BUILDINGENERGY NYC

KEYNOTE ADDRESS

BUILD TOGETHER. GROW TOGETHER. OWN TOGETHER.

A COOPERATIVE BLUEPRINT FOR CLIMATE-HEALING CONSTRUCTION



GREG BOSSIE
Founder & President,
Rare Forms



ACE MCARLETON
Cofounder & CEO,
New Frameworks

BUILDING ENERGY NYC · KEYNOTE

Build Together.
Grow Together.
Own Together.

A cooperative blueprint for climate-healing construction — inside the Seed Collaborative



The Seed Collaborative

Straw Panel Network



Greg Bossie (he/him)
Founder Rare Forms

RARE FORMS
LOCALLY GROWN HOMES



Ace McArleton (he/him)
Co-Founder New Frameworks

New Frameworks

What if the way we build buildings could heal the climate

and the way we build organizations could heal each other?...

and by doing both in an integrated way, we gain more ground, more quickly, on both fronts.

THE PROBLEM

Three compounding crises:

Climate

Buildings and their materials are a leading source of carbon emissions worldwide.

Housing

We are short millions of homes, and most of what gets built still degrades the climate to shelter us.

Workforce

Skilled trades are aging out faster than new tradespeople are coming in to replace them.

These are not three separate problems. They share one root solution:

Collaboration and interdependence.

THE HOUSING NEED

Millions of new homes by 2040

Northeast U.S.

~2 million

new housing units needed across the region

United States

15-18 million

new housing units needed nationwide

Closing the supply backlog and keeping pace with population growth.
The question is not whether we build them, but how we build them.

ONE HOME, TWO WAYS

The carbon footprint of a single home: same home, two ways

Status quo construction

73,288

lbs CO_2e emitted (33,243 kg CO_2e net)

Gross emissions	**33,743 kg**
Carbon stored	**500 kg**
Intensity	**31 lbs CO_2e / ft²**

Carbon-storing straw panels

−13,192

lbs CO_2e stored (−5,984 kg CO_2e net)

Gross emissions	**19,028 kg**
Carbon stored	**25,012 kg**
Intensity	**−6 lbs CO_2e / ft²**

Material carbon emissions modeled with BEAM (Builders for Climate Action), ±10%. Gross emissions minus carbon stored = net.

SCALED TO THE NEED

What we build next decides the climate math

Northeast · 2 million homes

STATUS QUO

73.3M

tons CO_2e emitted

≈ 21 coal plants, or 15M cars, for a year

CARBON STORING

13.2M

tons CO_2e stored

≈ 3.8 coal plants, or 2.8M cars, retired

NET CLIMATE DIFFERENCE

86 million tons CO_2e

≈ 25 coal power plants

National · 15–18 million homes

STATUS QUO

550–660M

tons CO_2e emitted

≈ 157–189 coal plants, or 112–135M cars, for a year

CARBON STORING

99–119M

tons CO_2e stored

≈ 28–34 coal plants, or 20–24M cars, retired

NET CLIMATE DIFFERENCE

650–780 million tons CO_2e

≈ 185–225 coal power plants

Per-home BEAM results × projected units by 2040. Short tons. Coal plant and car equivalents are one year of emissions each.

CASITA TERRA · BEAM RESULTS

A home that stores more carbon than it emits

Casitas are net carbon-storing, healthy homes made of straw panels, made by the collaborative, for communities.

−3,057

kg CO_2e net embodied carbon

≈ 6,740 lbs · 770 ft², 2 stories · −8.8 lbs CO_2e/ft²
(status quo home: +31)

MATERIAL CARBON BY SECTION (kg CO_2e)

Footings & slabs	489
Structural elements	176
Exterior walls (straw panels)	**−5,922**
Exterior cladding	493
Windows	592
Interior walls	235
Floors	119
Ceilings	50
Roof	711



The straw-panel walls store about twice what the rest of the house emits.

BEAM (Builders for Climate Action), construction documents stage. Foundation walls, party walls, garage: 0.

