TRI-COUNTY
REGIONAL ENERGY NETWORK
SAN LUIS OBISPO • SANTA BARBARA • VENTURA

Regenerative Design in Practice

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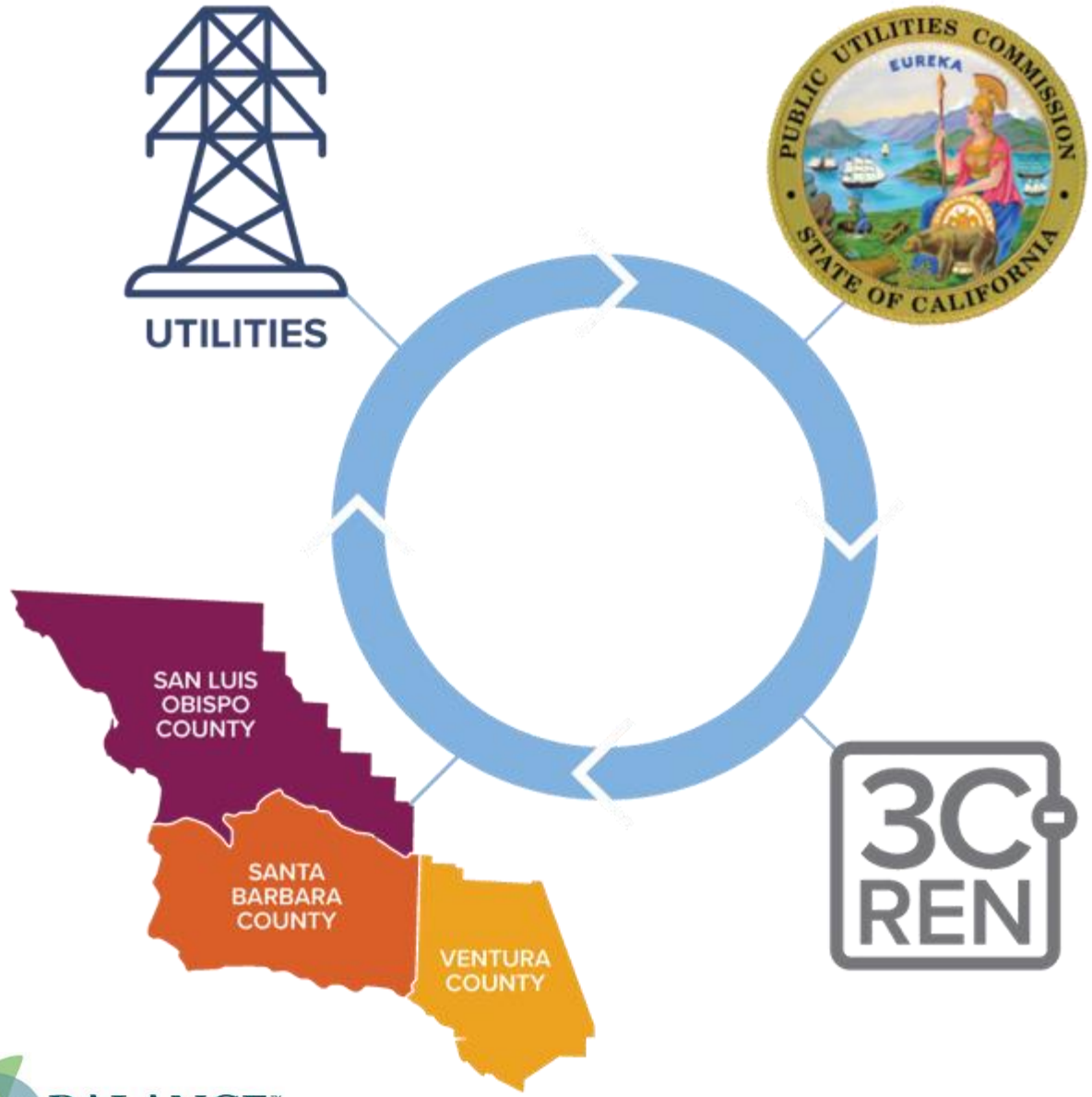
In Balance Green Consulting

July 17, 2025



Tri-County Regional Energy Network

3C-REN is a collaboration between the tri-counties

Our programs reduce energy use for a more sustainable, equitable and economically vibrant Central Coast

Our free services are funded via the CPUC, bringing ratepayer dollars back to the region

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Our Services

Incentives

HOME ENERGY SAVINGS

3c-ren.org/for-residents
3c-ren.org/multifamily

COMMERCIAL ENERGY SAVINGS

3c-ren.org/commercial

Contractors can enroll at
3c-ren.org/contractors

Training

BUILDING PERFORMANCE TRAINING

3c-ren.org/events
3c-ren.org/building

ENERGY CODE CONNECT

3c-ren.org/code

View past trainings at
3c-ren.org/on-demand

Technical Assistance

AGRICULTURE ENERGY SOLUTIONS

3c-ren.org/agriculture

ENERGY ASSURANCE SERVICES

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Today's Learning Objectives

- Be able to differentiate between sustainable and regenerative design principles
- Understand net positive energy, water and materials through the Living Building Challenge framework
- Build awareness of Equity in design and construction practices
- Identify strategies for natural sequestration and biophilic design elements

Learning Units:

- 1.0 AIA HSW LU approved for this course
- ZNCD 1.0 for CAB

Slides and video recording will be available.

Regenerative Design, In Practice!

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In This Presentation

Moving from Sustainable to Regenerative Design

Regenerative Components/Structure

Regenerative Thinking in Action!

What's Next?

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Moving from Sustainable to Regenerative Design

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Imagining our future built environment

OR

Image Credit: Mythoxia (left); A Solarpunk illustration by artist Jessica Perlstein (right)

or something else…

As we shift our design and construction from past practices to 'less bad' to sustainable, can we now shift to healing, to restoration, to regeneration?

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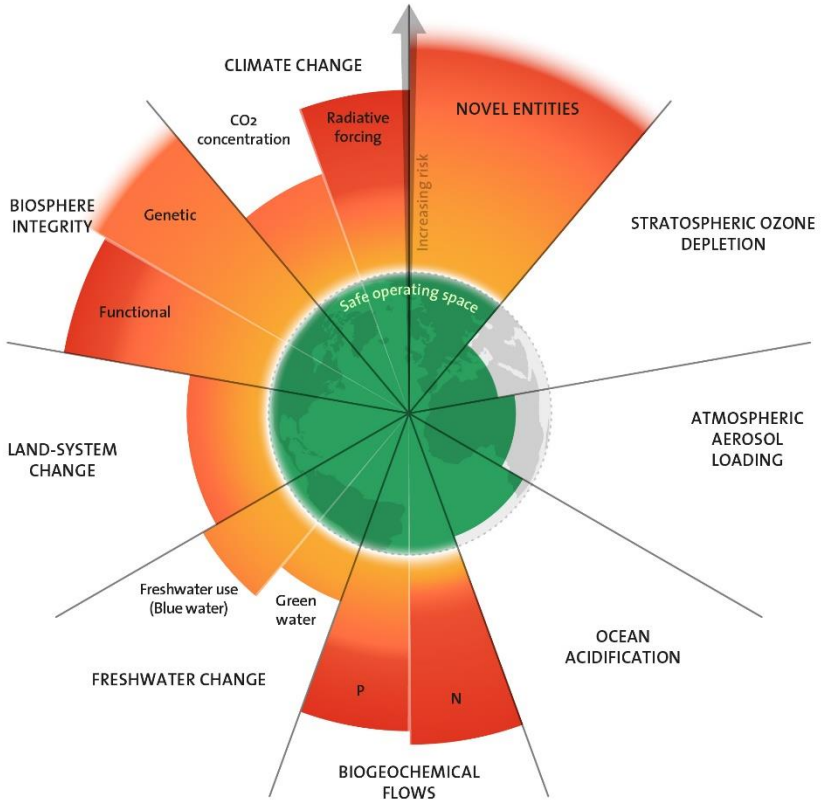
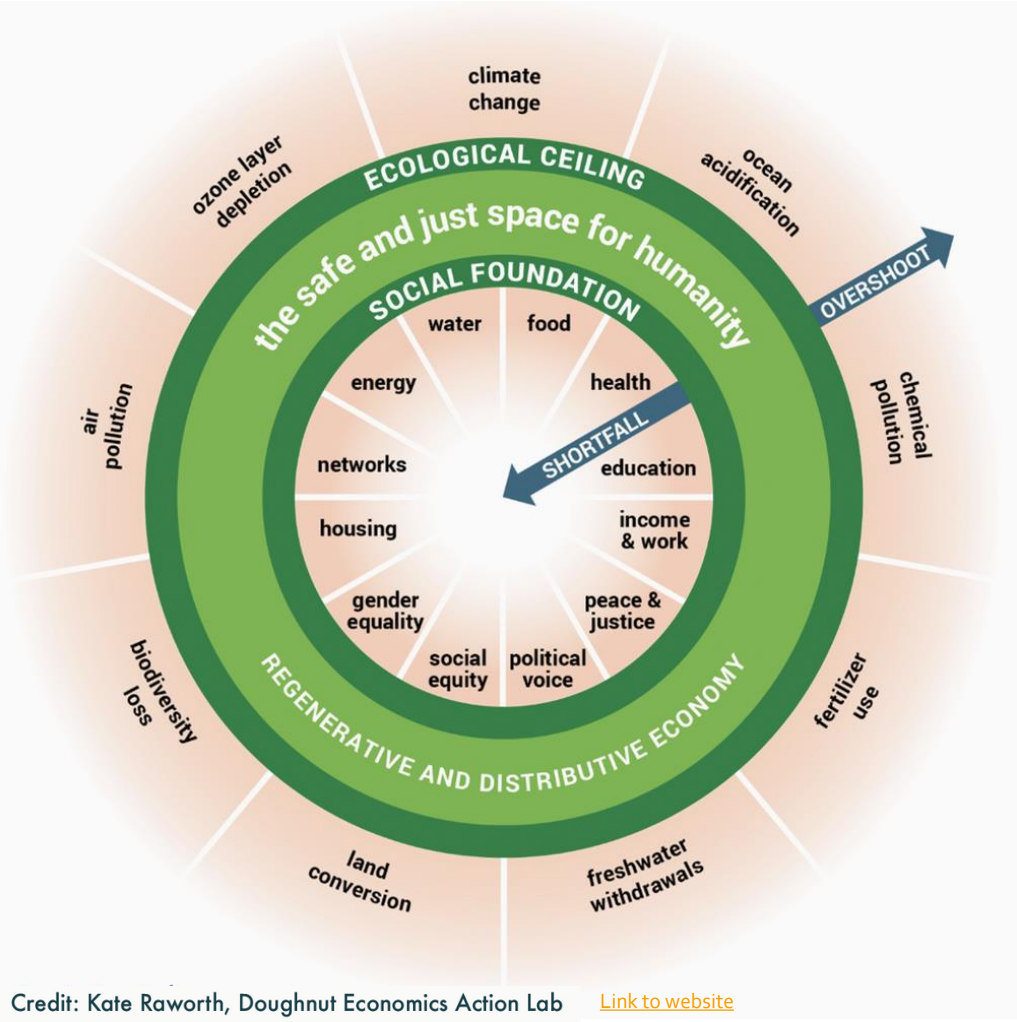
More Context: Planetary and Social Health



Credit: Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al. 2023, Steffen et al. 2015, and Rockström et al. 2009)



Credit: Kate Raworth, Doughnut Economics Action Lab [Link to website]

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Sustainable to Regenerative

- "**Regenerative**" describes processes that support, replenish, and respect the sources of their energy and resources.
- "**Regenerative Design**" is a process-oriented *approach to design* in pursuit of planetary and community health.

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Sustainable to Regenerative

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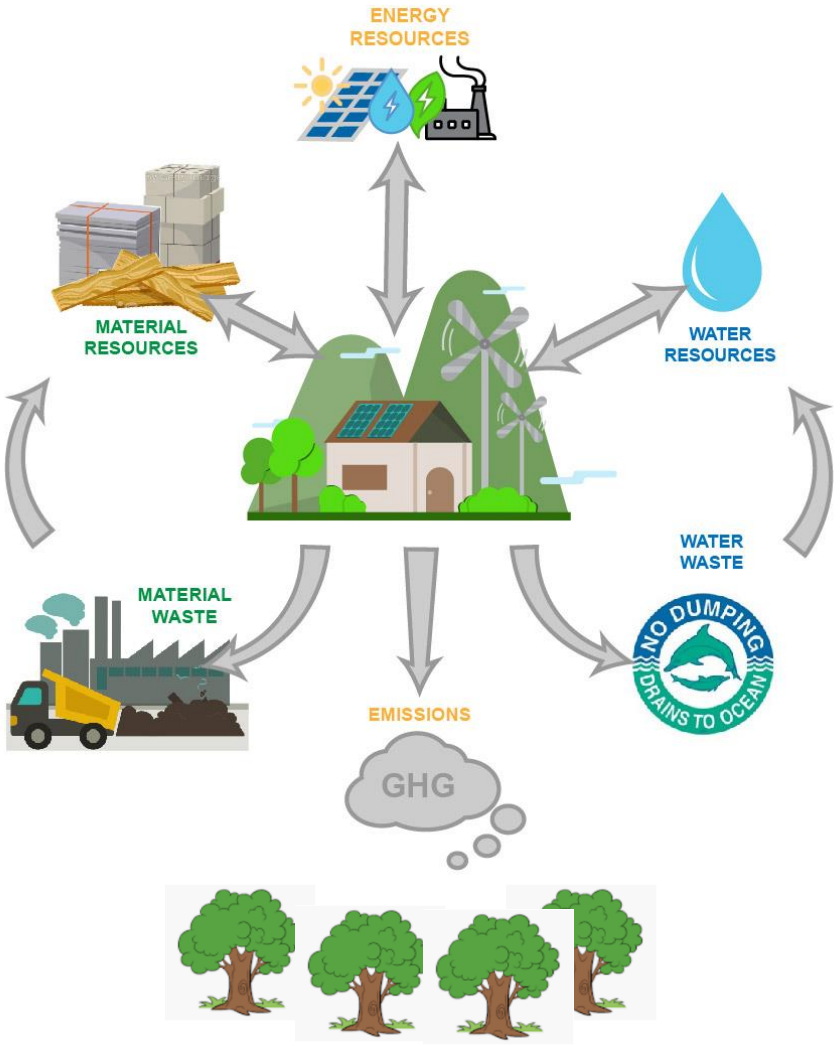
Sustainable vs Regenerative

