Yale

UN environment programme

Ecological Living Network

the world is facing
twin crises: affordable
housing and climate change
optimists tell us this:
solutions are still possible
but time is running out

Ecological Living Network | ELN:

A collaborative program hosted by Yale CEA + UNEP

Global Crisis

Globally, 1.6 billion people (1 in 5) lack adequate housing, 100 million are homeless, and 850 million inhabit informal settlements, increasing their exposure to an extensive range of health and wellbeing hazards. Furthermore, the building sector is the largest consumer of non-renewable resources, contributing over 37% of climate change emissions, endangering communities, causing shortages and conflict across the world. Even among wealthy areas with adequate housing, indoor environments are far less healthy than outdoor environments and lead to countless negative impacts on health and well-being. Something must change.

Uplifting Local Culture + Global Innovation

The Yale Center for Ecosystems + Architecture (Yale CEA) has partnered with the United Nations Environment Program (UNEP) on two precedent projects: 1. The Global Report on Building Materials and Environment, that will recommend major policy changes to support future sustainable materials, and 2. The Ecological Living Network (ELN) which is establishing a series of high-profile demonstrations of the most promising solutions for future net-zero housing and disaster relief that reinforce the principles outlined in the global report. The ELN Program proposes to conduct demonstrations of future housing solutions that are appropriate to different climates and cultures. Partnering and engaging with local practices to spur both global and regional material innovation, ELN provides a tangible vision of future systems that could inform local communities and world leaders alike.

We Can Live On Planet Earth Differently

ELN showcases visions for a different future where we harness nature-based solutions to deliver housing with materials that are biobased, non-toxic, and sourced from circular material economies. A future where buildings are both comfortable and on-site net-zero with energy and water that comes from sustainable, clean, and renewable sources. Crucially, a comfortable home must simultaneously provide energy, water, air quality, food, and beauty.

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"The Problem is Complexity.
The Solution is Integration"

The Ecological Living Network (ELN) is a partnership between Yale CEA and UNEP focusing on revolutionary approaches to the built environment and housing. ELN shows how on-site net-zero can be achieved by linking multiple systems through ecosystemic synergy. ELN functions as a flexible open testing framework, allowing for the testing of various energy, weather, and materials systems as they emerge in labs and industry. Pairing groundbreaking scientific research with equally rigorous aesthetics, ELN aims to deliver the feeling of home and oasis at an affordable price.

ELN is an international framework that integrates multiple universities, industries, and national labs from 5 different continents. The first installation of ELN at the UN Headquarters in New York was named as the #1 World Changing Idea by UN News and World Report. The second installation, showcased at the UN Environment Program World Assembly in Nairobi, Kenya, was the world's largest 3-D printed biomaterials structure. Our next installation will take place at COP28 in Dubai, UAE, demonstrating radical new approaches in material and environmental systems to decarbonize the building sector.

All the component parts for the Dubai Pavilion will be designed for disassembly and reassembly, allowing for new configurations at future demonstrations from India to Central America. Live data will be streamed from these locations to an open data visualization platform called SEVA.

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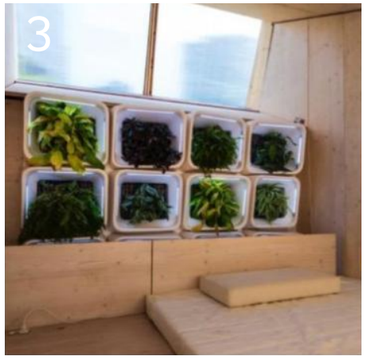
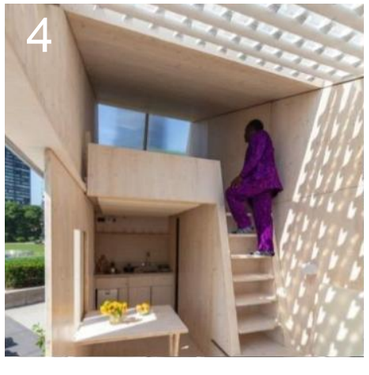
we need new economic models that usher in lifestiles that support our planet and humanity
we can solve both problems with one solution:
ecosystemic thinking