OUR SHARED PURPOSE

Buildings as carbon banks

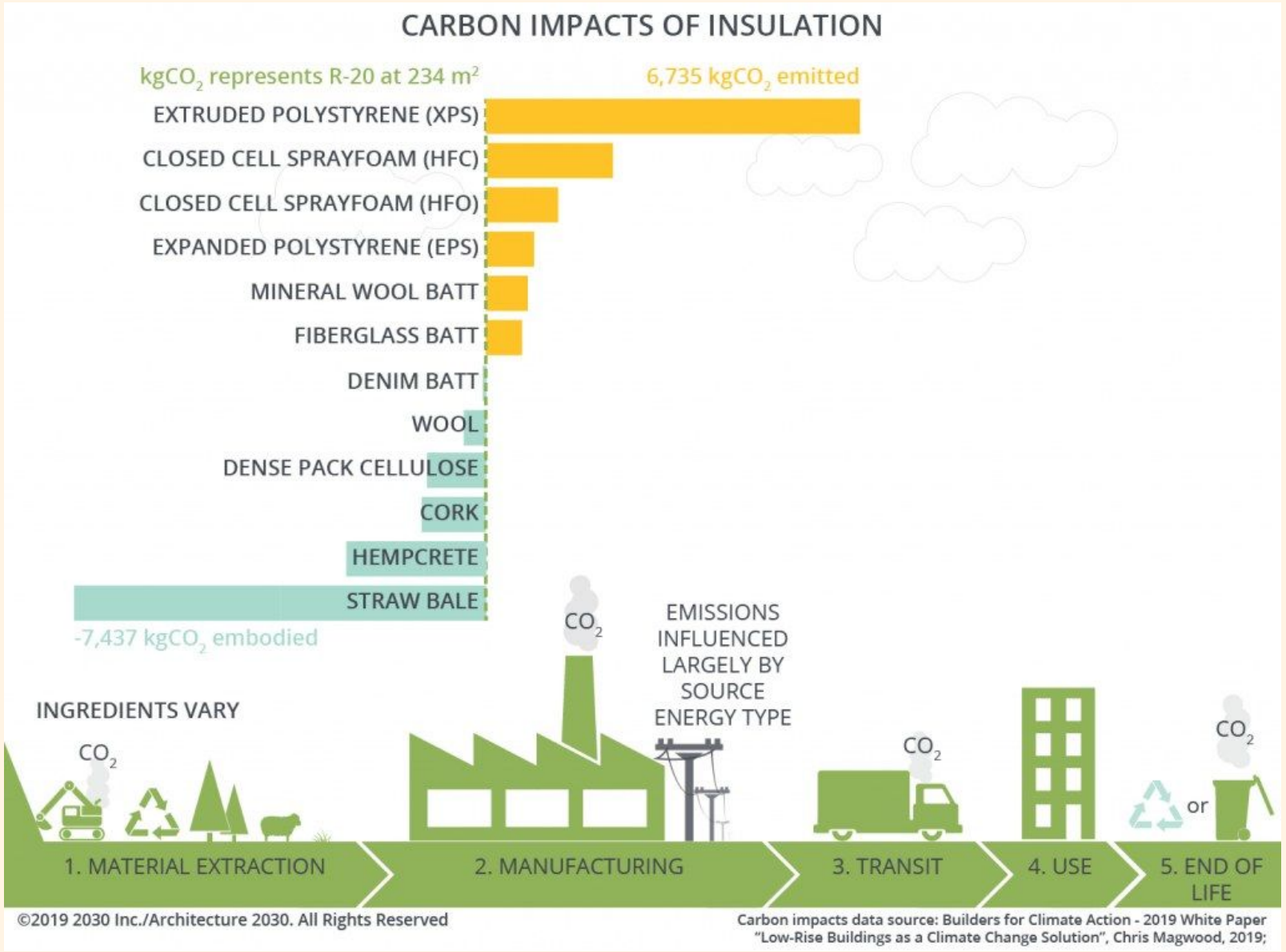
Store carbon in the building components of well-detailed, high-performance buildings, and it stays locked away from the carbon cycle — a human-made carbon bank that also shelters us.



Why straw?

- Rapid growing agricultural waste from grain we already grow to feed people.
- Stores carbon, is non-toxic, cellulose-based, and returns safely to the ecosystem at end of life.
- Excellent hygrothermal performance — buildings stay warm in winter, cool in summer, on less energy.
- Properly detailed, it's fire-resistant, moisture-resilient, and safe to fabricate, install, and live inside.





Compared at equal R-value. Everything above the line emits carbon to exist; everything below stores more than it costs.

Data: Builders for Climate Action, *Low-Rise Buildings as a Climate Change Solution* (Chris Magwood, 2019).
Graphic © 2019 2030 Inc. / Architecture 2030.



This isn’t (just) about building straw panels. It’s about building resources together.

The structure, economics, and culture of the Seed Collaborative

WHAT IS THE SEED COLLABORATIVE

The Mission

To build shelter that heals both climate and community

by developing bio-regional members who practice climate-healing manufacturing, education, and construction;

and who together own and operate a producers' cooperative.

