



THE FUTURE OF BAMBOO CONSTRUCTION

What We Need to Do Now



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Our Agenda

Mission/Vision

Where We Have Been

Green Construction

Where We Need To Go

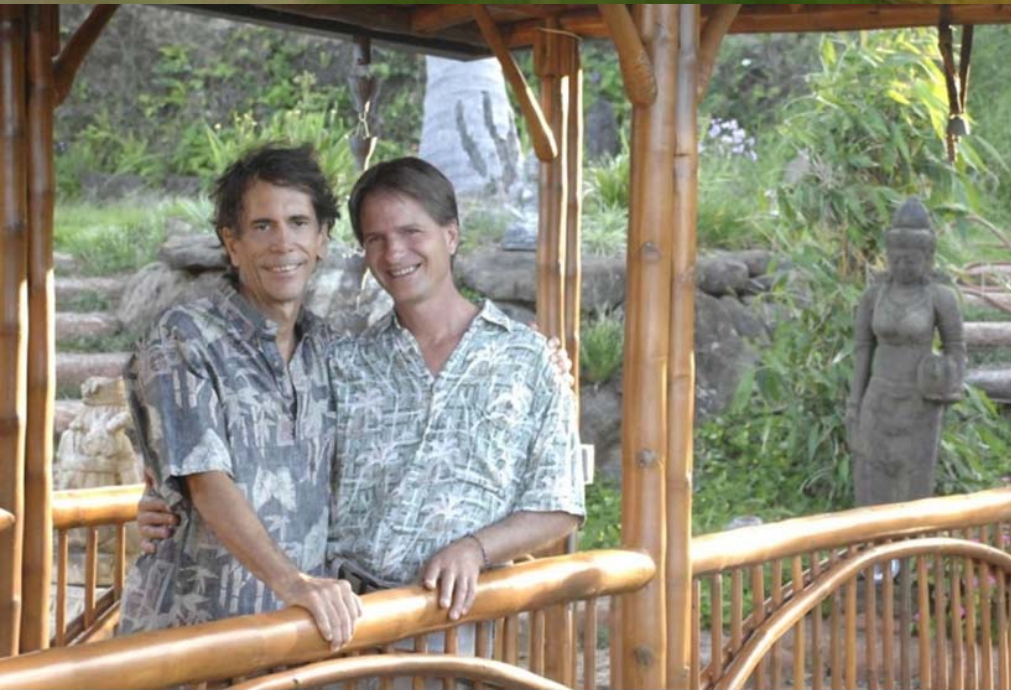
What Do We Need To Do Now



Bamboo Living Mission/Vision

Protect and Restore

In 1995, David Sands and Jeffree Trudeau founded Bamboo Living to protect and restore the Earth's forests by adapting bamboo for Western building practices