*Net positive Energy, Water, and Waste



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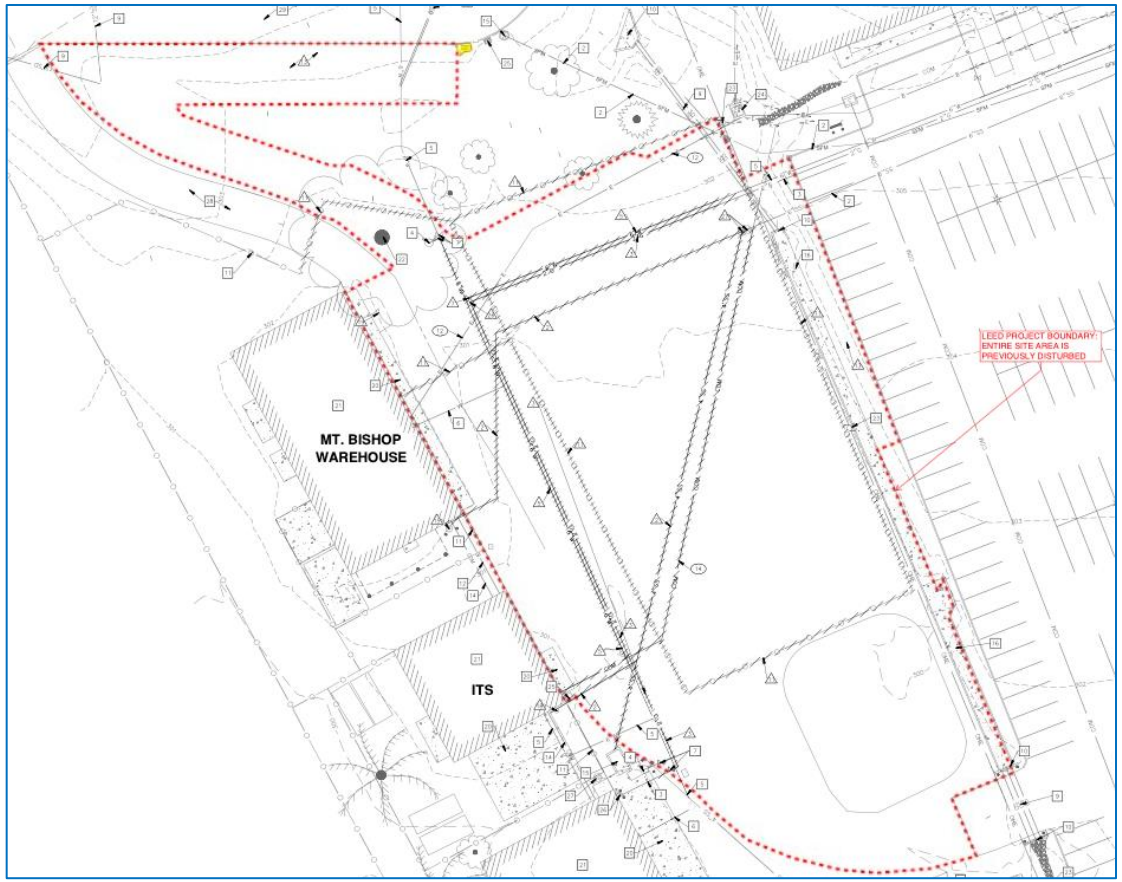
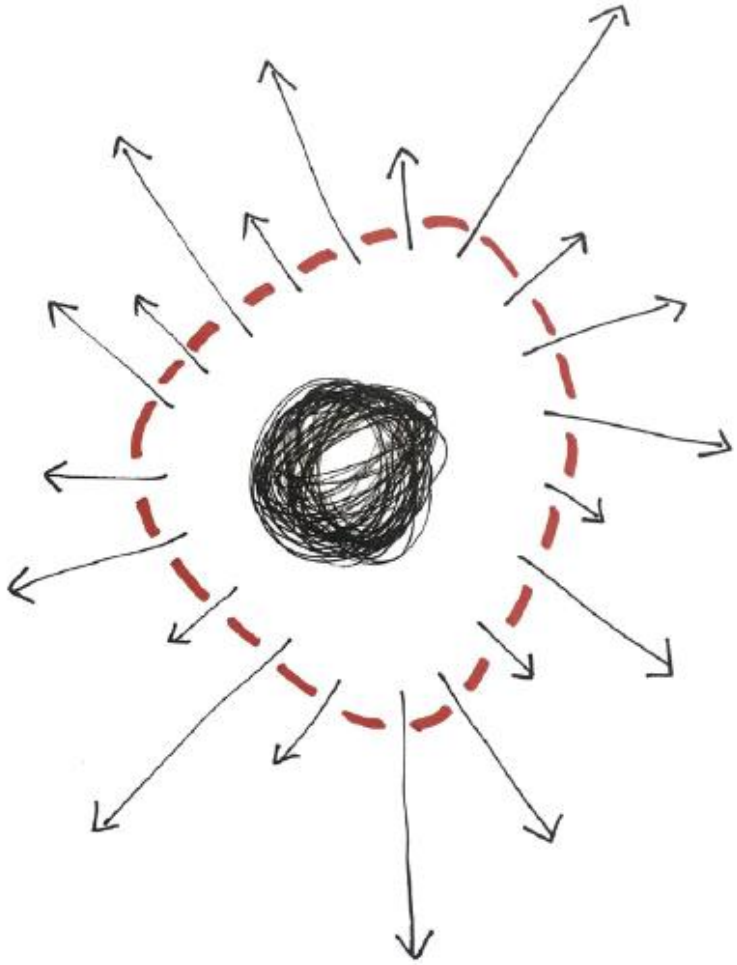
Expanding the Boundaries of Place





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Setting a New Target for Good Design

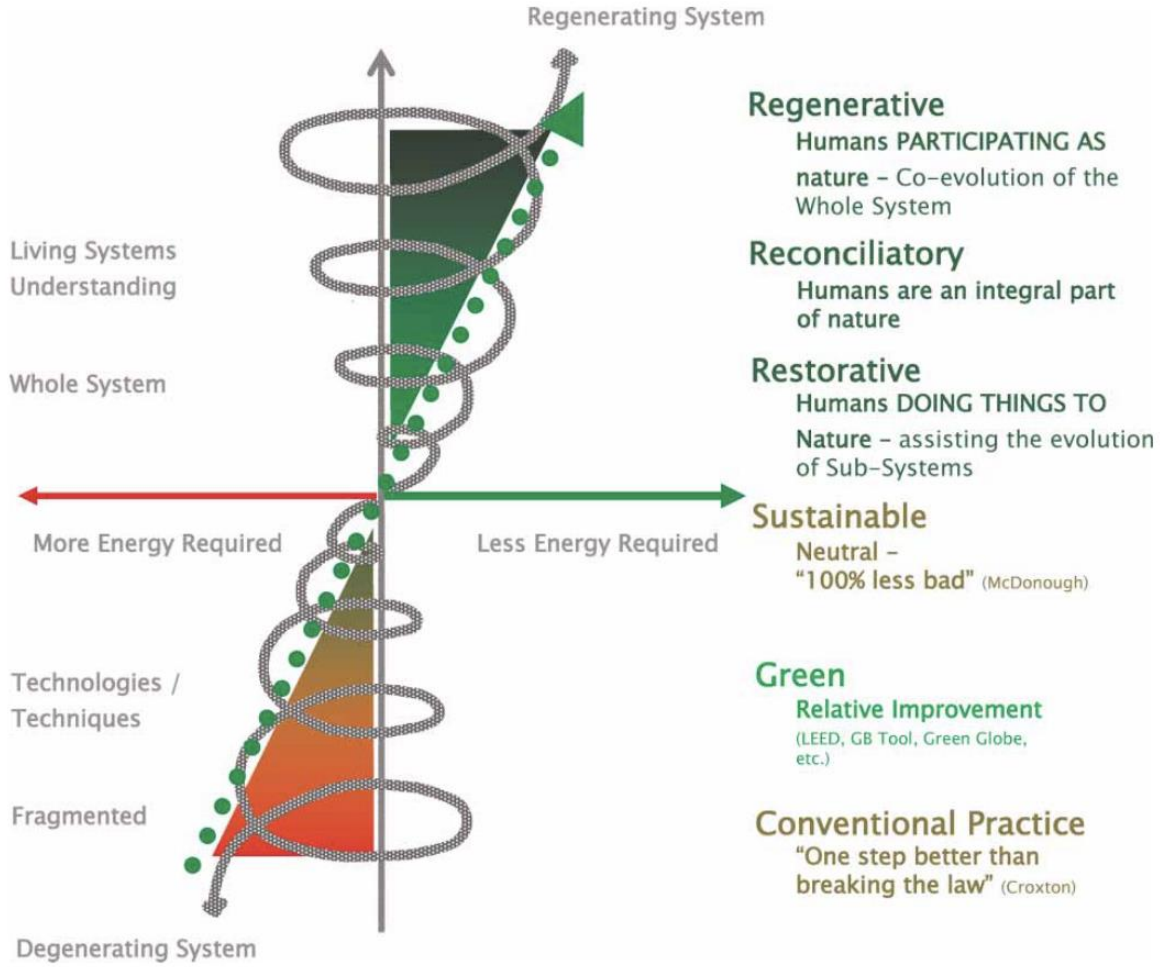
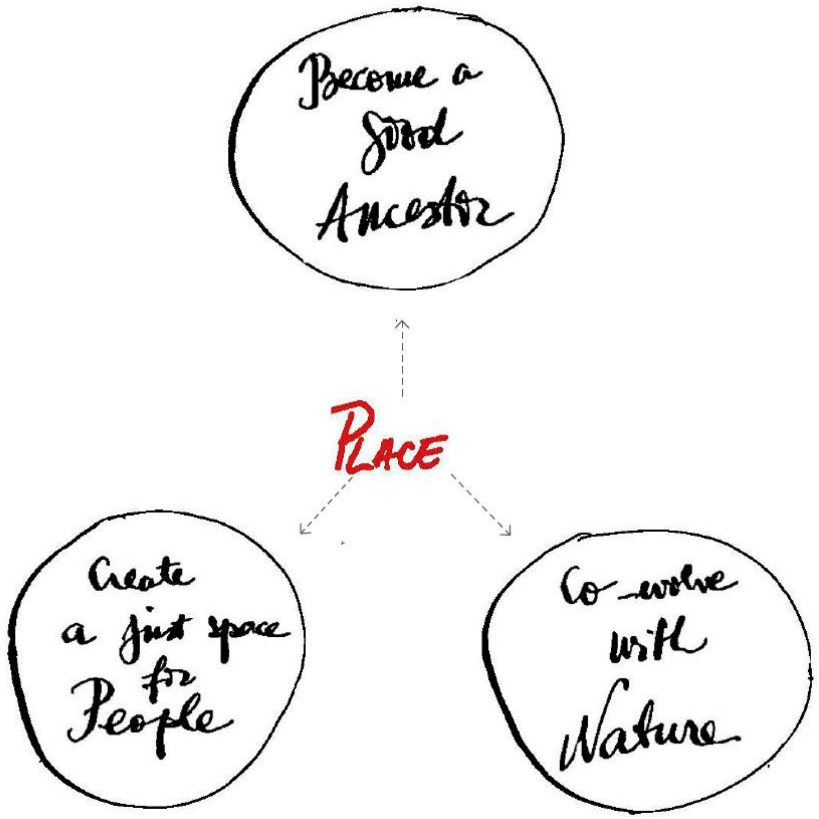
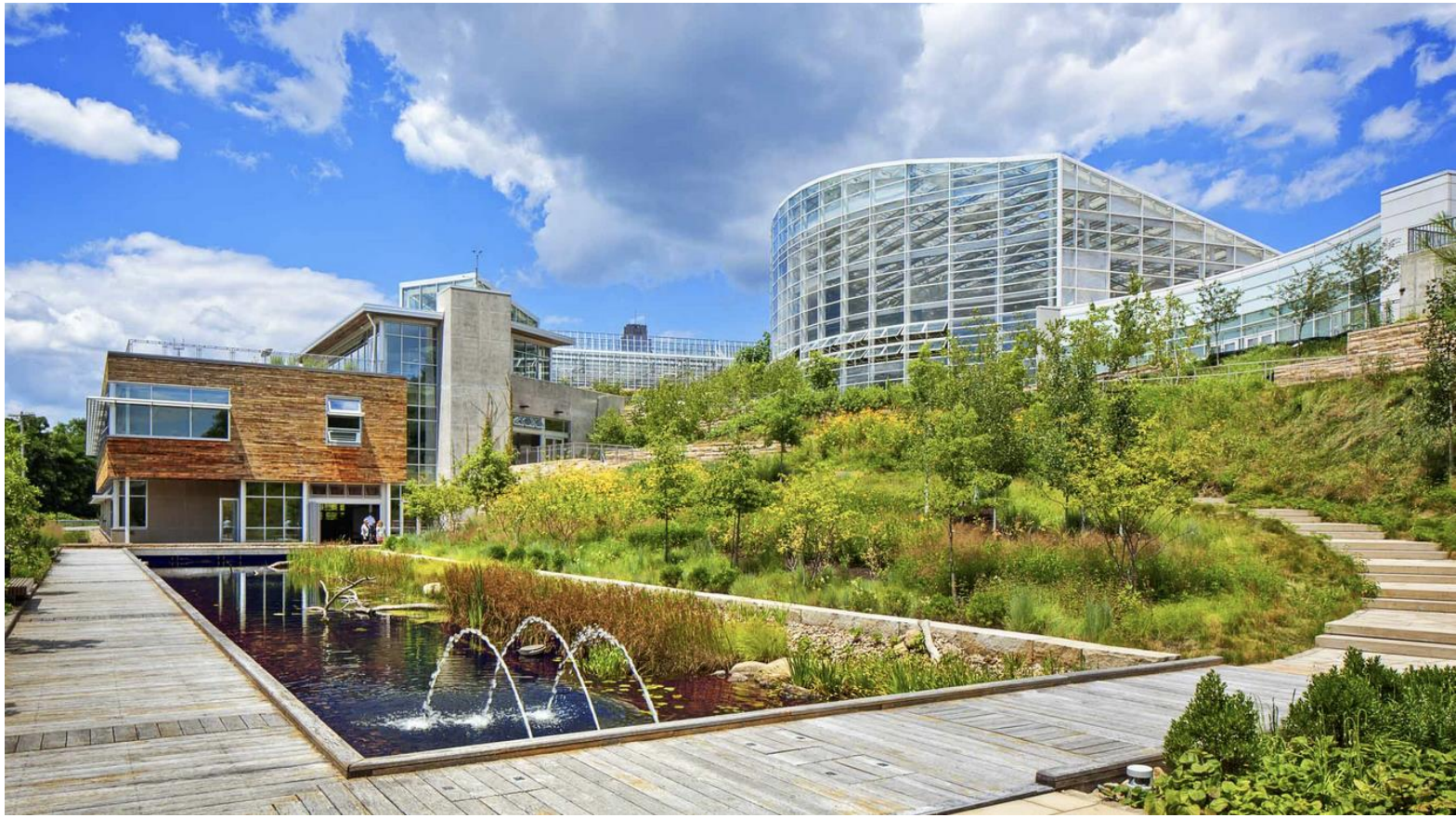