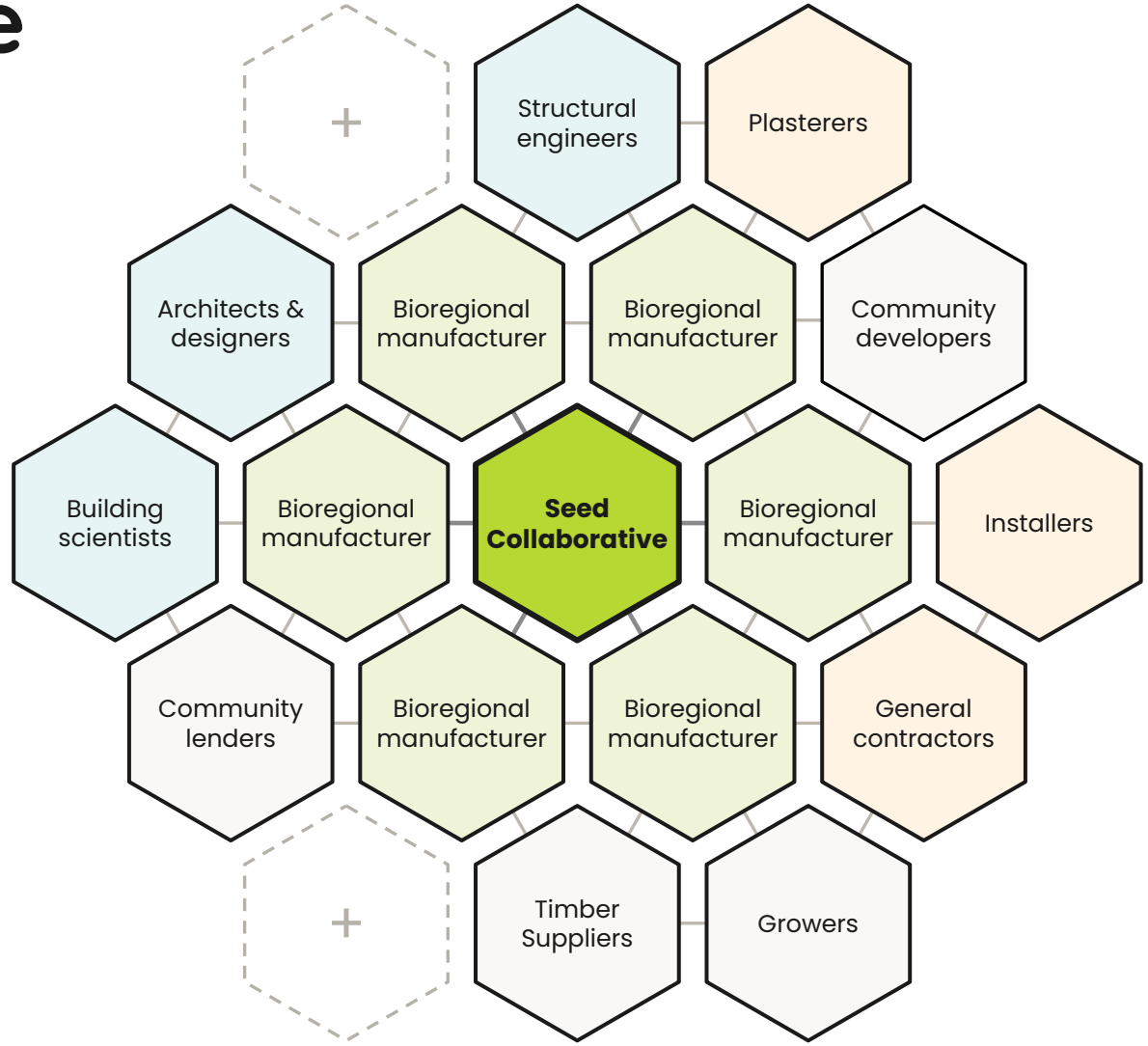
THE STRUCTURE

A producers' cooperative Not a franchise

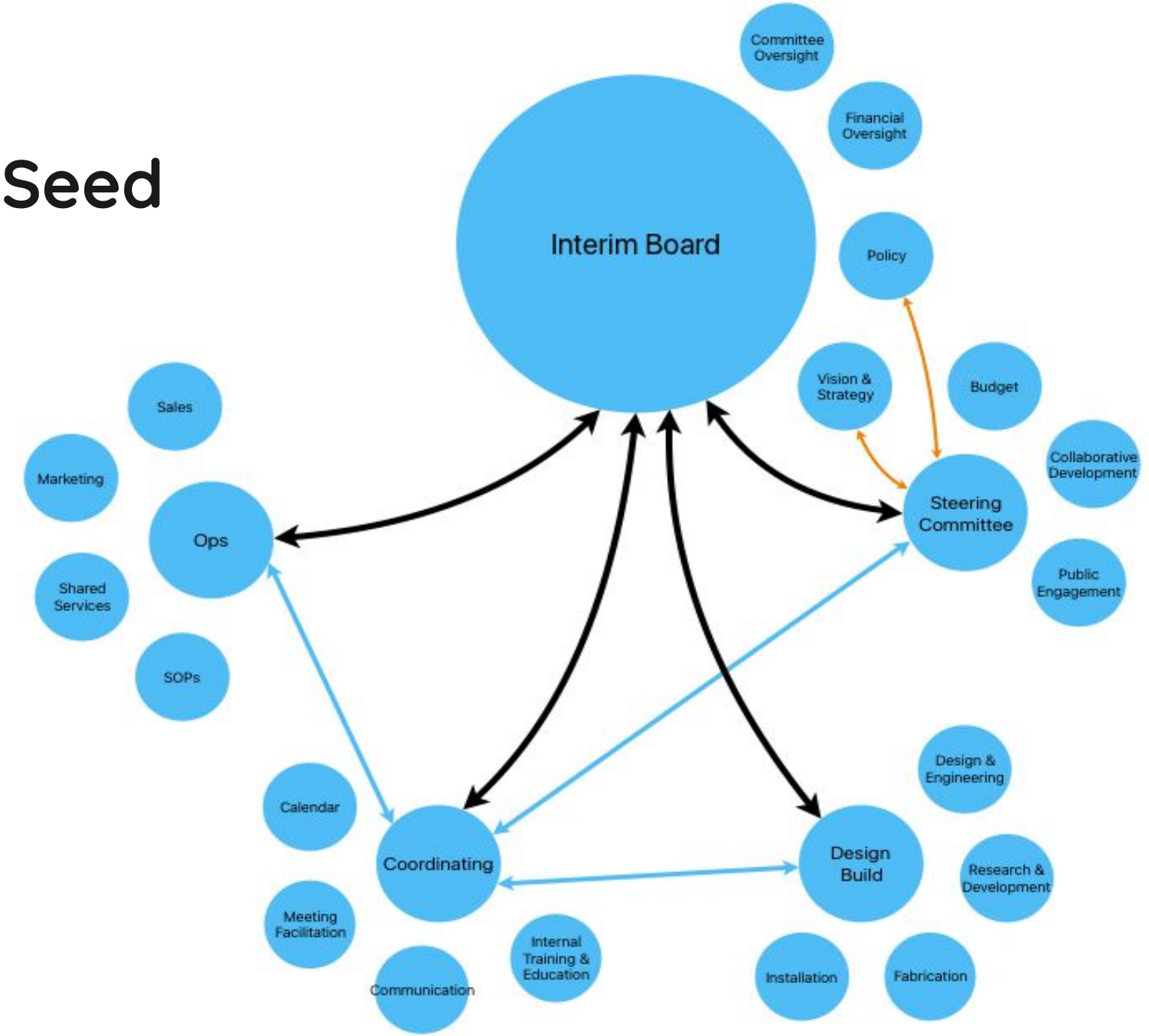
Bioregional manufacturers, connected to one cooperatively owned and operated hub.

Woven around every member is a web of local trade partners: the plasterers, engineers, installers, and growers who turn panels into homes.