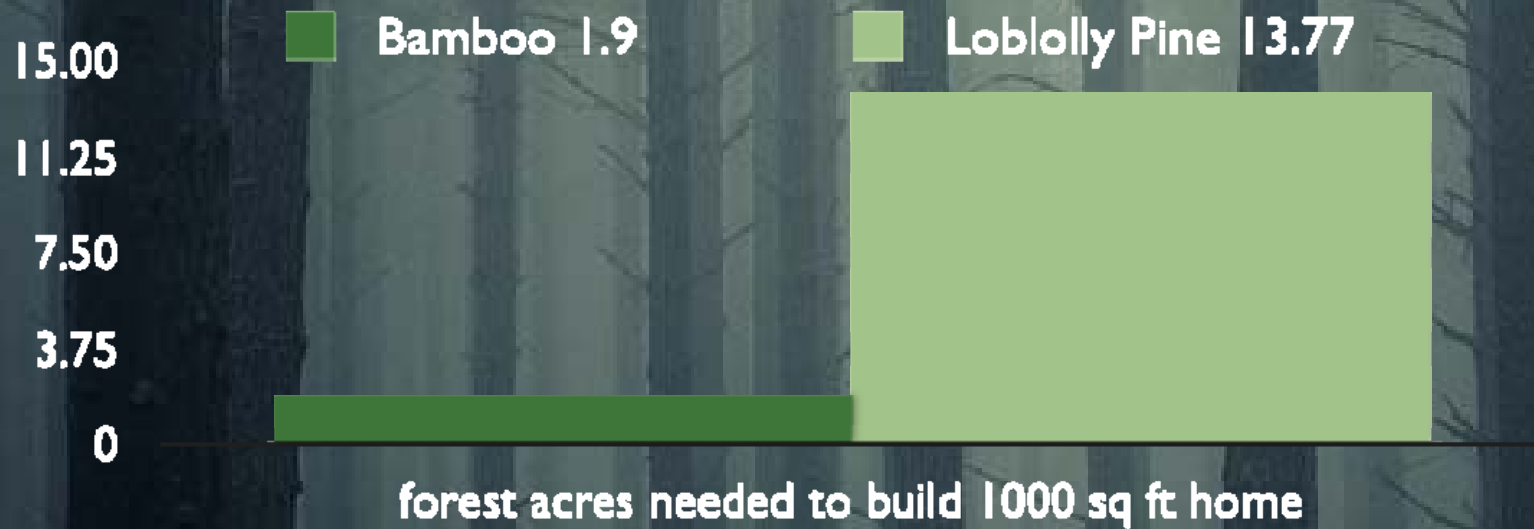


- bamboo grows incredibly fast
- bamboo is a grass species that when harvested sustainably, the same plant renews itself for many decades
- bamboo is flexible and resilient,
- bamboo has performed well in hurricanes and earthquakes

