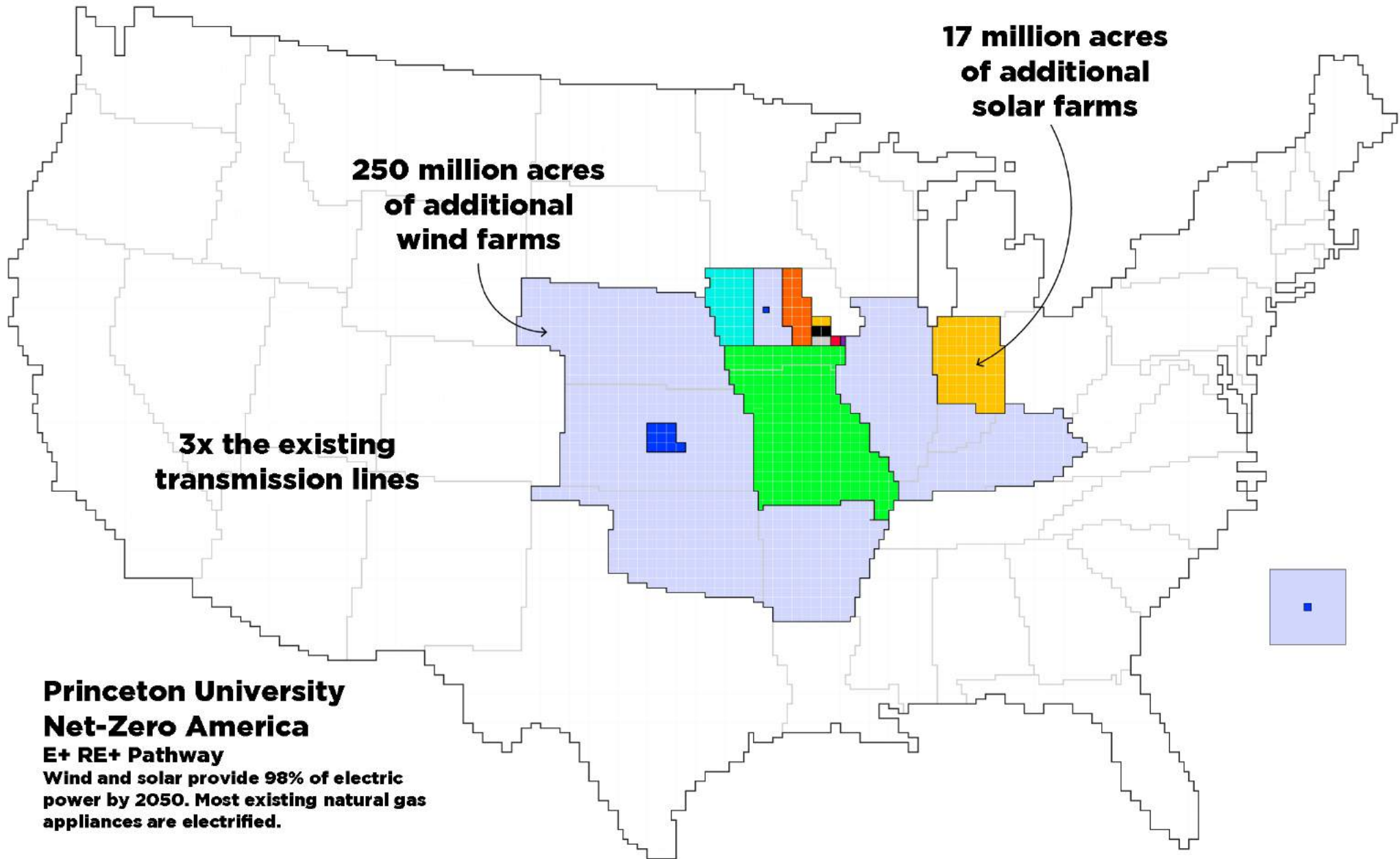
Total **energy landscapes** and **energy oceanscapes** comprise 1,392,599 km² and 487,892 km² respectively.

Remember: land use for solar and wind can often be shared with agriculture or other productive uses. Solar panels can also be sited on reservoirs or rooftops where they don't require any land.