Figure 1 Trajectory of Environmentally Responsible Design

Graphic from: Bill Reed (2007) Shifting from 'sustainability' to regeneration, Building Research & Information, 35:6, 674-680, DOI: 10.1080/09613210701475753

Evolving Role of Architects





Credit: *UK Architects Declare Climate & Biodiversity Emergency*

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Players in this Field

THE REALLY REGENERATIVE CENTRE

AIA

CALGreen®

CALGreen – eventually?

LIVING FUTURE℠

UK Architects Declare
Climate & Biodiversity
Emergency

REGENESIS INSTITUTE
for Regenerative Practice

architecture 2030

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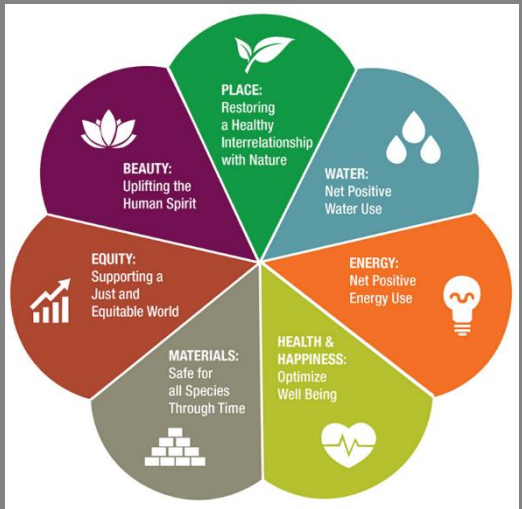
Living Building Challenge Framework



PLACE

Restoring a healthy interrelashionship with nature.

WATER

Creating developments that operate within the water balance of a given place and climate.

ENERGY

Relying only on current solar income.

HEALTH + HAPPINESS

Creating environments that optimize physical and psychological health and well being.

MATERIALS

Endorsing products that are safe for all species through time.

EQUITY

Supporting a just and equitable world.

BEAUTY

Celebrating design that uplifts the human spirit.

Living Future website

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Components of Regenerative Design

- Place
- Community
- Net Positive Water & Energy
- Materials

Your ideas and examples welcome!

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Regenerative Design: Place

Credit: National Assoc. City Transportation Officials

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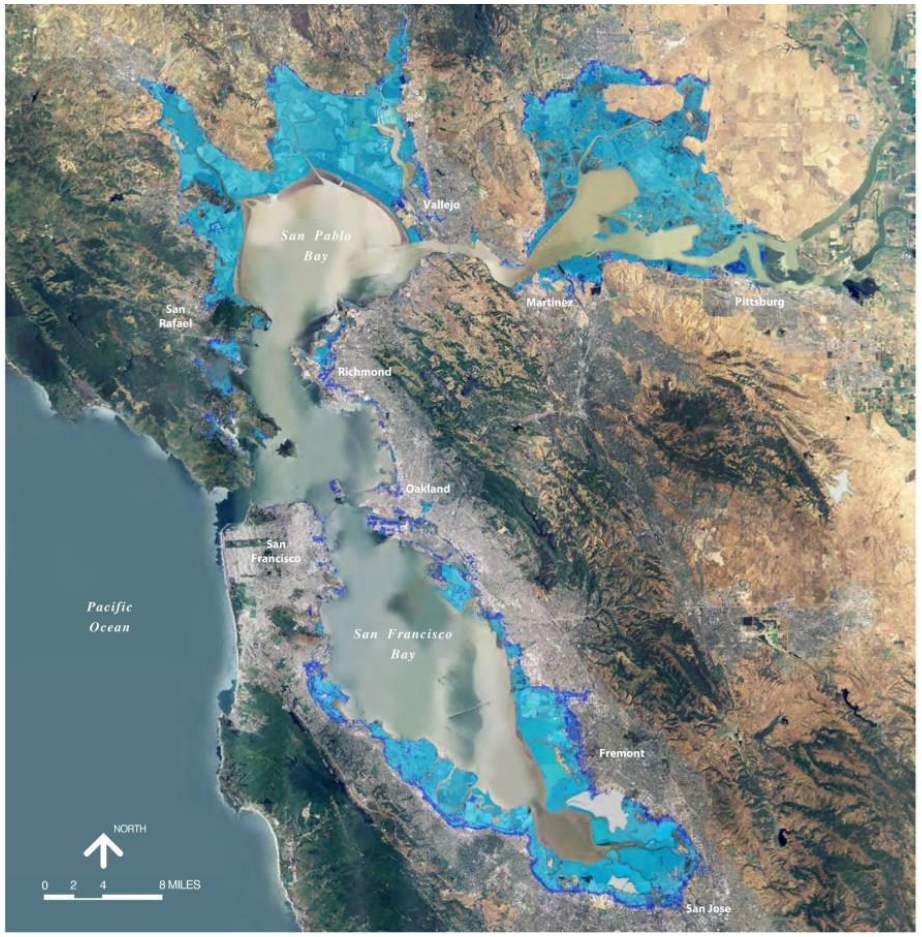
Place: Points for Analysis

- Climate
- Ecology
- Human history
- Hazards
- Inundation



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Responses to analysis example:
Rainwater management and creating “sponge cities”

***Jinhua Yanweizhou Park*, China**

Designed to adapt to monsoon floods

South Thornton Natural Drainage System (NDS) Project, Seattle, WA

Permeability to slow, spread and sink rainwater

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Restoring water basins and natural hydrology

- Agrarian Hotel, Arroyo Grande
- Bioswales for rainwater management and groundwater recharge
- Creek restoration for natural hydrology

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Building on History – The Phoenix

Phoenix Ironworks. Image courtesy of Human Nature

Phoenix Ironworks built in the 1800s

Reimagined as neighborhood built around 10 courtyard with design guidelines using “Golden threads” to connect to history.

Community spaces

The *Every Hall* - built between 1860-1873 and used as the main casting hall in the Phoenix Ironworks - will become a **flexible co-working space and community canteen**.

The *Foundry Workshops*, originally used as a Smiths shop by the Phoenix Ironworks will continue the site’s long history of manufacture and creativity by providing rentable **workspace for makers, artists and craftspeople.**

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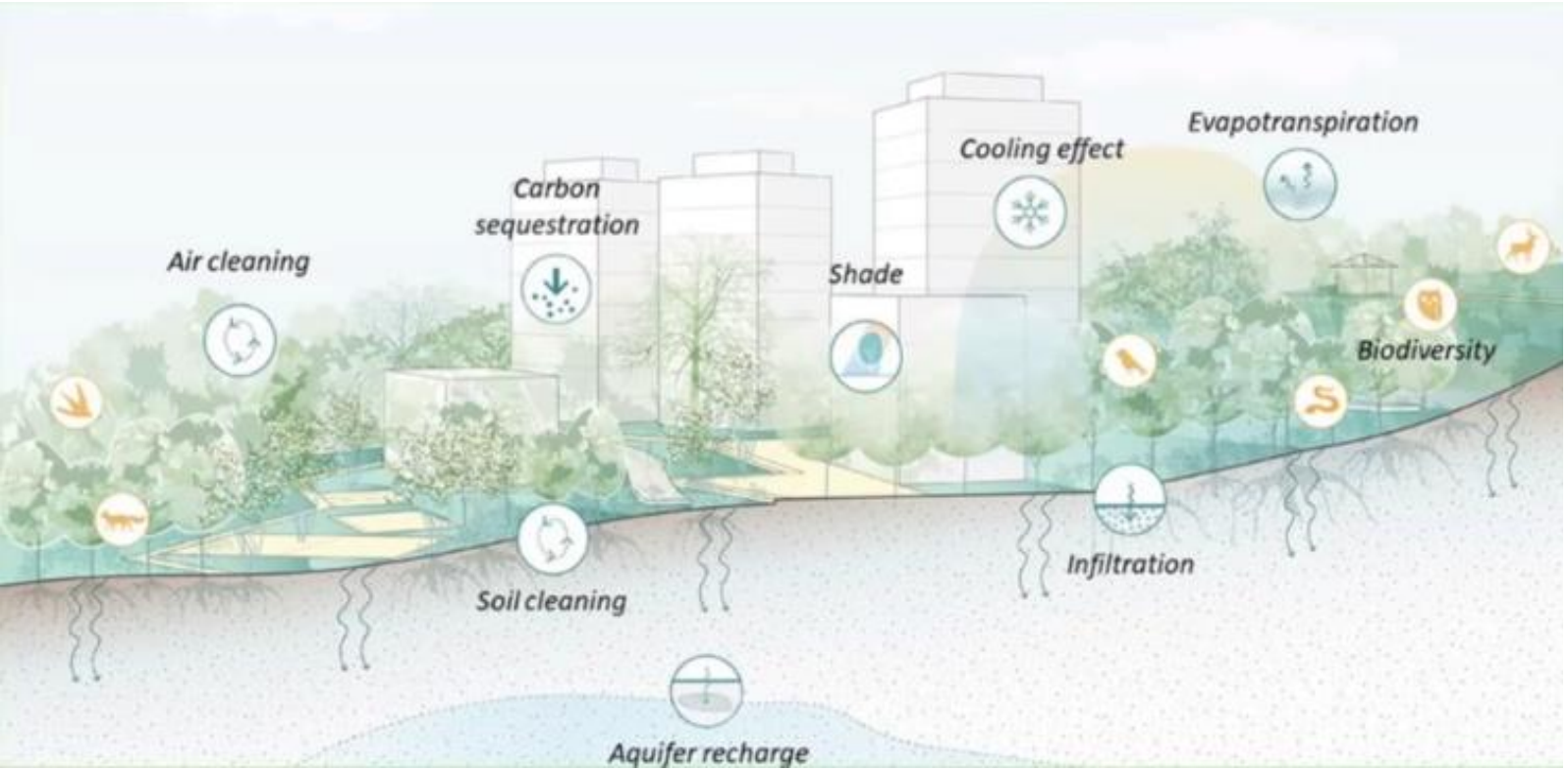
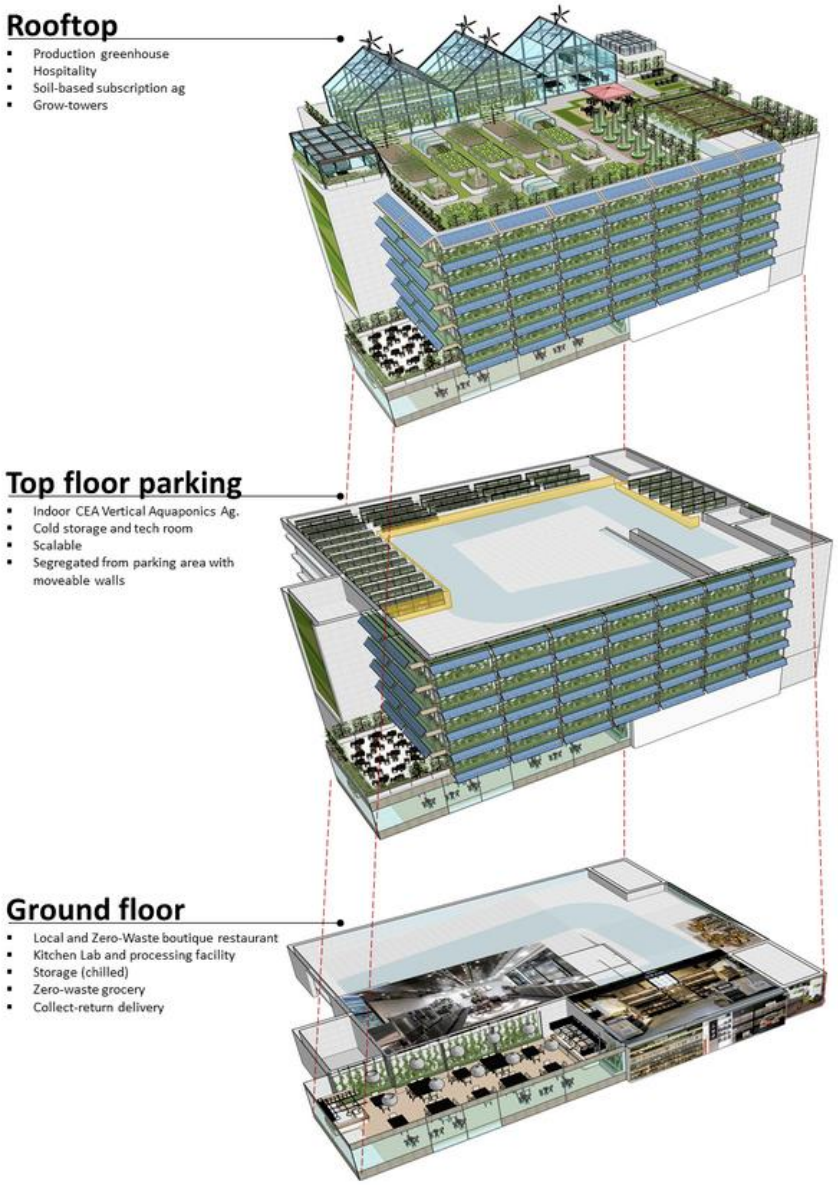
Urban Agriculture and Gardens



Credit: Smart Cities



Credit: https://www.agritecture.com/blog/2021/7/13/remodeling-a-multistory-carpark-into-a-future-city-food-hub-in-ireland

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City Planning

"The most sustainable building,

designed for net zero with rainwater catchment, carbon sequestering structural systems, and drought tolerant landscaping,

may still increase traffic, displace residents, or be out of scale with its neighbors."