Bamboo Living Mission/Vision

from reforestation to carbon sequestration

We were initially motivated by the efficiency in land and forest resources

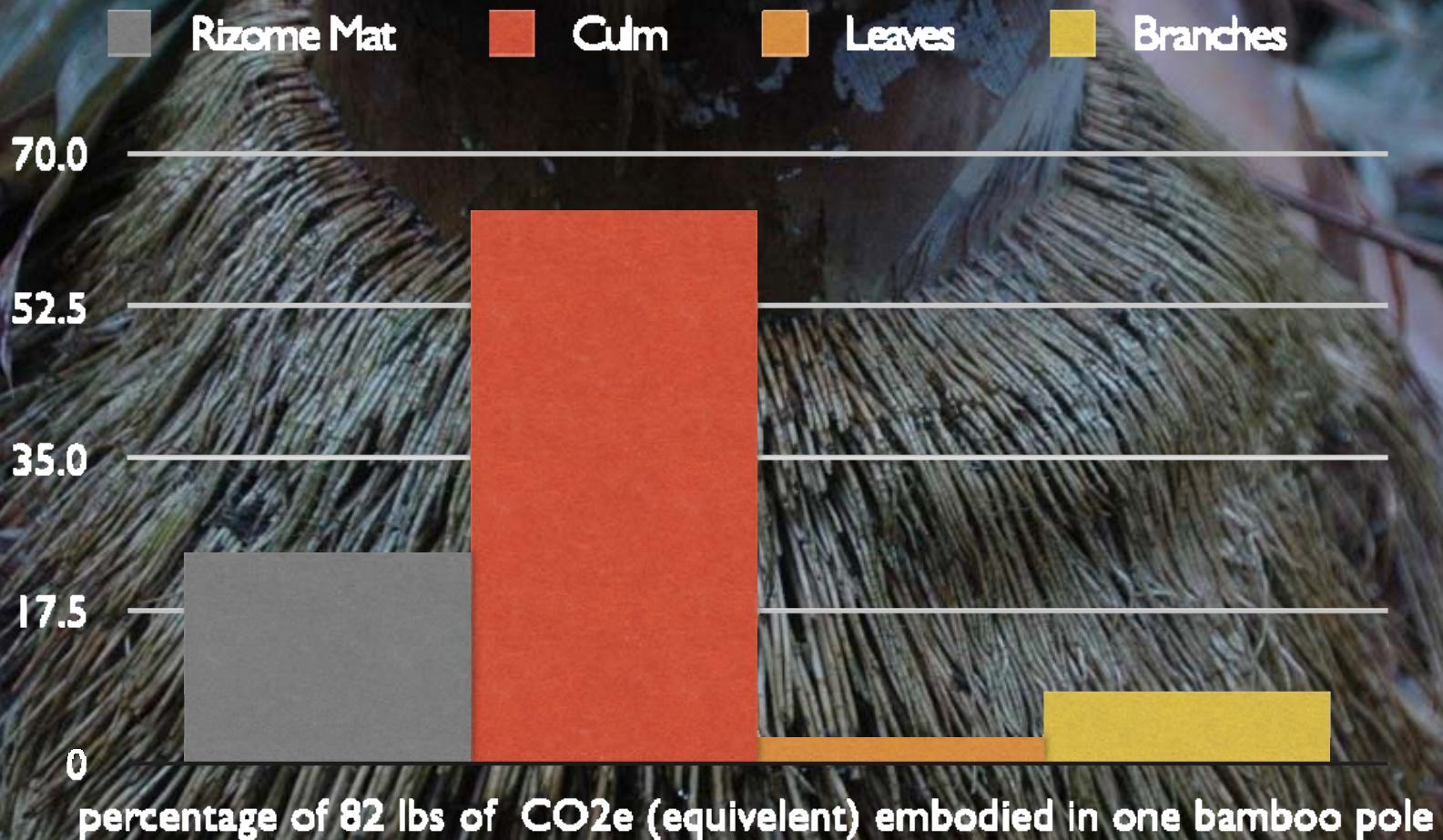


-For wood frame BC44: $0.0138 \text{ acres/sqft} \times 1000 \text{ sqft} = 13.77$ acres of a Loblolly pine forest in SE USA are needed for a 1,000 sqft BC44. at 500 board feet per acre per year. That means that those same 13.77 acres can produce enough wood for one 1,000sqft BC house every year. if the forest is sustainably harvested at a rate of 500 board feet per acre per year.

-For bamboo BC44: $0.0019 \text{ acres/sqft} \times 1000 \text{ sqft} = 1.9$ acres of bamboo are needed for a 1,000 sqft BC44. This means that those same 1.9 acres can produce enough bamboo for one 1,000sqft BC house every year. If the bamboo forest is sustainably harvested at a rate of 960 poles per acre per year.