- Cooperative hub
- Member manufacturers
- Design & engineering
- Field trades
- Materials, development, & capital

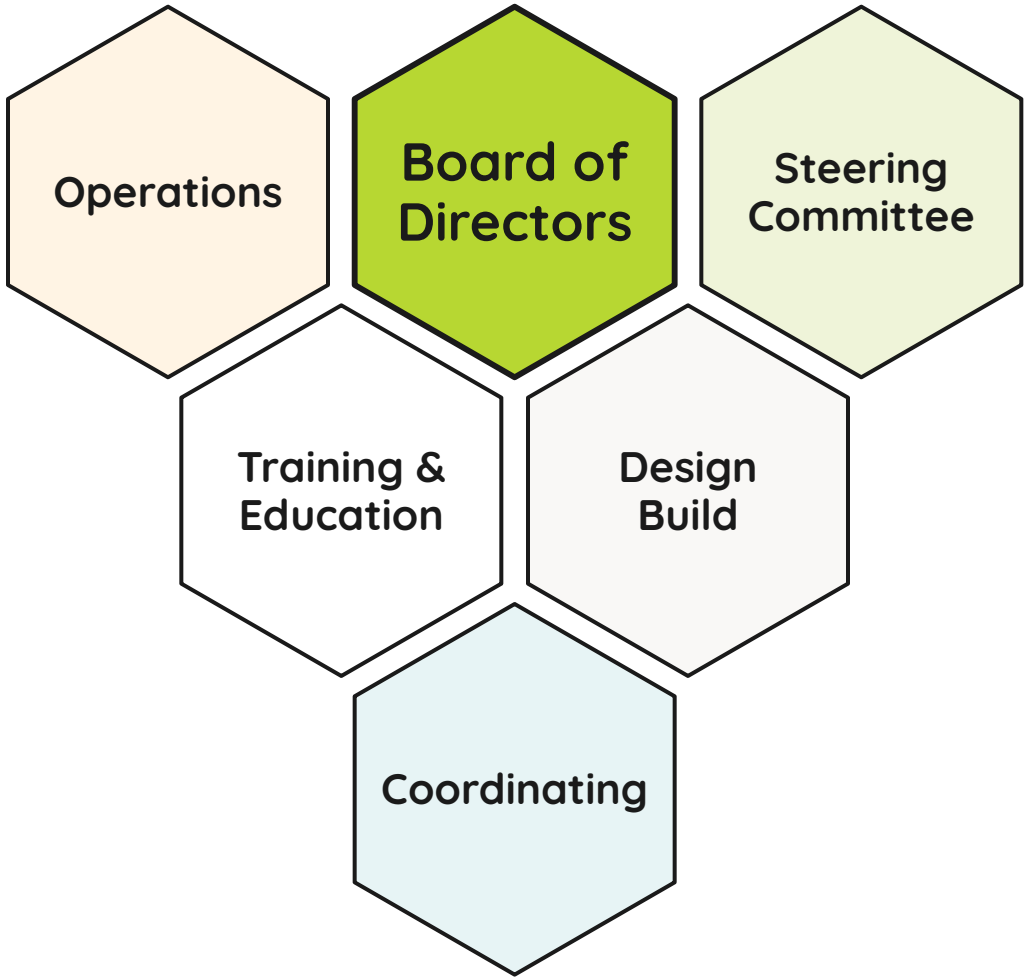


Structure of the Seed Collaborative



HOW WE'RE ORGANIZED

Structure of the Seed Collaborative



Steering Committee
Policy · vision & strategy · budget · financial oversight · collaborative development · public engagement

Operations
Sales · marketing · shared services · SOPs

Design Build
Design & engineering · R&D · fabrication · installation

Training & Education
The Seed Program and other workforce development

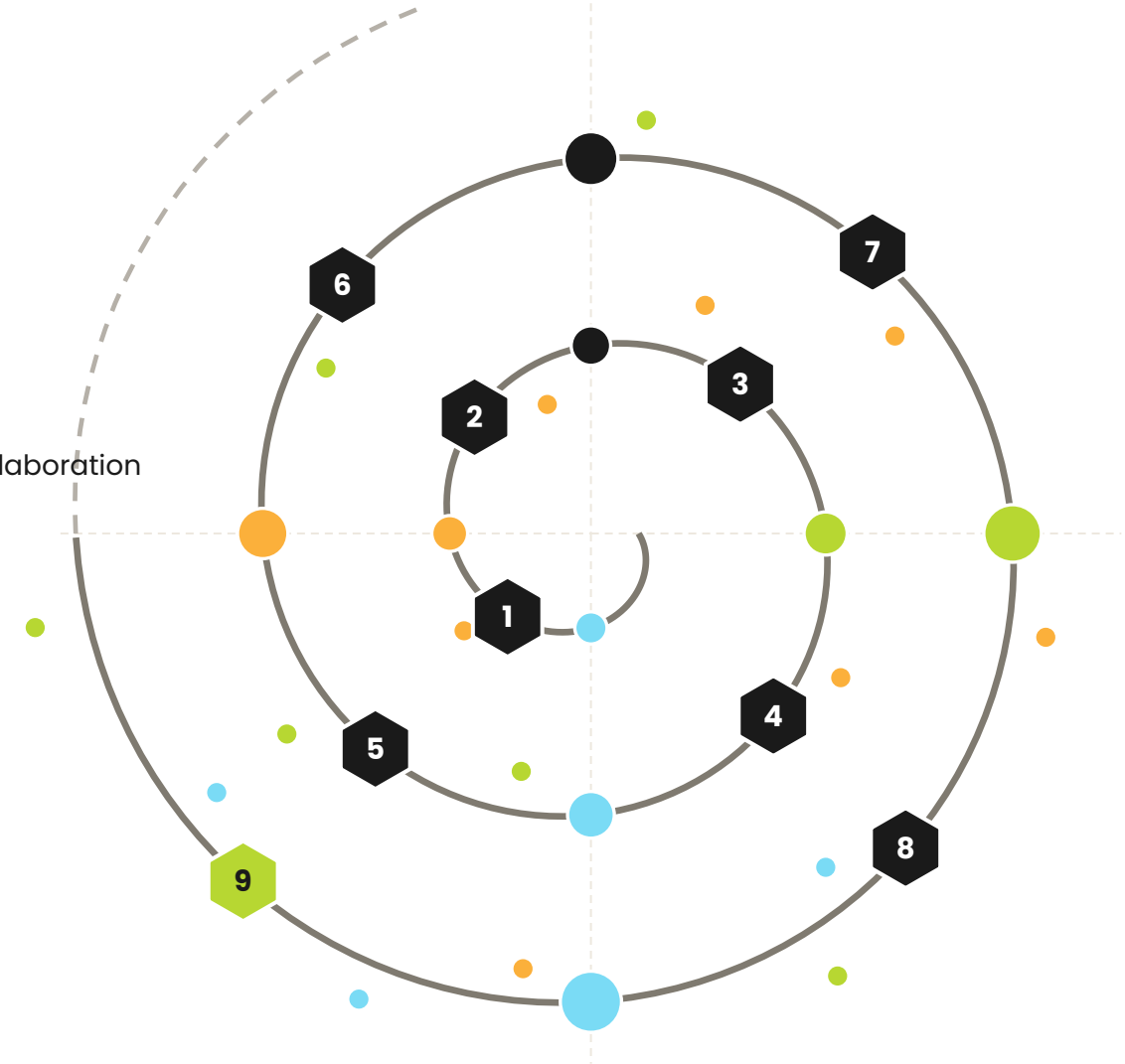
Coordinating
Calendar · meeting facilitation · communication · internal training