For more information about this graphic along with methodology, references, and documentation visit:

<https://landartgenerator.org/blagi/archives/77565>

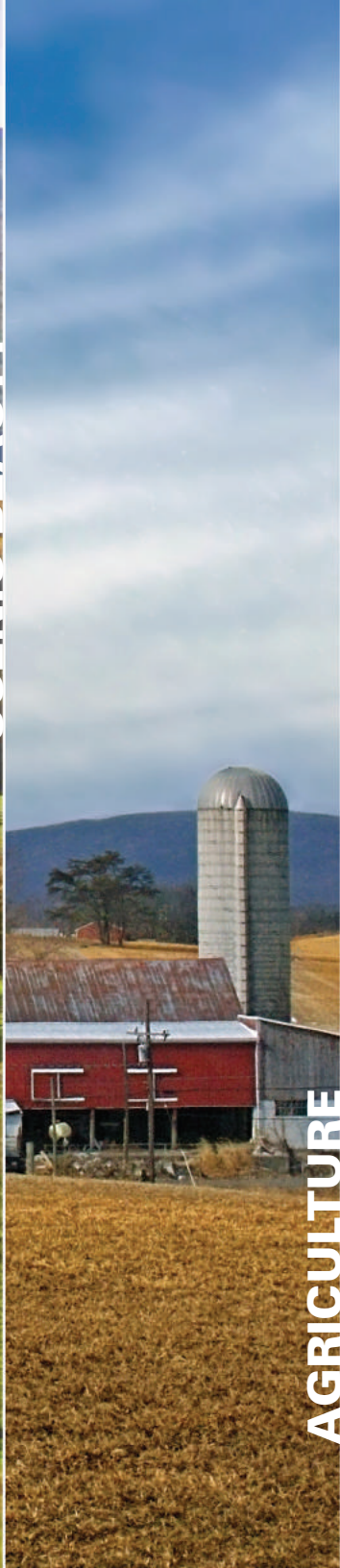
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<https://www.bloomberg.com/graphics/2021-energy-land-use-economy/>
by Dave Merrill



SCENIC BEAUTY



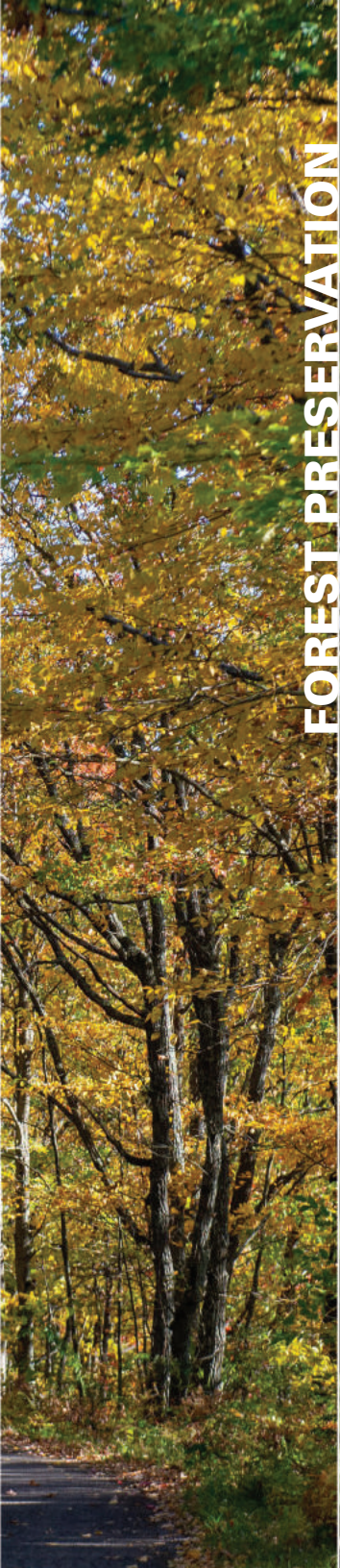
AGRICULTURE



RECREATION



LAND CONSERVATION



FOREST PRESERVATION



BIODIVERSITY

Land Art Generator Initiative

Elizabeth Monoian & Robert Ferry

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<https://landartgenerator.org>