Bamboo Living Mission/Vision

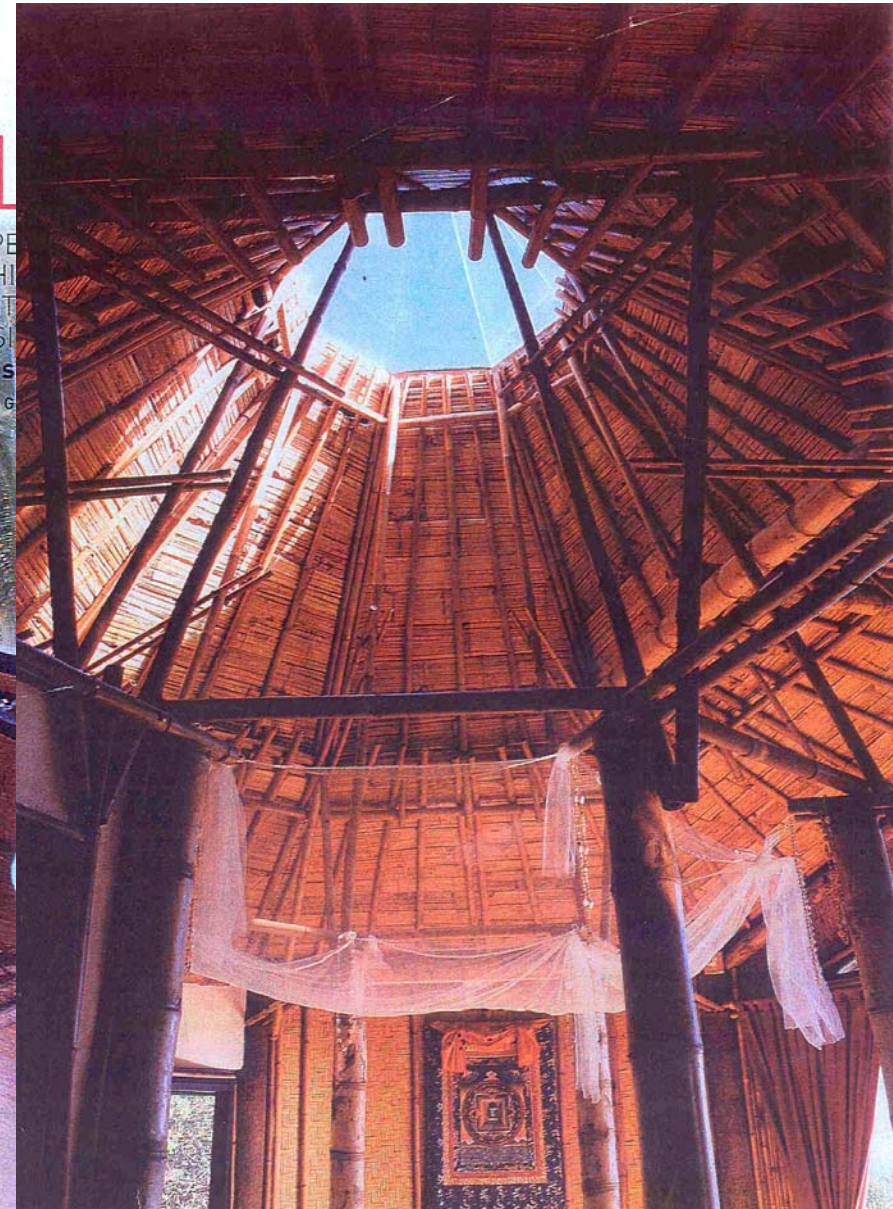
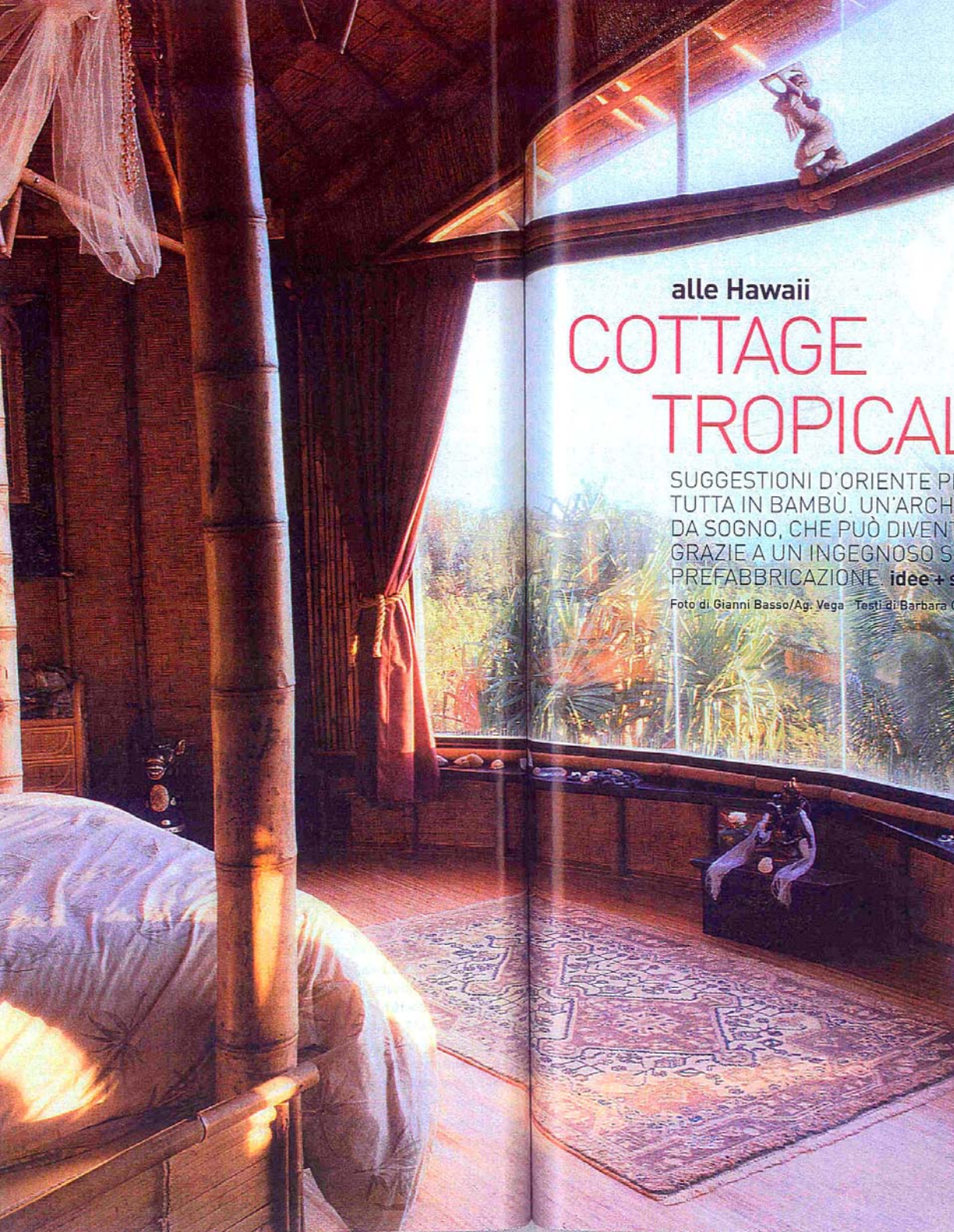
from reforestation to carbon sequestration



Average wet weight of culm is 25kg. $13 \text{ kg weight} \times 50\% = 6.5 \text{ kg Carbon} \times 3.67 = 23.85 \text{ kg CO2e}$ which is 52.5 lbs CO2e per pole.