- AIA California Regenerative Design workbook

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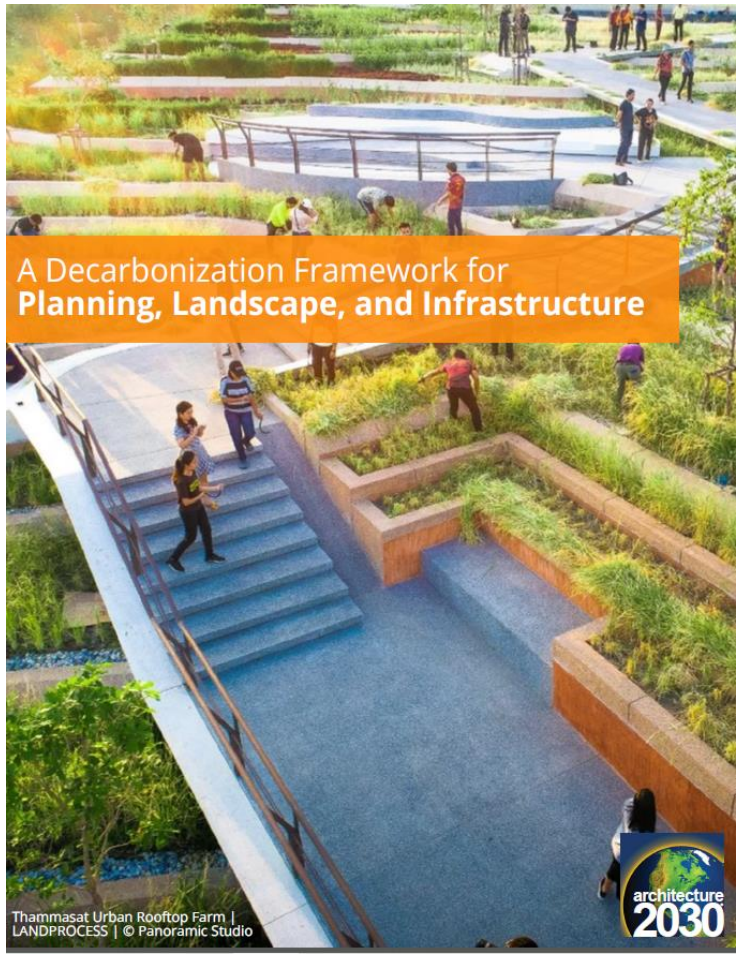
Planning and Infrastructure



- 83% of a building's emissions are locked in at the planning stage (RMI)
- 75%+ of embodied carbon emissions come from infrastructure, e.g., concrete and steel (UN Study)
- 75% of the infrastructure for 2050 is yet to be built (UN Environment)

Architecture 2030

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Infill, Gentle Density, Complete Streets

LA Blvd (Pico?)
Livable Communities Initiative, Los Angeles

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Regenerative Design: Community

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Equity

Living Future certification for organizations

- Diversity and Inclusion
- Compensation and Benefits
- Health
- Stewardship

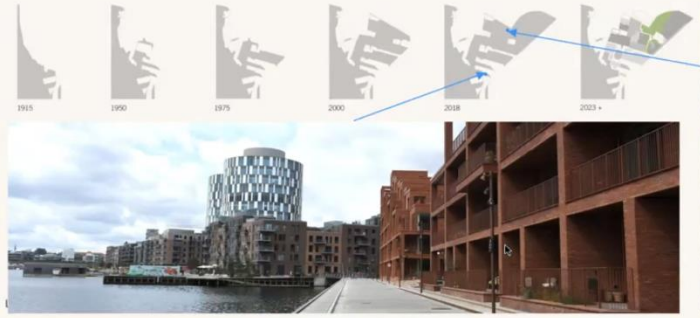
Engagement – Meaningful Nature in Nordhavn, Denmark

"How can the concept of meaningful nature shape future urban development in Nordhavn to foster healthier, more sustainable spaces that strengthen connections between people, biodiversity, and the urban environment?"

I. Nordhavn: Copenhagen's "sustainable neighbourhood of the future"

4,500 inhabitants today → **~40,000 inhabitants** when finished in 40 years

Nature park to be established by 2028

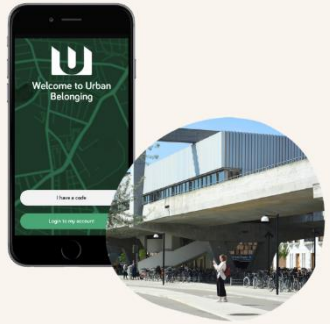


1. PPGIS

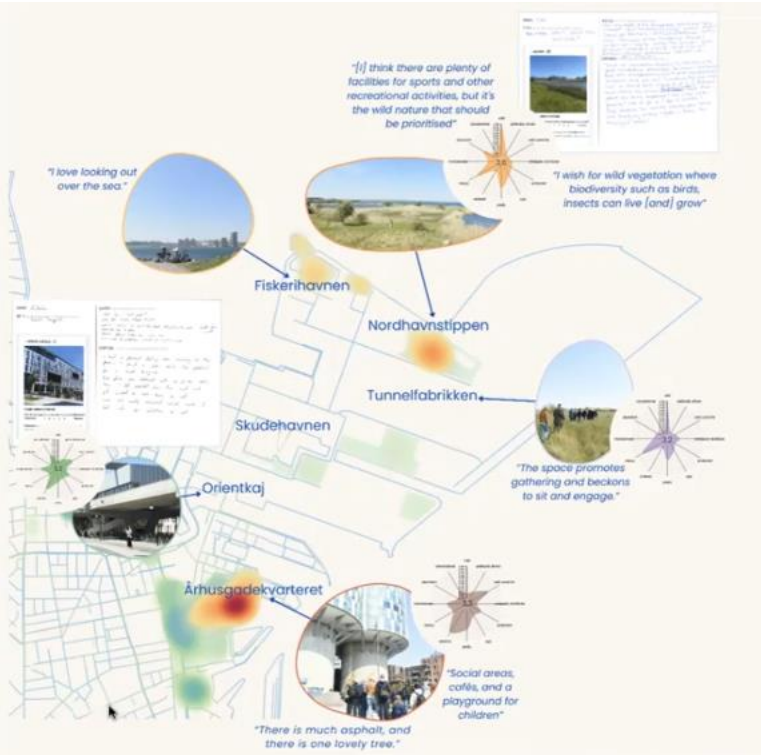
Figure 06: Hotspot maps created from PPGIS data showing liked and disliked spaces in Nordhavn.

2. PHOTOVOICE

Figure 07: The welcome screen of the photovoice app and a photo taken during the photovoice survey.

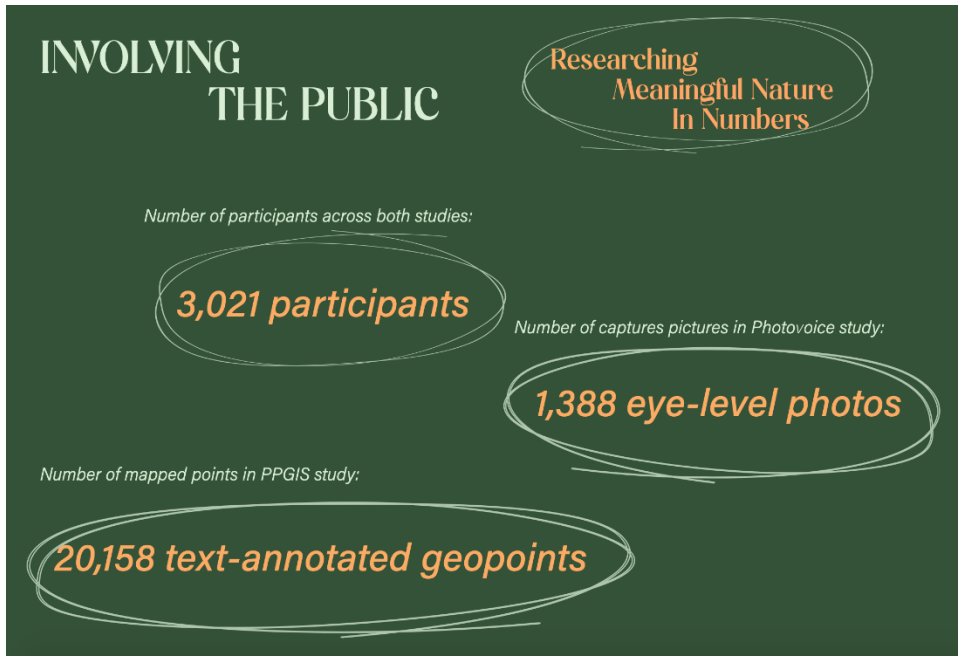


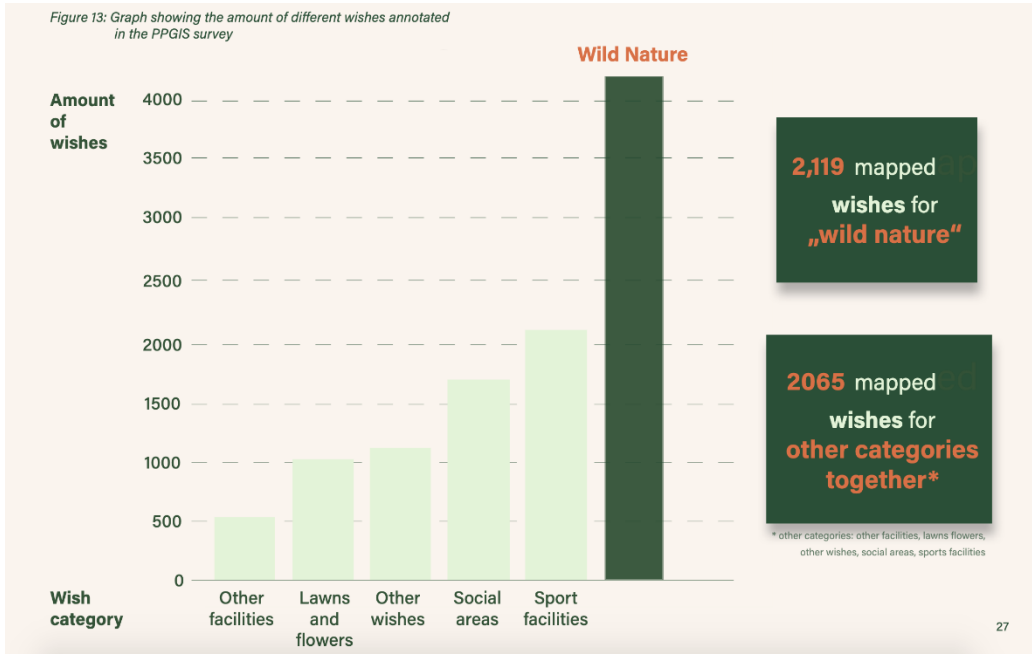
Data geocoded with layers of aerial and eye-level views



Source: Gulsrud, Natalie Marie and Csilla Duray, "Meaningful Natures in Nordhavn", University of Copenhagen, May 2024

Nordhavn – Designing for Meaningful Nature





- ***Incorporate*** measures such as ***perceived biodiversity*** into green space evaluations by including public input on vegetation variety, visual interest, and natural aesthetics.
- ***Ensure green spaces***—especially wild or "messy" ones—are ***easy to reach*** via pedestrian paths, bike lanes, and transit connections.
- ***Apply One Health principles*** in environmental impact assessments and planning policies.
- ***Promote vegetation diversity, habitat continuity*** in park and streetscape design.
- ***Incorporate co-visioning workshops*** and ***participatory tools*** into local consultation and neighborhood planning processes.
- ***Combine citizen-generated data with scientific biodiversity indicators*** to inform zoning, land use, and habitat protection.