HOW WE GOT HERE

Growth is not linear

We keep practicing the goals and values, each time wider, and each time with new hands.

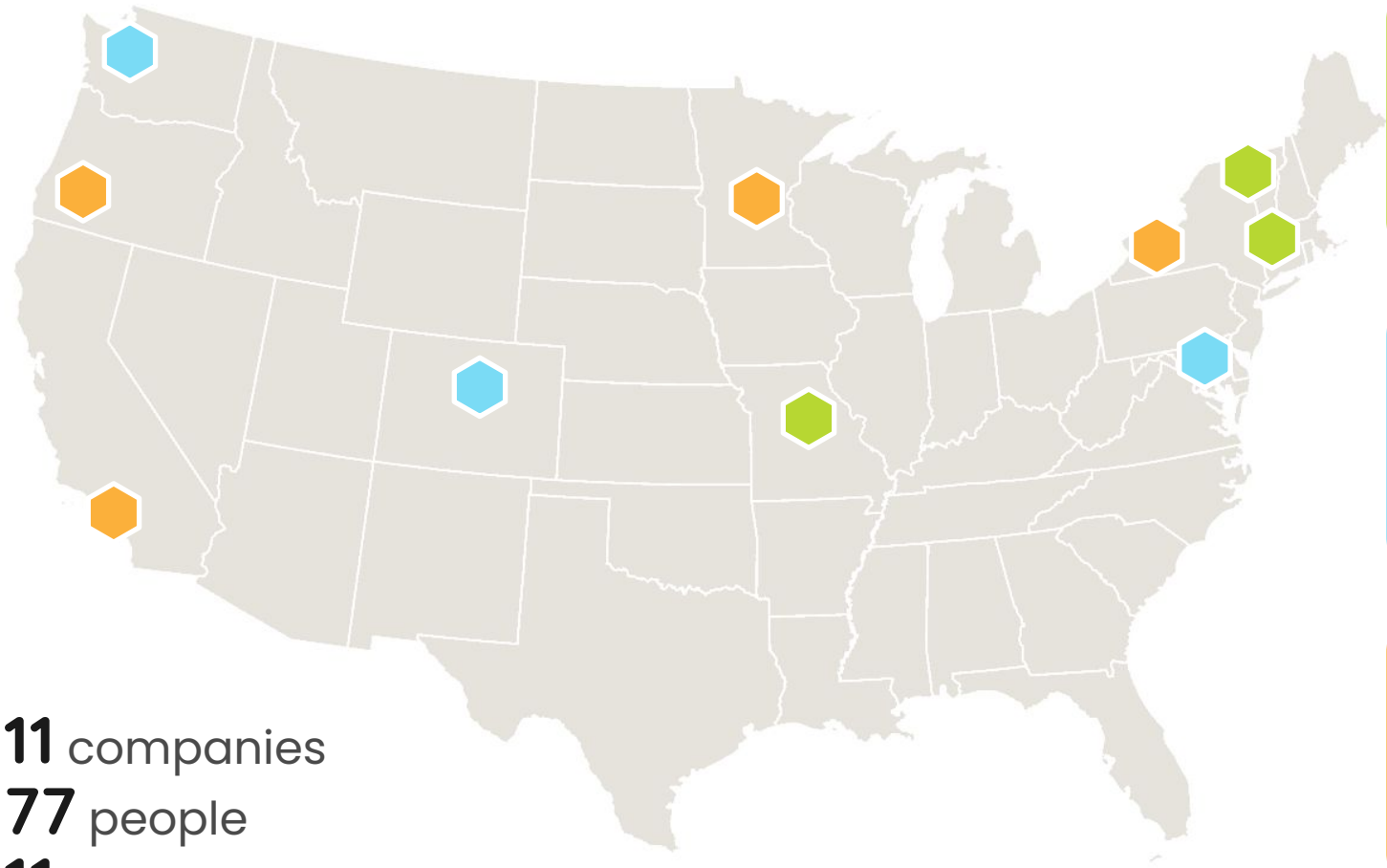
1	**2010s**	Endeavour Centre starts building straw panels in Ontario
2	**2013**	NFW, Endeavour, 4th Pig and others first discuss a cross-border collaboration
3	**2016**	NFW builds first prototype panels
4	**2018**	First commercial panel production begins at NFW
5	**2019**	Building Energy Boston keynote: Carbon Drawdown Now!
6	**2024**	Seed Program launches
7	**Y2-3**	Second & third cohorts
8	**Now**	Transition to SC management
9	**Ongoing**	Shared-services pilots