ELN I.
Ecological Living Module | UN Headquarters Plaza, New York

The first installation in the ELN program was the Ecological Living Module (ELM) at the UNHQ Plaza in New York City. While conforming to the typical footprint of refugee and informal migrant housing, ELM NY was able to provide a secure source of clean water, air, and energy. While using the food producing plant systems to clean the air and water, this installation demonstrated novel on-site systems from different labs across the world. Cross laminated timber sourced from local sustainable forestry practices was chosen for ELM NY's structural system.

ELM NY aligns with 9 of the 17 United Nations Sustainable Development Goals and was voted the #1 World-Changing Idea by the UN News and World Report. ELM NY was featured in dozens of international press articles and design awards. For more details on ELM NY click here.

1. Urban Agriculture
2. Onsite Solar + Water
3. Plant-Based Air + Water Purification
4. Circular Bio-Materials

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ELN II.
Nairobi Ecological Pavillion | UNEP Headquarters, Nairobi, Kenya

The second installation in the ELN program, featured at UNEA-4, was at the time the largest 3-D printed structure made of biomaterial bi-products. Using locally sourced agricultural waste material, this pavilion demonstrated the future potential for small farmers to upcycle agricultural waste into durable goods and products using renewable solar energy. Many non-toxic material processes including coconut, rice, bamboo, soy, corn and mycelia (mushrooms) technologies were displayed. These material systems demonstrate novel solutions for renewable forest and farming practices as well as additional income sources for farmers, across Kenya, Uganda, Ghana, Rwanda and the United States.

By utilizing bioclimatic principles and emerging bio-materials, we offer alternatives to traditional social housing schemes. The pavilion highlights the potential and viability of these renewable materials as next-generation building materials. For more information on ELN Nairobi, click here.

1. Agriculture By-Product
2. Onsite Concentrating Solar
3. Onsite Rain Water Purification
4. Radiant Thermal Comfort

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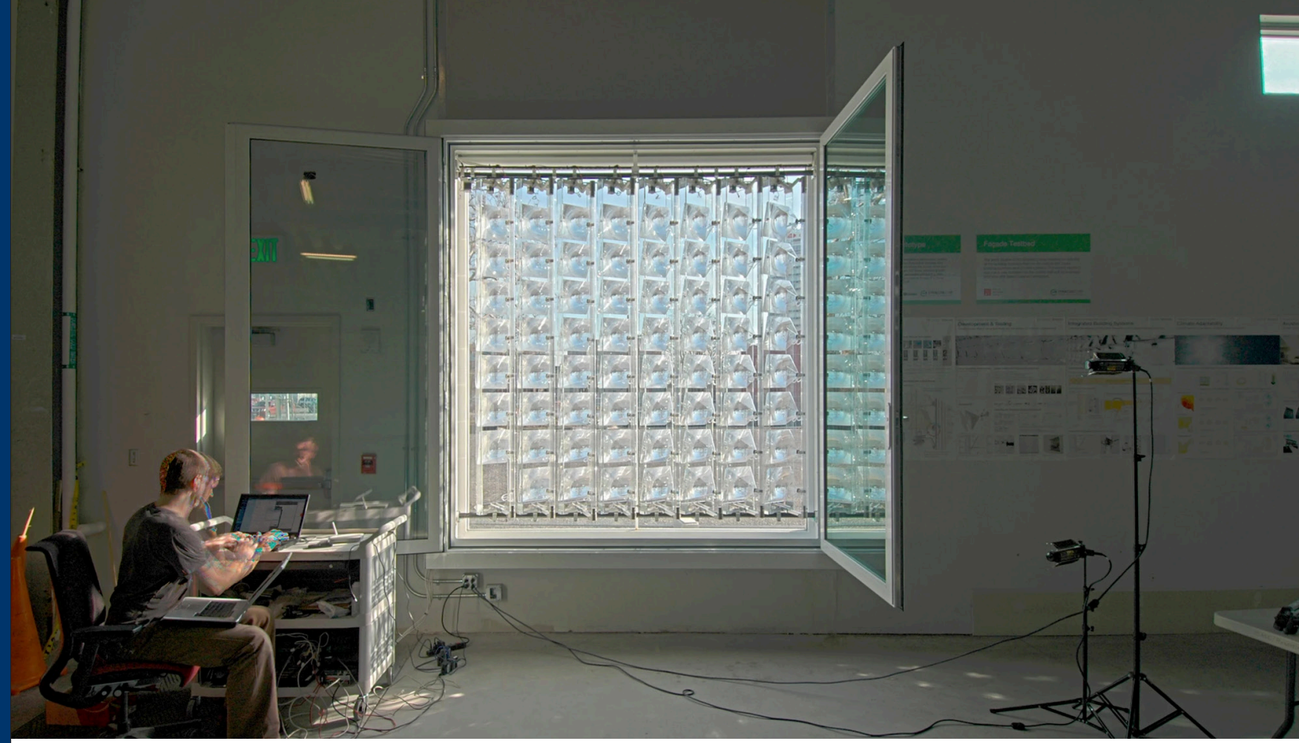
by developing a network of locations that demonstrate expertise in **extreme decarbonization** solutions for on-site net-zero energy, water, and food, **ELN** seeks to spark a revolution in global housing.