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Upskilling – Building Community

Girls Build Summer Academy: Insulating with biobased materials

Training tradespeople to use new (or unfamiliar) materials such as wood fiber and lime plaster

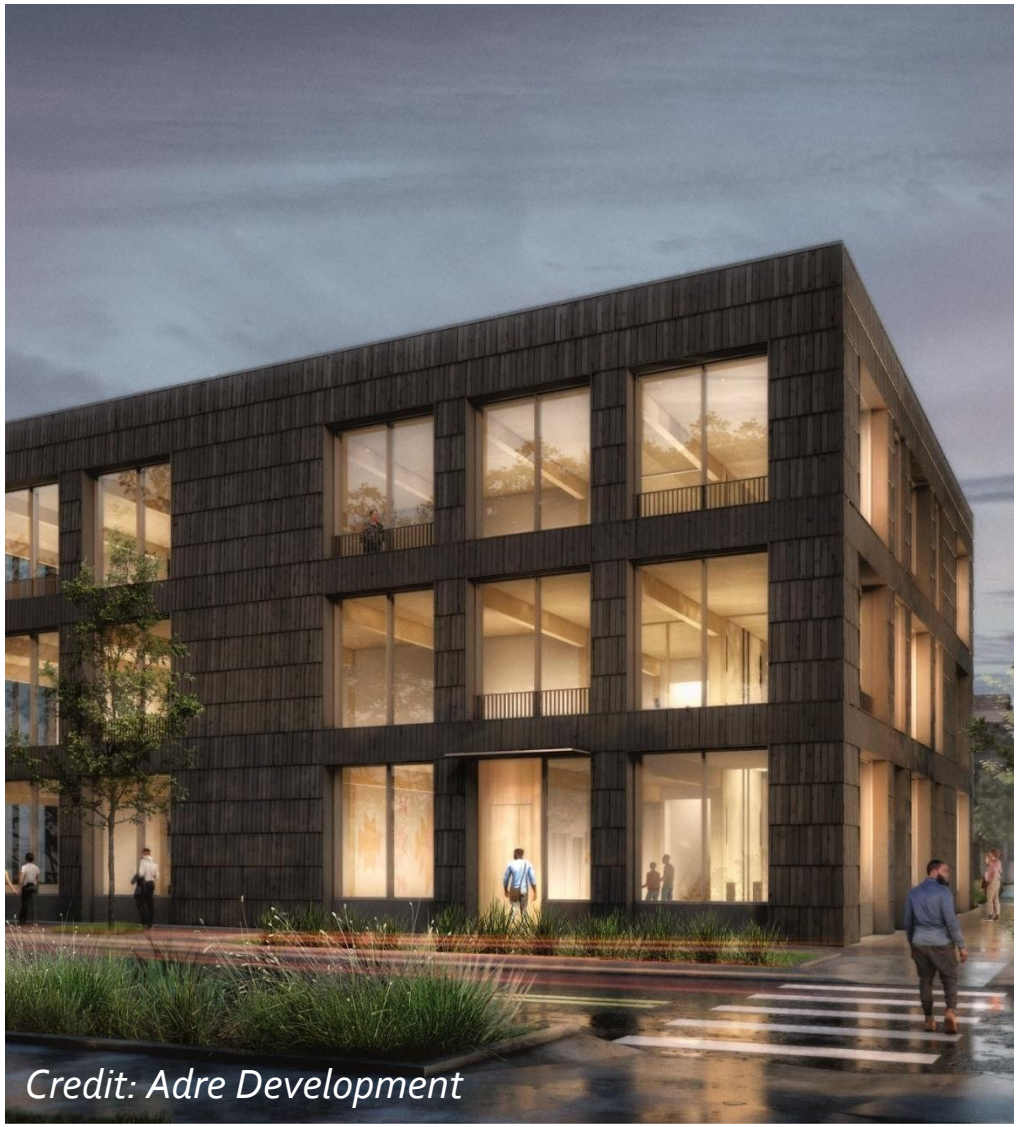
Killingsworth CEC Hub

Portland, OR neighborhood that suffered from "Red Lining" and discriminatory lending practices

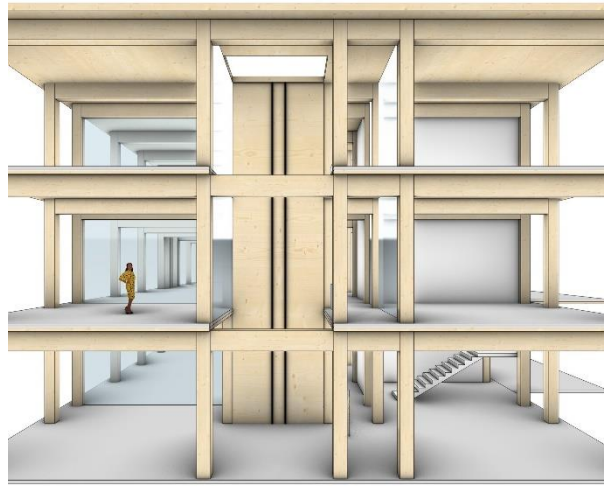
Working with four culturally specific chambers to support economic development and business incubation

The Community Economic Coalition (CEC) is a partnership between:

- Northwest Native Chamber
- Black American Chamber of Commerce
- Hispanic Metropolitan Chamber
- Philippine American Chamber of Commerce of Oregon



Credit: Adre Development



Regenerative Design: Net Positive Energy and Water

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Net Positive Energy

Energy Efficient

All Electric

PVs & Storage

People's Self-Help Housing Office

San Luis Obispo

Built 2022, 24,000 SF

Owner: People's Self-Help Housing

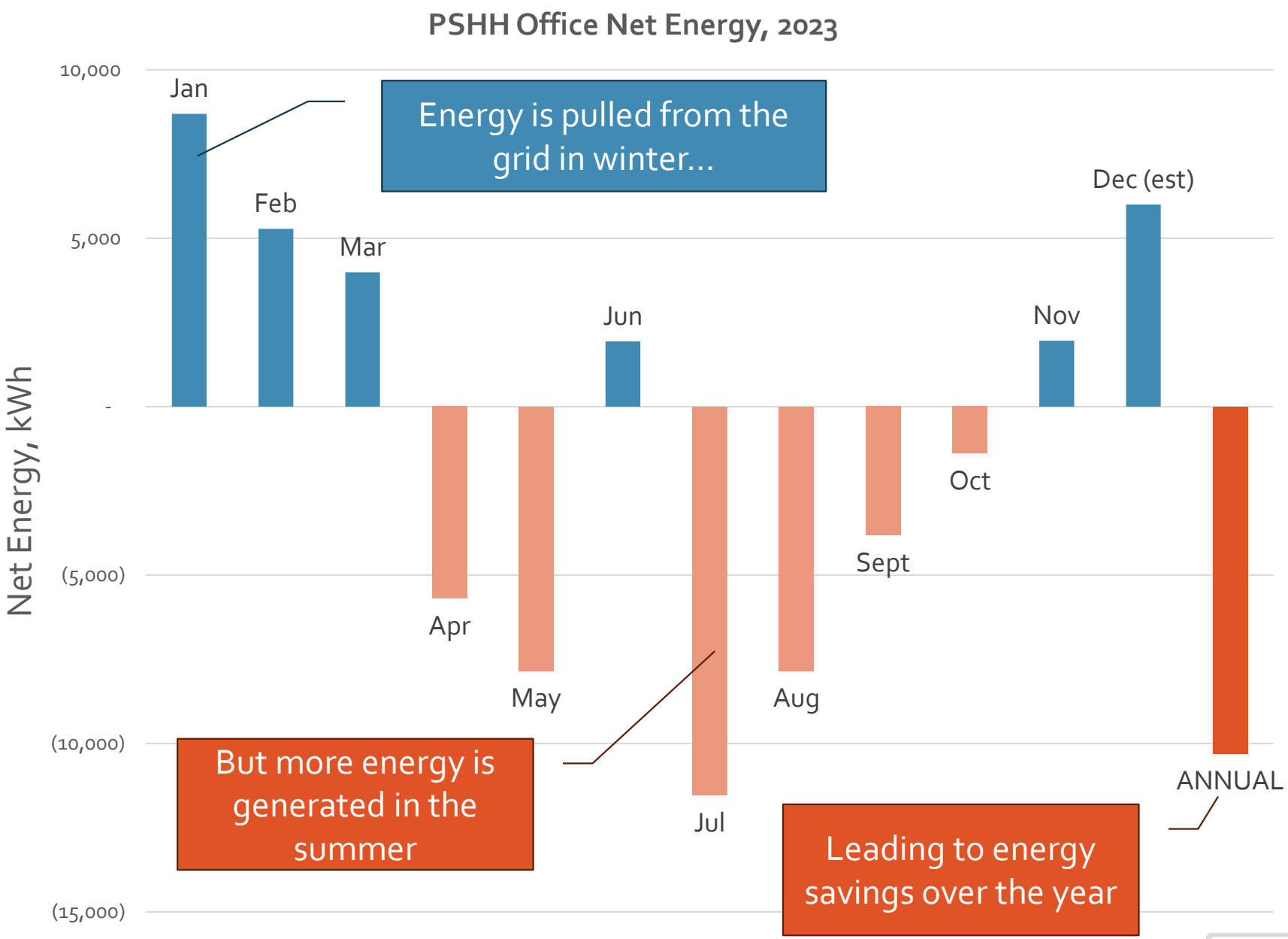
Architect: MDA

LEED Silver certified

- Roof area is optimized for large PV array:
  - Heat pump units are ground-mounted
  - No parapets, leaving edges free and no shading

Zero Net Energy

115 kW PV system



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Boston Resources

LF Zero Energy

46 kW PV Systems

Built 2020, 8,545 SF

Owner: Boston Building Materials Resource Center

Architect: Black River Architects

- Renovation & Addition. Renovation including new SIPs panels and cladding.
- Tight Envelope: Recommend blower door testing for verification. Lower energy and improved comfort.
- User education: Required a few months of training to reduce energy use in equipment, roll up doors and other systems.

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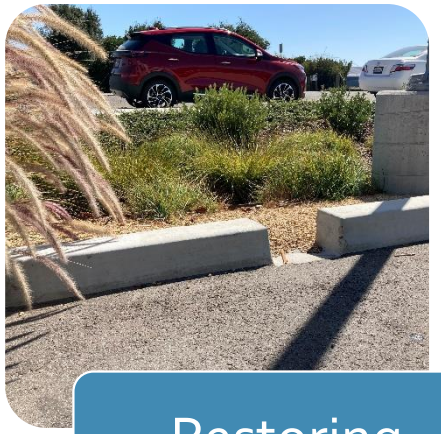
Net Positive Water

Efficient Water Use

Water Capture

Water Re-use



Restoring Water Systems

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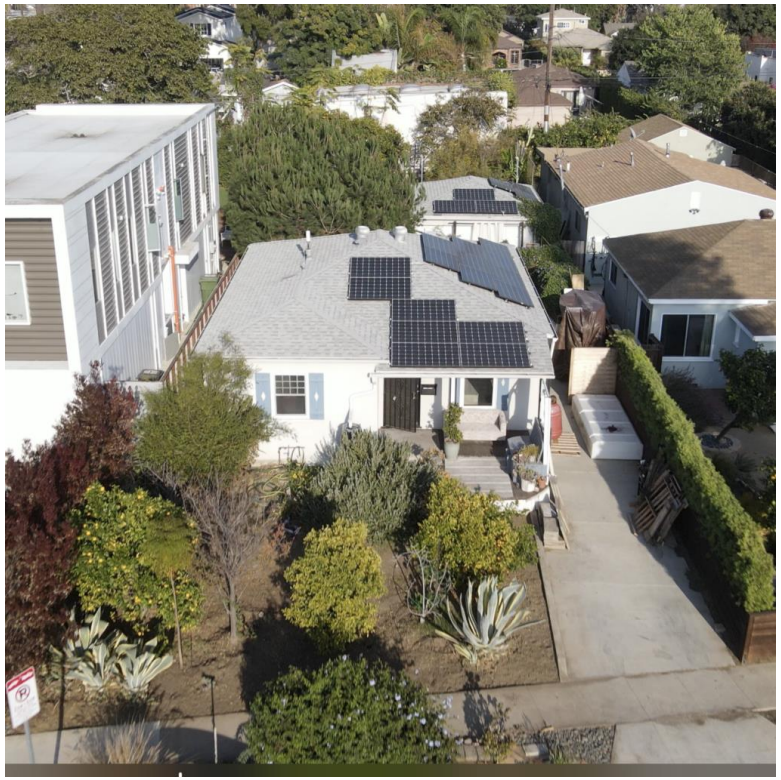
Campbell Collective

Living Future Zero Energy Petal

Built 2020, 948 SF

Owner: Ryan McEvoy

Water Consultants: Gaia Water Solutions



- Rainwater collection into several cisterns
- Captured additional rainwater from the street
- Laundry to Landscape
- Atmospheric water generators (AWGs), solar-powered
- Extensive food gardens and community connection events