- Open knowledge & training
- Bio-regional production
- Shared services & financing
- Shared ownership & governance

OUR NETWORK

A growing network of straw panel makers



11 companies
77 people
11 states

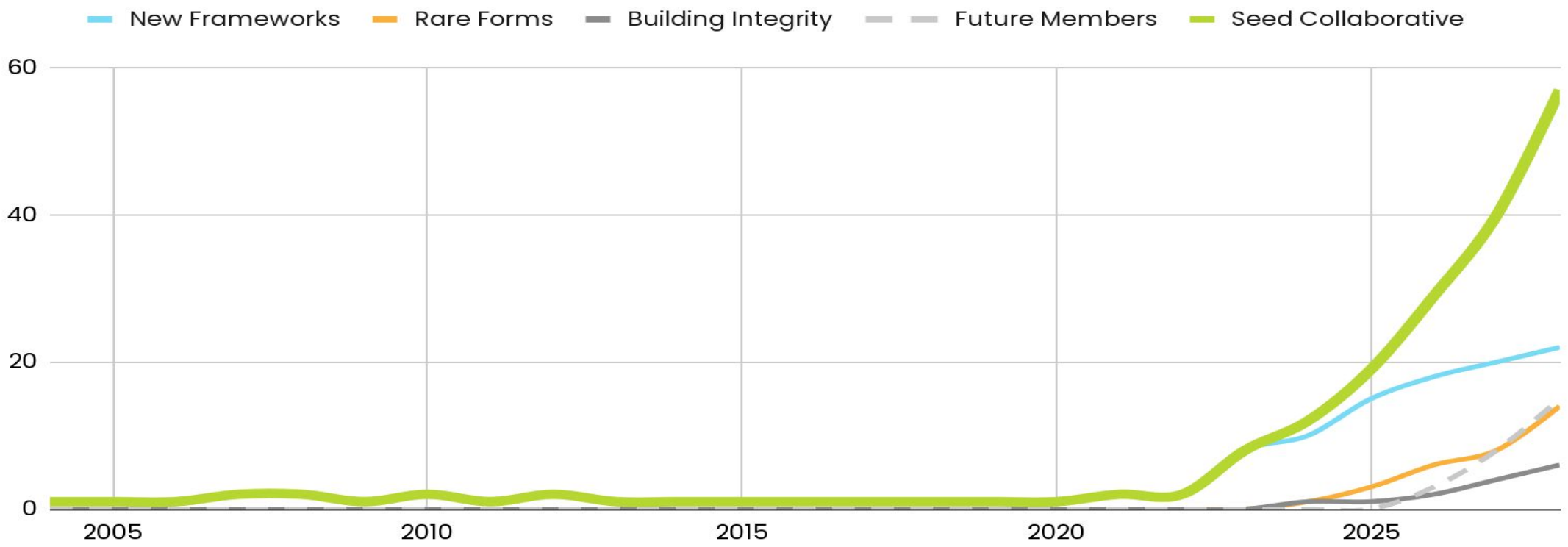
Founding members
New Frameworks, VT
Rare Forms, MA
Building Integrity, MO

2025 cohort
Living Craft, CO
A1 Design Build, WA
Earthbound/POM Studio, MD/VA

2026 cohort
BrightBale, MN
Field Assembly, NY
Earthlight/Sol, CA/OR

SCALING IMPACT TOGETHER

Straw homes produced per year



WHAT THE COLLABORATIVE HOLDS

Shared services, owned in common

- Marketing & Sales
- Research & Development
- Design & Engineering Services
- Quality Assurance
- Training & Education
- Financing
- Testing & Certifications
- Housing Development
- Business Development

No single member carries the full burden. ***We go further, faster, together.***

SHARED ECONOMICS

Buying power, labor and capital, pooled



Shared Purchasing, Shared Projects

Key materials bought together, at collective volume — smaller manufacturers get pricing normally reserved for the largest players.

Revolving Loan Fund, Shared Labor

A shared financing mechanism built by and for members — capital that recirculates through the network instead of extracting out of it.

SHARED DEVELOPMENT

Development services, aimed at cooperative outcomes

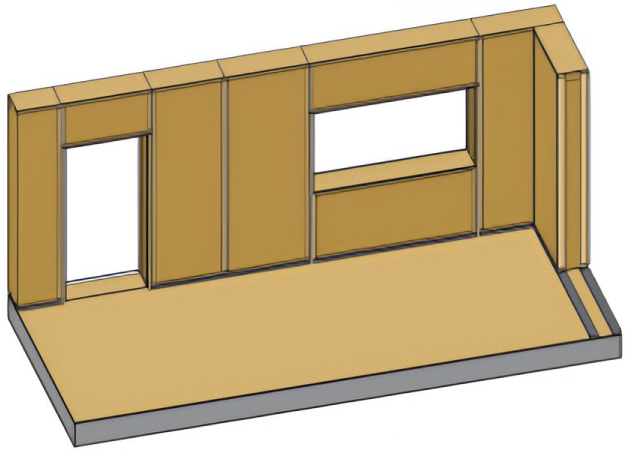
The collaborative offers development services focused specifically on cooperative development — helping projects (like affordable, community-owned housing) get built with the same shared-ownership values baked into the buildings themselves.