ELN III.
Building Materials + The Climate | COP 28, Dubai, November 2023

ELN Dubai at COP28 will offer a glimpse into an aesthetically beautiful, healthy vision for future low cost housing. It will address the need for alternative housing solutions in developing countries due to the worldwide growth of slums and the sharp increase in energy consumption. The exhibition at COP 28 will showcase conventional and next-generation concepts for transforming the housing sector through affordable, clean on-site energy generation.

Another highlight of the exhibition is the use of a sensor network for live, real-time monitoring. This data is presented on the SEVA platform, a web-based interactive tool that quantifies and displays both environmental performance and human health data in real-time. The sensors deployed in the exhibition provide live data on environmental conditions such as temperature, relative humidity, CO_2, VoC, sound, lighting, and air pressure levels. Additionally, they monitor the performance of building systems and human biometrics such as heart rate. This data will be visualized with technology developed for Yale CEA's BEEM Lab to provide a real time understanding of what is happening in the pavilion.

ELN will add an essential new dimension to the discussion at COP 28 as it represents an innovative approach to solve the global housing crisis. It can raise awareness about the significance of sustainable living by demonstrating what living with nature based solutions looks like. These solutions for on-site clean energy, water, food, and materials can be replicated around the globe in different climates. Furthermore the "touch and feel" of the ELN can provide a tangible experience that helps individuals understand the benefits of these living practices.

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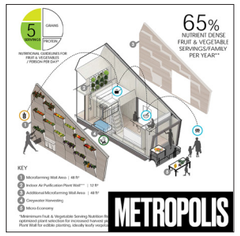
ELN Press + Awards



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Architectural Digest

Off-Grid Prefab Home Grows Its Own Food
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Rethink The Future

Un Backed, off grid tiny home
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2018 Residential Architect Award
Residential Architect Awards

Voted #1 World Changing Idea
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2019 New York Design Awards
2019 New York Design Awards

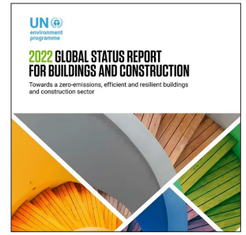
"Small in Stature, Big in Potential"
Wood Design & Building

NOW Design Spotlight
Better Future Awards

Super Sustainable Eco Housing Module
Biz Community

ELN Press + Awards

The Last Mile of Decarbonization
Fortune



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YSoA News

2019 American Architecture Award
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enel foundation at UN in Kenya
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Prototype shows promise in urbanizing Africa
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IISD, SDG Knowledge Hub

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UNEP & YaleCEA

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