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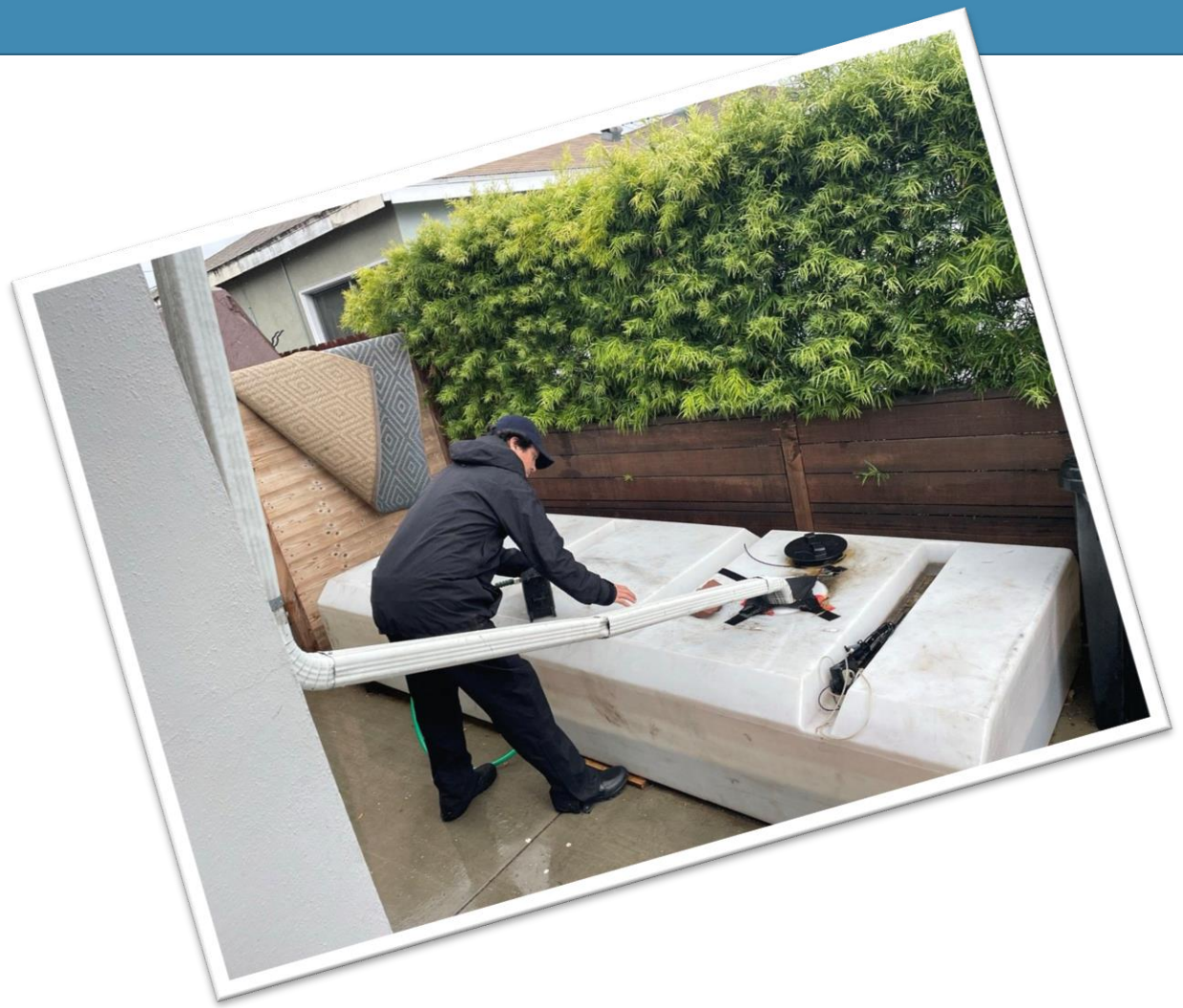
Residential Water Capture and Re-use Project

Heat pump provides cooling to house and heated water to showers, sink, laundry

Greywater goes to fruit trees and garden

greywater

Credit: Gaia



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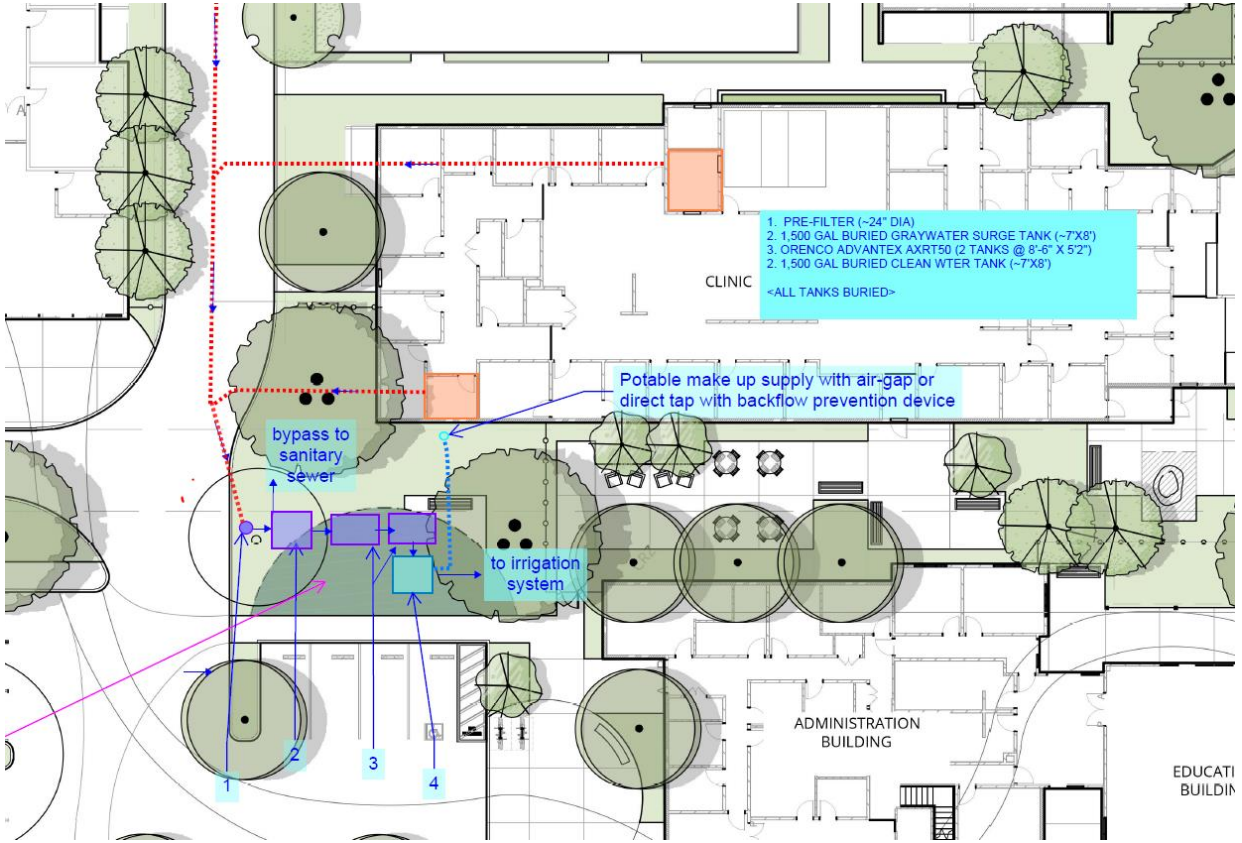
Commercial Water Re-use Project

Extensive laundry – similar to hospitality

Desire for highly-vegetated landscape



- Water Use analysis studied all uses and potential sources of water
- Determined that landscape irrigation and laundry wastewater could generally be balanced at 1,000 gallons per day
- Specified "ozone" for laundry water to reduce chemicals and hot water use

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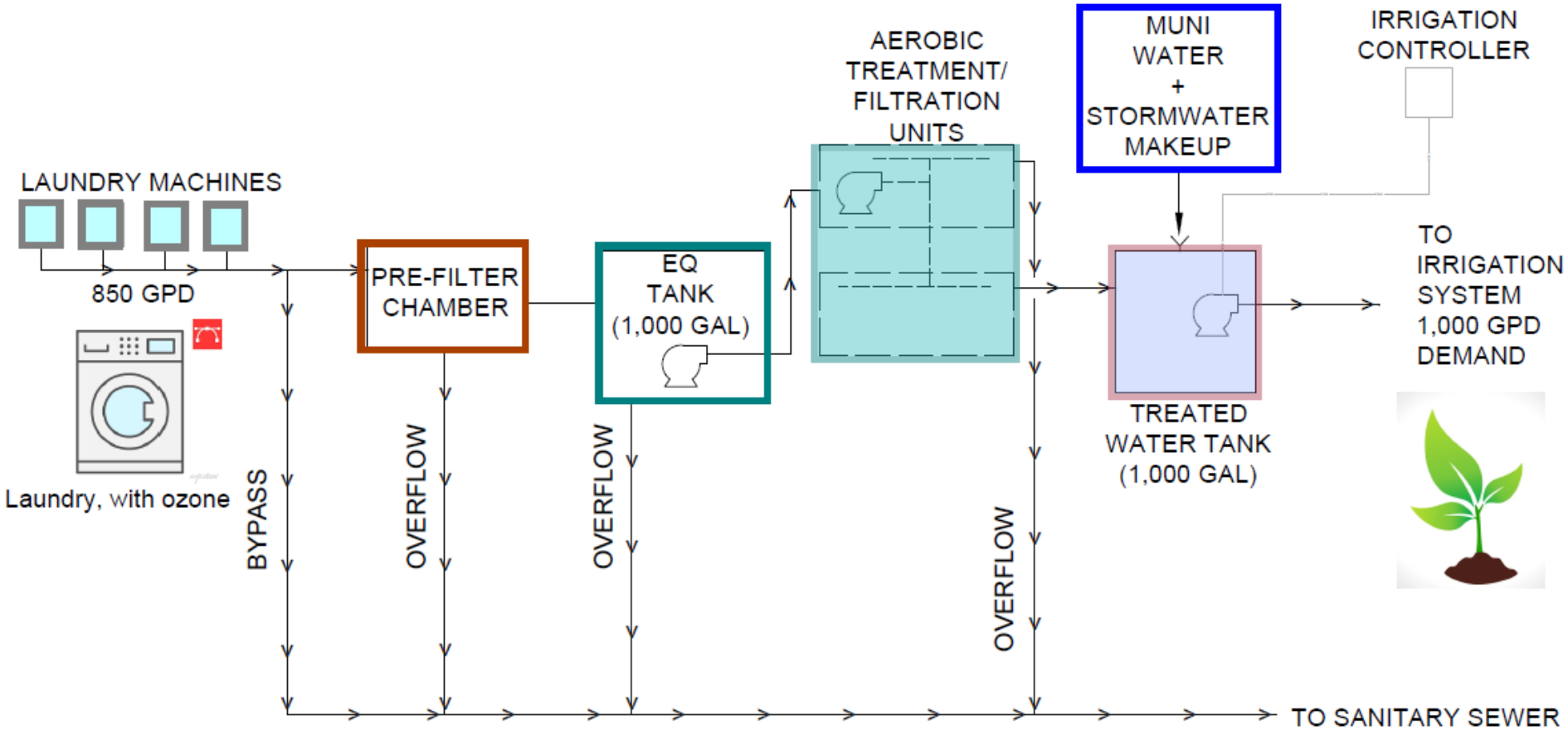
Commercial Water Re-use Project



Engineering by Wallace Group

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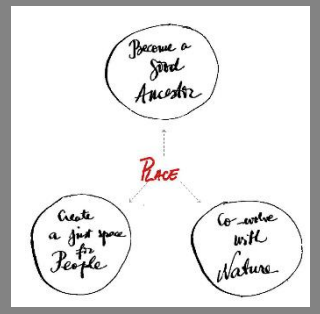
Regenerative Design: Materials



Institute for Advanced Architecture of Catalonia (IACC)
Barcelona, Spain; Credit: Adria Goula

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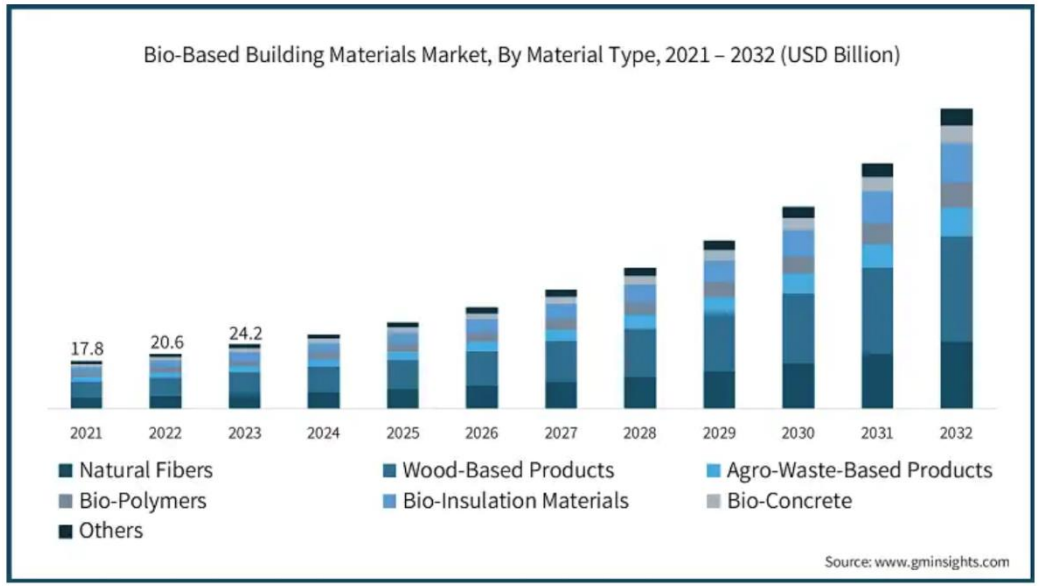
Biobased Materials – Scaling up

Definition:
Materials derived from renewable resources and at least partially biological in origin: fibers, sugars, microorganisms, or proteins.