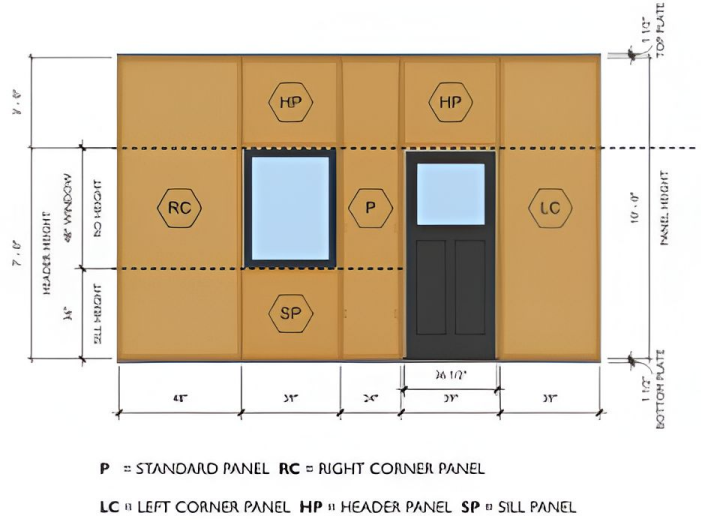
BUILDING ACCESS

Intentionally low barriers to entry

- Race, class, gender and geography limit access to capital, not talent.
- More minds, from more angles, solve problems better than any lone entrepreneur.
- Equity guides who we train and who we build for, including through our Community Housing Initiative.

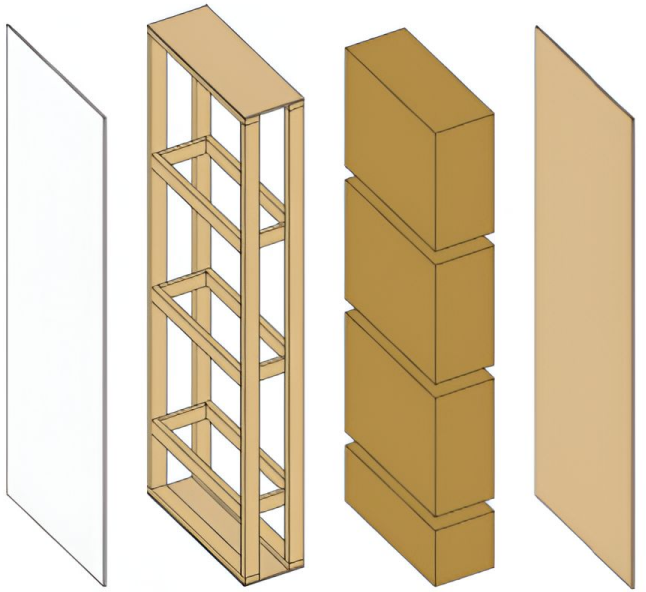


EXAMPLE PANEL LAYOUT



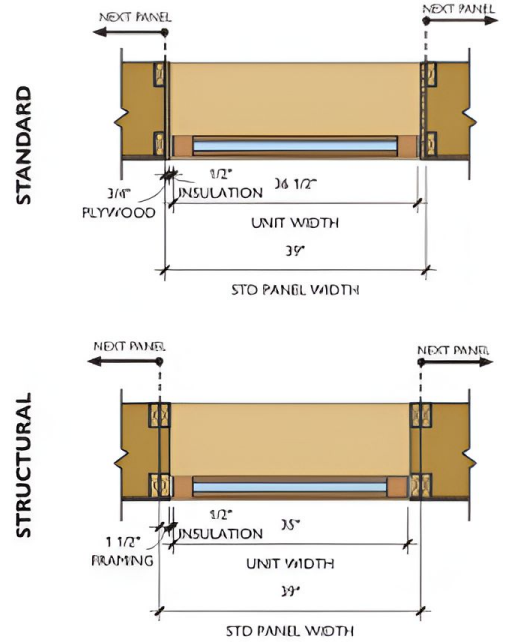
P = STANDARD PANEL RC = RIGHT CORNER PANEL

LC = LEFT CORNER PANEL HP = HEADER PANEL SP = SILL PANEL



AIR BARRIER FRAMING STRAW BALES SHEATHING

WINDOW PLAN DETAILS



WHERE STRAW CAME FROM

We didn’t invent this. We inherited it.

Homesteaders in Nebraska were stacking bales into load-bearing walls in the 1880s, working with what the sandhills gave them. The technique spread the way vernacular knowledge spreads — farm to farm, workshop to workshop — refined by people who never filed a patent.

In the early 2010s, Chris Magwood and his colleagues at the Endeavour Centre laid the groundwork for straw structural insulated panels in **North America**. Instead of enclosing that knowledge, they shared it freely with New Frameworks, Rare Forms, and Building Integrity.



Pilgrim’s Holiness Church, Sand Hill Nebraska, 1928

BUILDING ALTERNATIVES TO CAPITALISM

What is open, and what is bounded?

OPEN TO PUBLIC

The basic fabrication process. We teach it freely and give shop tours. We want to see land-based practices that heal earth widely adopted, and we all have rights to practice it.

OPEN TO MEMBERS

The processes the Collaborative develops to make the process faster, more consistent, and safer. It's the result of shared development — and it's part of what makes this a viable business instead of a hobby, and represents our shared investment.

Cooperatives have always grown in the cracks of the dominant economy, and point the way to alternate possibilities.

THE COMMONS, REFRAMED

Restoring the commons

A commons is a shared resource, stewarded for ongoing, common benefit.



A commons is cooperative ownership.
The people doing the work and the people governing the work are the same.

A commons is not extractive.
No one profits from someone else's labor or hoards what others need, the way a landlord or a boss can.

WHY THIS, WHY NOW

Competition is too slow for this crisis

- Competing for profit pits us against each other instead of the problem.
- Siloed solutions, defended by IP, stay less effective and less integrated.
- A single-company view misses what only a systems view and a cooperative ecosystem view can see.

Survival is not a competitive sport. Humans survive and thrive more and better together.



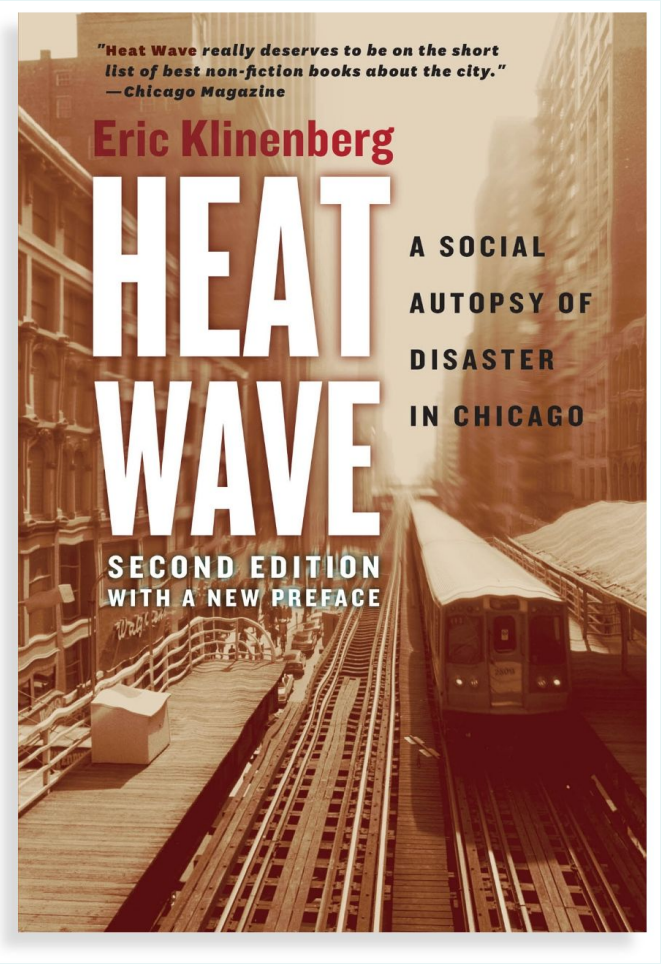
THE EVIDENCE

What actually saves us in a crisis?

During Chicago's 1995 heat wave, mortality varied block by block — even between neighborhoods with nearly identical poverty and demographics. The difference wasn't technology or income. It was social connection: whether neighbors knew and checked on each other.

Social infrastructure — relationships, trust, mutual obligation — outperformed technological or individual solutions when it mattered most.

That's the same logic the Collaborative applies to business: organize as a web of life, not a single competitor.



Klinenberg, E. (2015). *Heat wave: A social autopsy of disaster in Chicago* (2nd ed.). University of Chicago Press

THE LEGAL & CULTURAL FORM

What is a cooperative, exactly?

An organization owned and democratically controlled by the people who use it — sharing responsibility, resources, benefits, profit, and purpose.



Worker Cooperatives

Owned and governed by the people who work there.

Consumer Cooperatives

Owned by its customers, like credit unions and food co-ops.

Producers' Cooperatives

Owned by producers who pool output.

THE INTERNATIONAL COOPERATIVE ALLIANCE FRAMEWORK

Shared values, shared principles

VALUES

- Self-help
- Self-responsibility
- Democracy
- Equality
- Equity
- Solidarity
- Honesty & Openness
- Social Responsibility
- Caring for Others

PRINCIPLES

- Voluntary & Open Membership
- Democratic Member Control
- Member Economic Participation
- Autonomy & Independence
- Education, Training & Info
- Cooperation Among Cooperatives
- Concern for Community

A PROVEN MODEL AT SCALE

Mondragon: cooperation, industrialized

Mondragon expanded the cooperative framework to 10 principles — and, with the United Steelworkers, co-developed the “Union Co-op” model blending cooperative ownership with union protections.

Sovereignty of Labor	Labor — not capital — is the primary organizing force of the enterprise.
Instrumental & Subordinate Capital	Capital is a tool that serves the work, never the other way around.
Wage Solidarity	Pay ratios stay bounded, keeping compensation in proportion, not runaway.
Social Transformation	Success is measured by broader impact, not just enterprise growth.

70,000+

worker-members across Mondragon's federation of cooperatives

Proof that “cooperative” and “industrial scale” go hand in hand.

THE PRODUCERS COOPERATIVE MODEL

Familiar model, new crop



Ocean Spray · since 1930

700+ grower families jointly own the processing, brand and distribution of their cranberries.

Cabot Creamery · since 1919

Dairy farm families across New England and New York own the creameries and brand through Agri-Mark.

The Seed Collaborative: the same model with a new crop

- Members make homes, not food
- We share know-how, not just output
- Built for climate and housing goals
- Grows by seeding regional makers

THE CULTURE OF THE COLLABORATIVE

Unlearning Independence; Learning to Share

Most of us were trained to prize independence: own your shop, guard your methods, win the bid. Working as a cooperative means teaching, and practicing something different.

WHAT WE'RE UNLEARNING		WHAT WE'RE PRACTICING
Going it alone	→	**Asking for help early**
Guarding trade secrets	→	**Sharing what we learn**
Competing for every bid	→	**Growing the pie together**
Fast, top-down decisions	→	**Slower decisions that hold**

The Reality is that shared decisions take longer, trust is built slowly, and conflict is part of the work.

2026 Seed Cohort weekly training call



FOR EVERYONE IN THIS ROOM

What this means for you

Developers	Bring a project to a partner whose incentives already point toward community-owned, climate-positive outcomes.
Architects	Seek out materials and partnerships that move projects toward shared climate and social goals.
Building Owners	Ask what a revolving loan fund and pooled purchasing could do to reduce costs for your building operations.
Builders	Consider how shared services and pooled resources could benefit the delivery of much needed housing.
Everyone	Build connections and collaborations across AEC disciplines to accelerate the pace of positive change.

SURVIVAL IS NOT A COMPETITIVE SPORT, IT'S COMMUNAL

Build Together.
Grow Together.
Own Together.