Benefits:

- Carbon storage/sequestration
- Lower GHG emissions during production
- Renewable and biodegradable
- Often made up of residual waste streams, circularity
- Generally less toxic and fewer VOCs

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Biobased Materials

A hempcrete home in La Veta, Colorado, built with hemp grown in the United States. (Image credit: Jean Lotus, U.S. Hemp Building Association)

Structural panels/OSB replacement - grown from perennial grasses

Source: Plantd

Structural

Credit: Myco Bricks

Applications

Cladding

Bark

Interior finishes

Japanese Knotwood

Acoustic tiles

Credit: Seacork

Insulation

Expanded Cork: Corklink

Image courtesy of CorkLink

Hempwool

Mycelium board: Greensulate

Some Sources:

Mycelium	Flax	Rice
Seaweed	Wood	Cotton
Cork	Algae	Wool
Hemp	Straw	Cellulose
Bamboo	Grasses	Coconut
	Biochar	Grains

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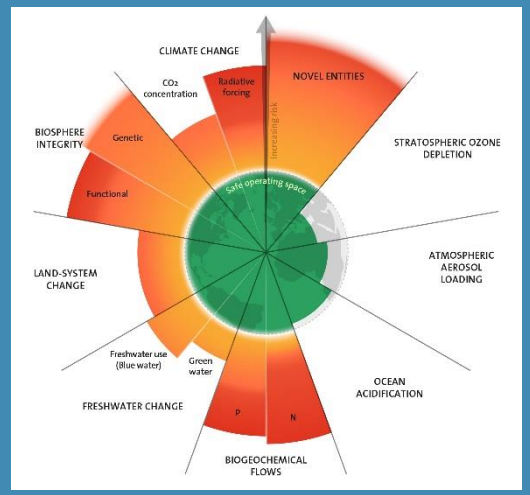
Circularity and Sufficiency – based Design



- Sufficiency-based design focusses on meeting human needs with the minimum necessary resources, prioritizing ecological limits and social well-being
  - Applications in engineering, architecture, product manufacturing
- Strategies include:
  - Circular economy models – design for durability, repairability, reuse, closed-loop material flows
  - Move from providing products to services – shared access resources
  - Biomimicry and biophilic design

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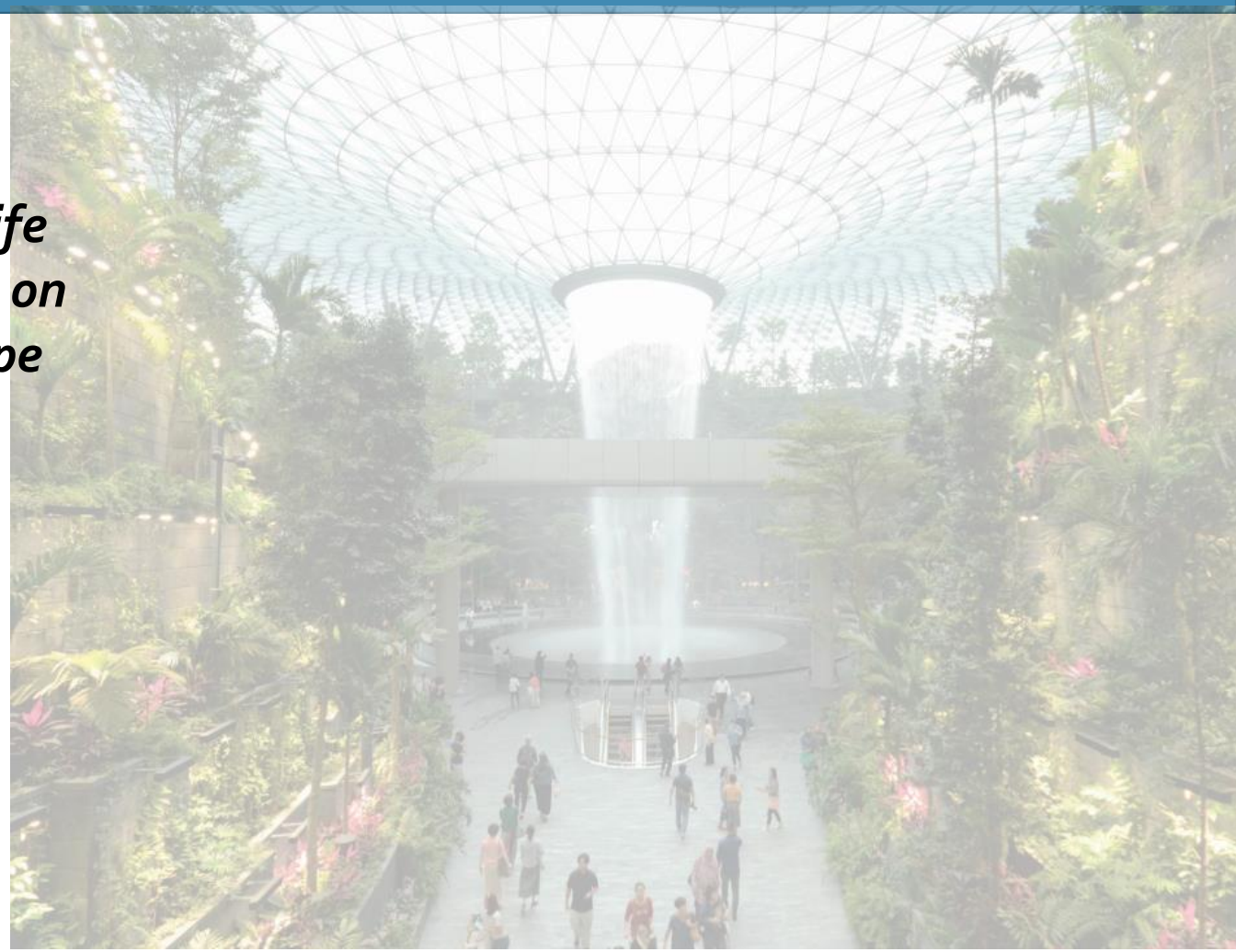
Regenerative Spaces:
Biophilia and Biophilic Design

What is it?

"Biophilia is the innate tendency to focus on life and lifelike processes…our existence depends on this propensity, our spirit is woven from it, hope rises on its currents." – E.O. Wilson



Biophilic design can be defined as biophilia *applied* to the design and development of the human built environment.

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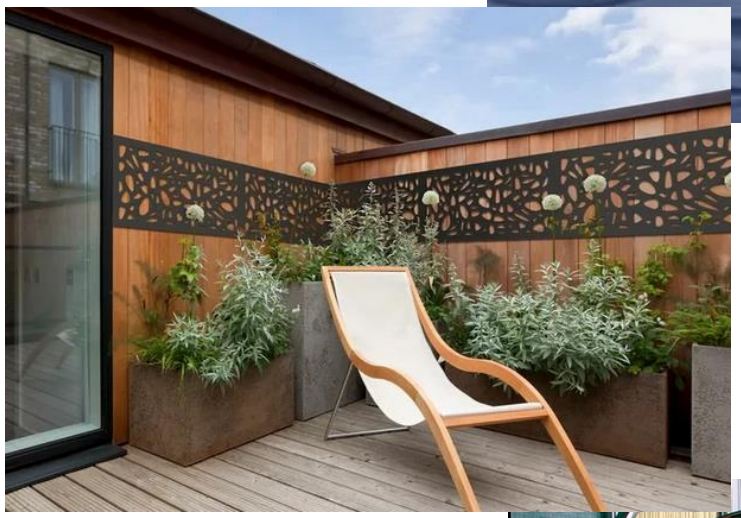
Biophilic Design: Materials and More

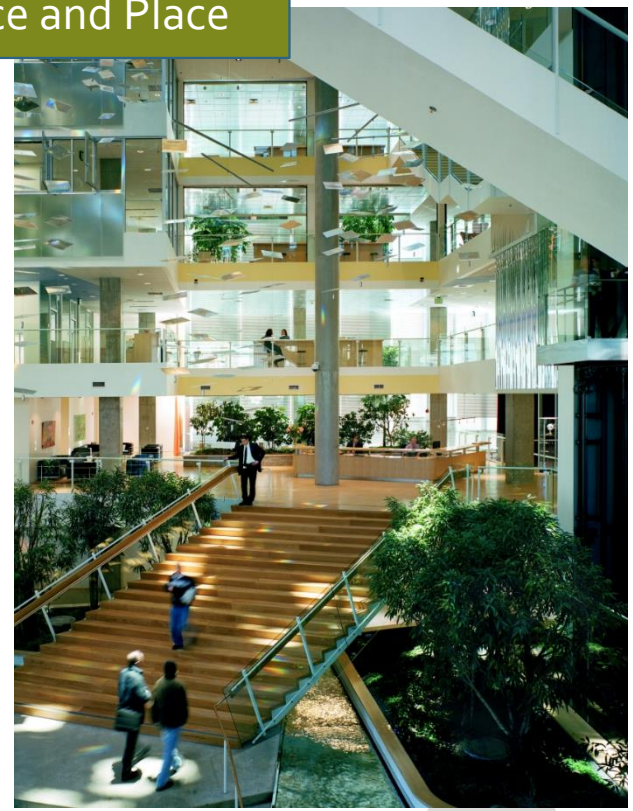
Direct Experience of Nature

Source: Stephen Kellert, *Nature By Design*

Indirect Experience of Nature



Experience of Space and Place



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Case Studies

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Brattleboro Food Co-op

Interested in LEED certification and sustainability

Project ultimately included many green building features including:

- Triple-glazed window
- Green roof
- Low-carbon and recycled finishes
- PV production
- LID landscape features

Regenesis Group

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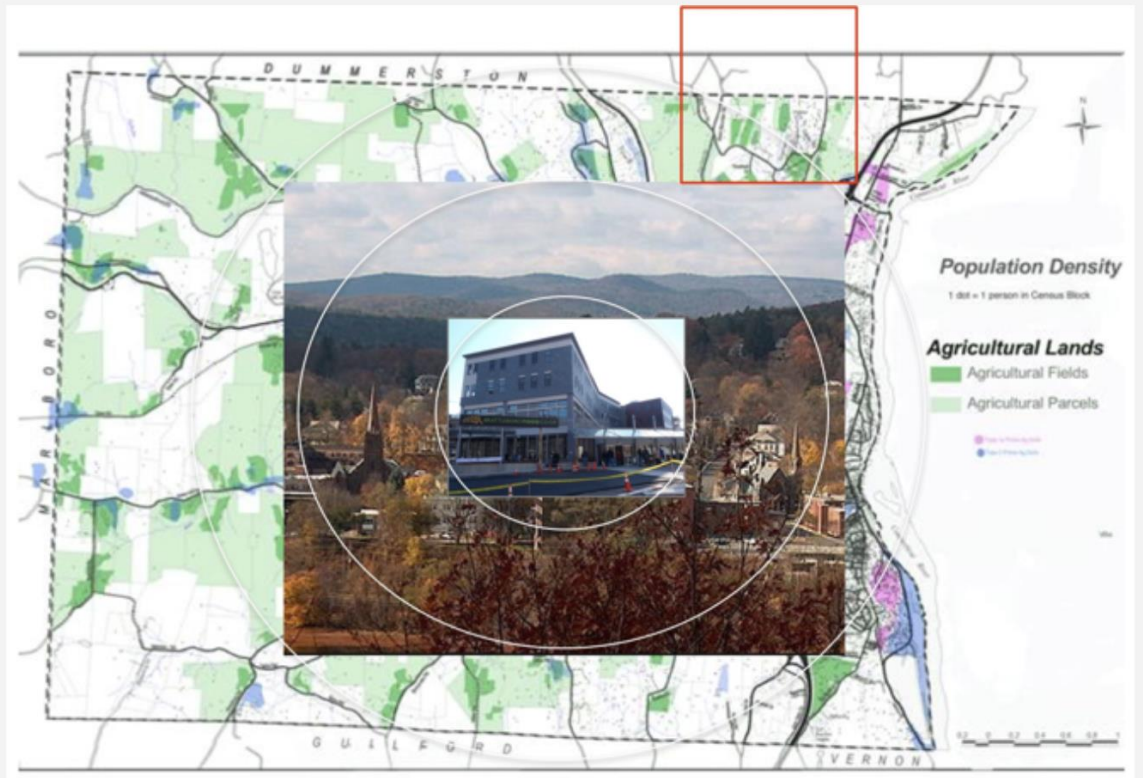
Green Building Project to Regenerative Marketplace



The co-op project within its local context (three nested systems)

But a place-based analysis uncovered a variety of issues:

- Food sourced from 1500 miles away
- Local farmland depleting, aging farmer population
- Co-op vulnerable to supply chain disruptions from crop failure, fuel prices, and truckers' strikes
- Rumors of large chain opening in area

"An energy efficient building wouldn't solve these problems"

Question became: What contribution could this place make to the regeneration of the larger system within which it is embedded? And, what value-adding role could I or my organization play in order to help this place realize its potential?

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The New Brattleboro Food Co-op

100 year plans includes:

- Focus on growing local agriculture capacity
- Cooperation with other coops in region
- Housing – 24 residential apartments
- Energy – solar panels, heating system recycles heat produced by refrigeration it the store
- Youth education – cooking classes, agriculture

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Living Places Copenhagen:
Healthy homes for people and planet

Velux Living Places

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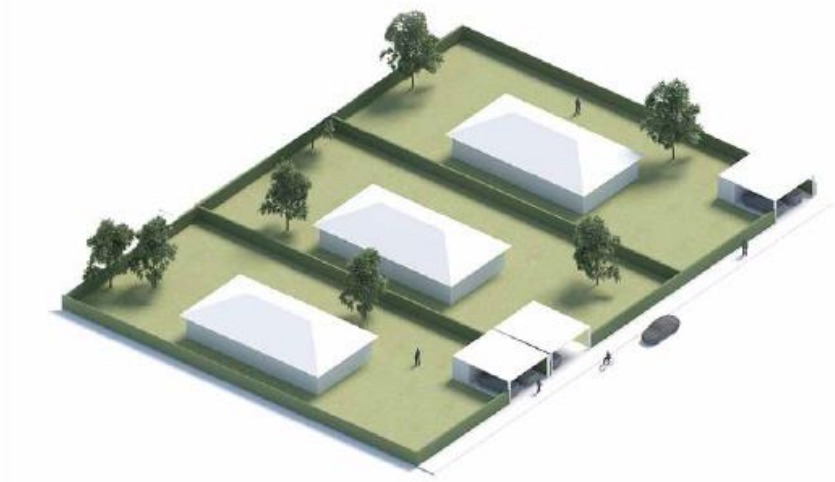
Living Places, Copenhagen - Place

- *Abandoned Industrial site*
- *Elevated buildings and walkways*
- *Site restoration*
- *Community gardens*

Living Places, Copenhagen - Community

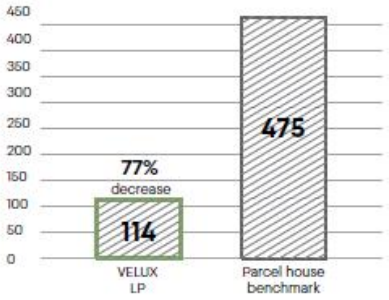
From separated private homes...



...to active communities

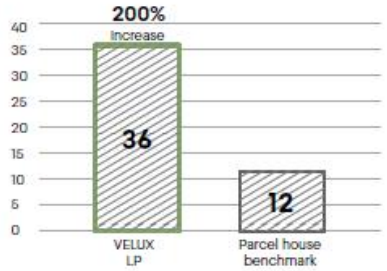
Impact of the design

Environmental Impact:
kg CO_2 / person a year



Land-use:
m^2 / person

Density:
People / 2400 m^2 (site)



Estimation for 7 VELUX LP with 5 persons per unit

Living Places Copenhagen – Energy, Daylight, Air Quality

- Operable windows and skylights
- Open plan for cross ventilation and stack effect
- Automatic controls for CO2, thermal comfort and glare control
- Air quality monitoring and reporting

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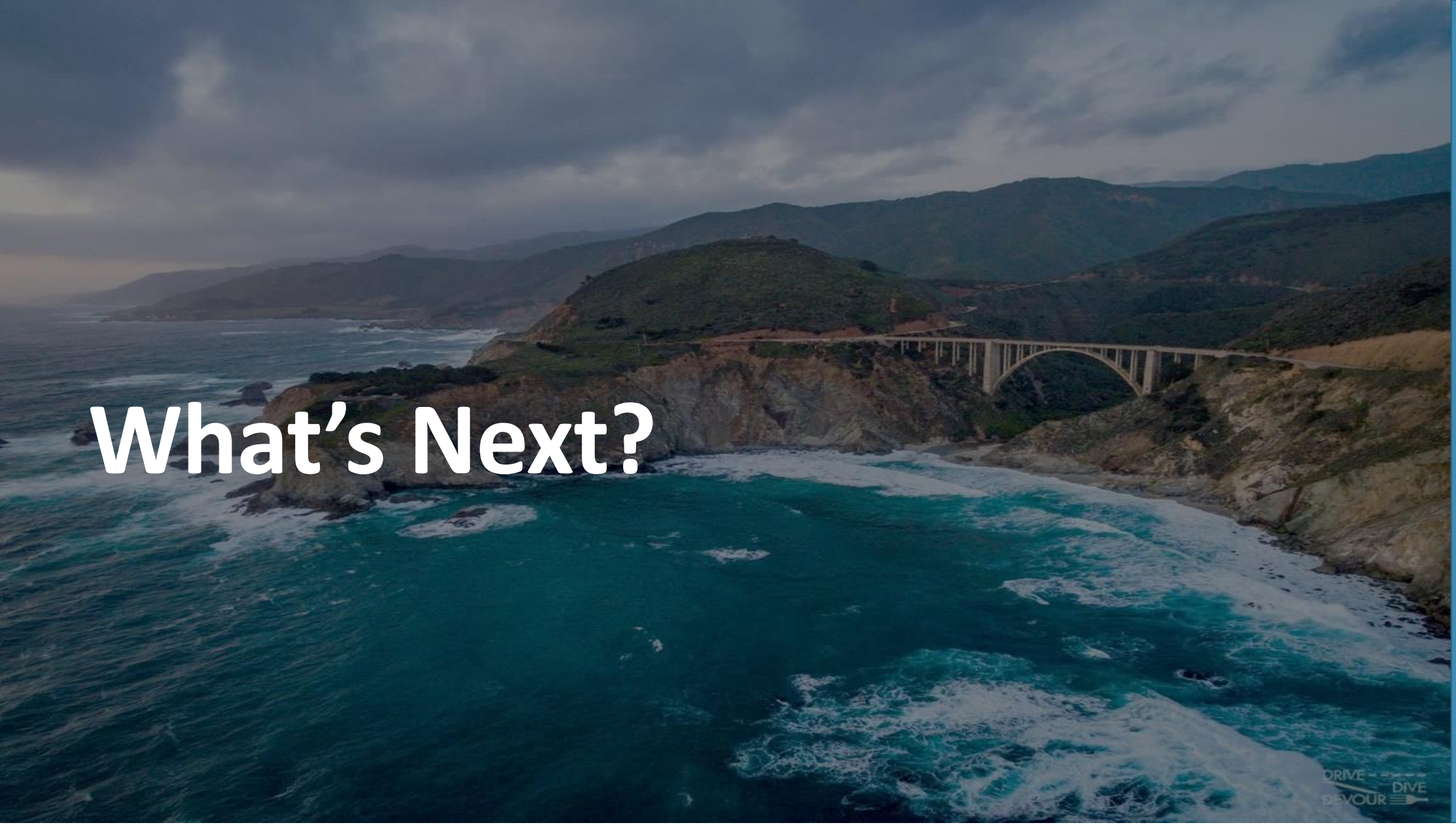
Living Places Copenhagen – Materials, carbon footprint

- Mass timber and stick construction to reduce concrete and steel
- Exposed wood finishes
- Screw pile foundation



What's Next?

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Tips from the AIA Regenerative Design guide

1. Listen and observe to truly understand a place. Every project has a “here”.
2. In addition to the usual site analysis, conduct a systems analysis at the start of every project to understand the impact it has beyond the site boundaries. Observe the relationships between your project and its context.
3. Think about your project’s higher potential to evolve future systems complexity.
4. You and your project stakeholders should develop a statement and guiding concept that identifies the essential value-adding role of your project that goes beyond just its function. Test this statement against the values, motivations, and traditions of the community it is nested in.
5. Once you understand your project’s *value adding role*, identify metrics that can be used to hold the project accountable. These might be adopted from Living Building Challenge or LEED, for example, but may also be unique and project specific.

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Tips from the AIA Regenerative Design guide

6. Partner with local stakeholders and community groups to understand what a place needs and ensure those needs can be met long after construction is complete.
7. Understand your role is to bring forth what is needed in each place, in a given time. Think less like a designer, and more like a co-designer with nature.
8. Understand your project is just the beginning of the process and should be a catalyst for evolutionary change.
9. Don't stretch too far. The change should be achievable, or the process can lose momentum.
10. Build a field of optimism, energy, and excitement about the potential of the project. Sustain this energy through the design process by keeping it achievable, and frequently envision the healthy, livable future you are trying to create

Enjoy the Process!

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Closing

Continuing Education Units Available

- Contact chloe.swick@venturacounty.gov for AIA LUs

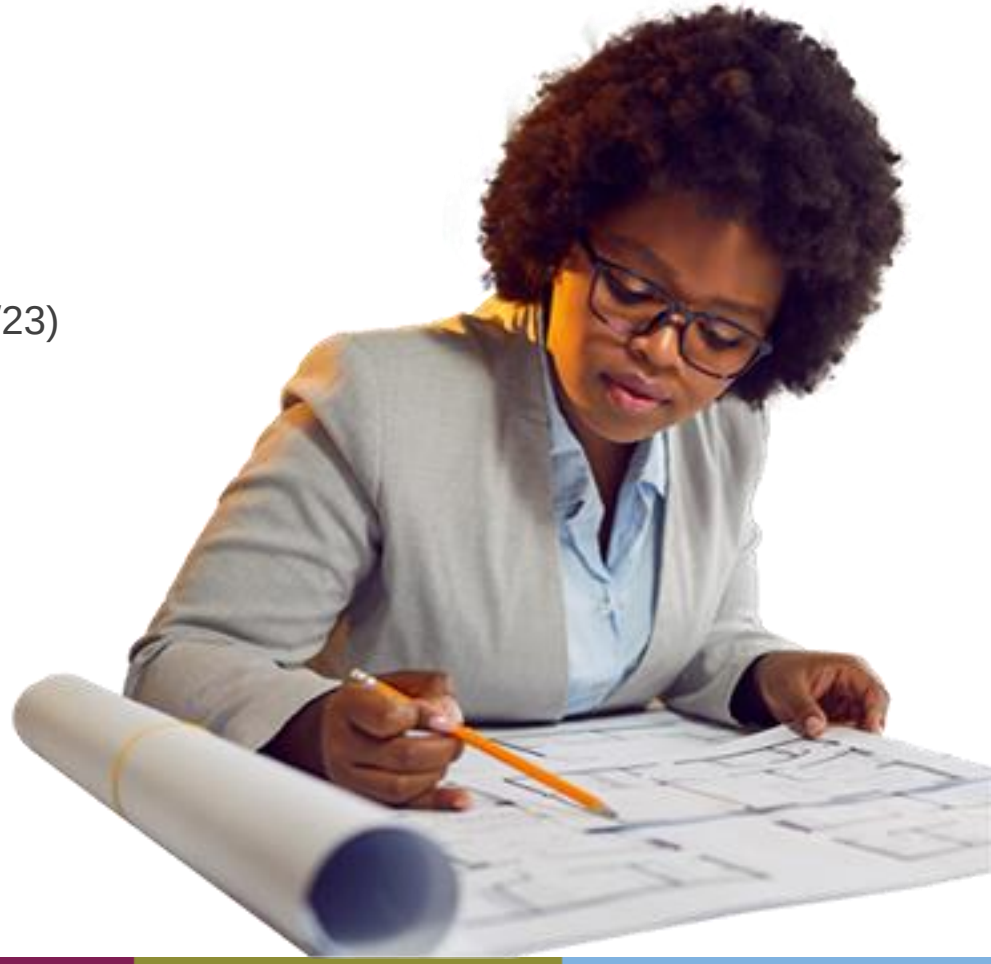
Coming to Your Inbox Soon!

- Slides, Recording, & Survey – Please Take It and Help Us Out!

Upcoming Courses:

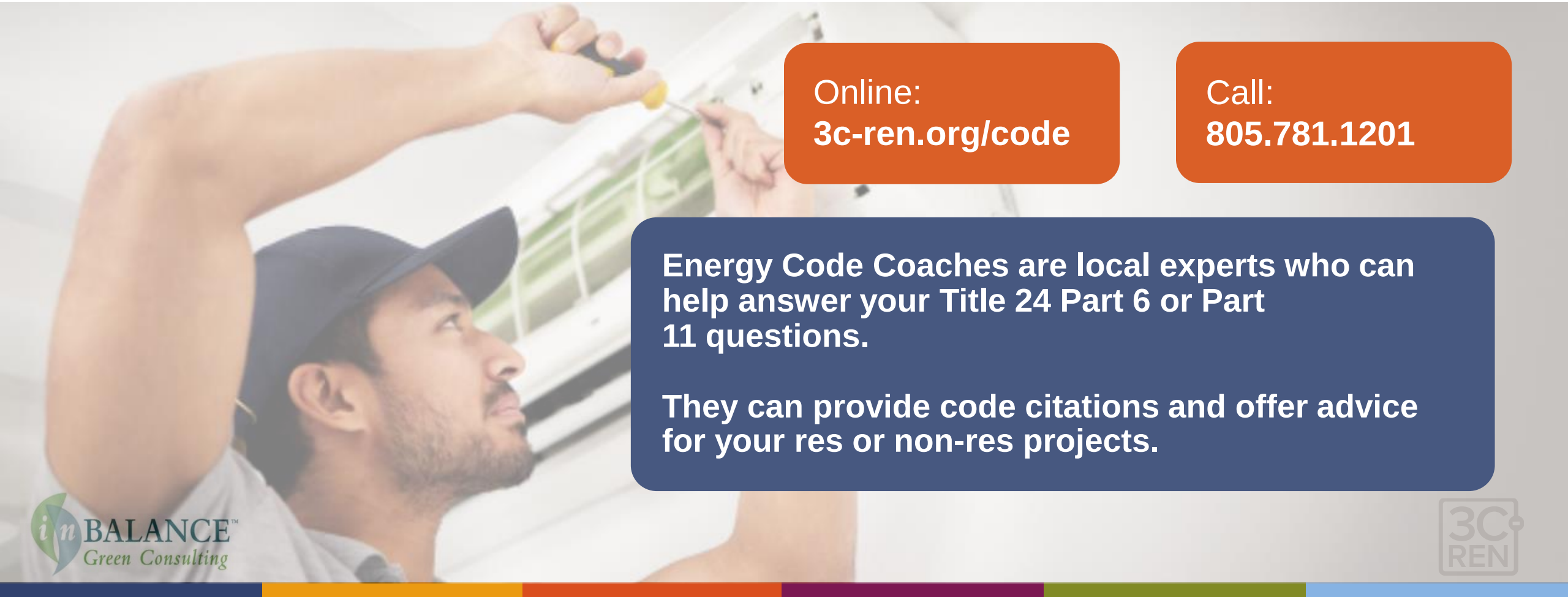
- Multifamily: Energy Code Implementation Series w/ 2025 Code Updates (7/23)
- Next Generation Passive Solar (In-Person!) (8/12)
- CALGreen Code – 2025 Update (8/13)

Any phone numbers who joined? Please share your name!



Questions about Title 24?

3C-REN offers a *free* Code Coach Service



Online:
3c-ren.org/code

Call:
805.781.1201

Energy Code Coaches are local experts who can help answer your Title 24 Part 6 or Part 11 questions.

They can provide code citations and offer advice for your res or non-res projects.

Thank you!

More info: **3c-ren.org**

Questions: **info@3c-ren.org**

Email updates: **3c-ren.org/newsletter**

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