82 lbs CO2e in culm, leaves, branches, rhizome mat and fine roots.

Brava Casa



In 2004 Bamboo Living became the first company in the world to gain ICC-ES certification for structural bamboo



1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2003 *International Building Code*® (IBC)
- 2003 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

Structural

2.0 USES

The structural bamboo poles are used as structural elements in wall, roof and floor trusses (panels) or as individual compression and/or tension members, in Type V non-fire-resistance rated residential and commercial construction. The commercial construction is limited to one story and a maximum floor area of 2000 square feet (180 m²).

3.0 DESCRIPTION

The structural bamboo poles covered in this report are from Quang Ngai, Vietnam, and are of the Tre Gai (*bambusa stenostachya*) species. The bamboo poles are typically 2³/₄ inches (70 mm) to 3¹/₄ inches (82 mm) in diameter and 10 feet (3048 mm) to 14 feet (4267 mm) in length, depending on the building type. The structural bamboo poles have a nominal density of 42 pcf (673 kg/m³) and are preservatively treated with a borate solution.



VS

In 2005
Bamboo
Living
buildings
withstood
multiple
173mph
hurricanes





Bamboo Living Factory Vietnam



Bamboo Living Factory Vietnam





17 years of construction

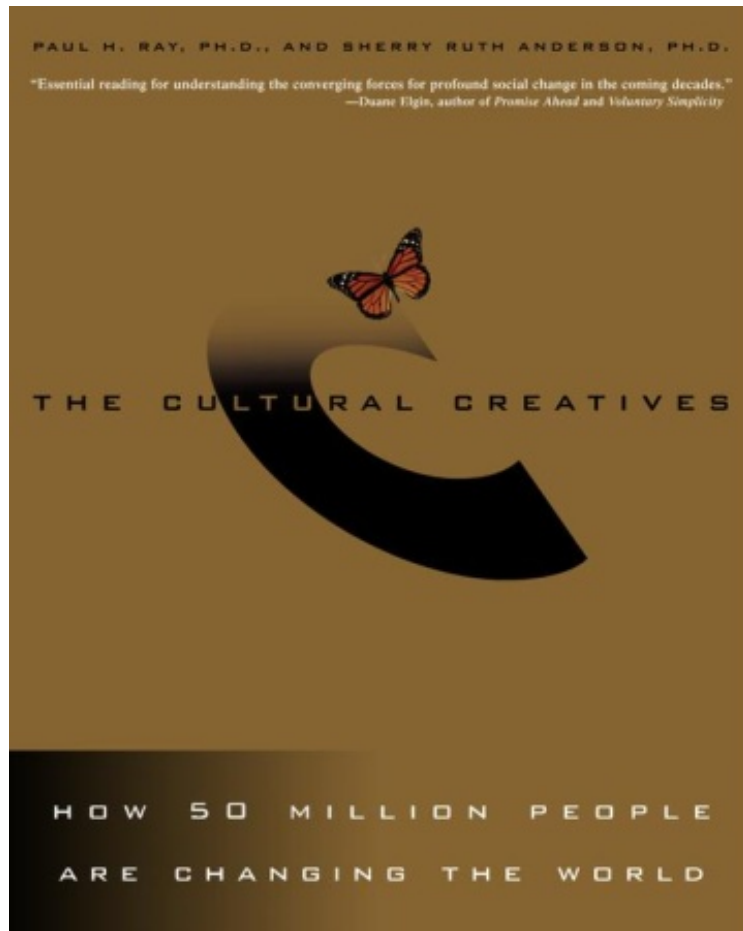






Green Construction

the cultural creative 2001



Cultural Creatives **hunger for a deep change in their life that moves them in the direction of less stress, more health, lower consumption, more spirituality, more respect for the earth** and the diversity within and among the species that inhabit her.

Cultural Creatives are a growing number of people who **want to see deep, integral change in the cultures that have evolved in industrialized nations.**

Cultural creatives **seek new ways to work and learn together.**

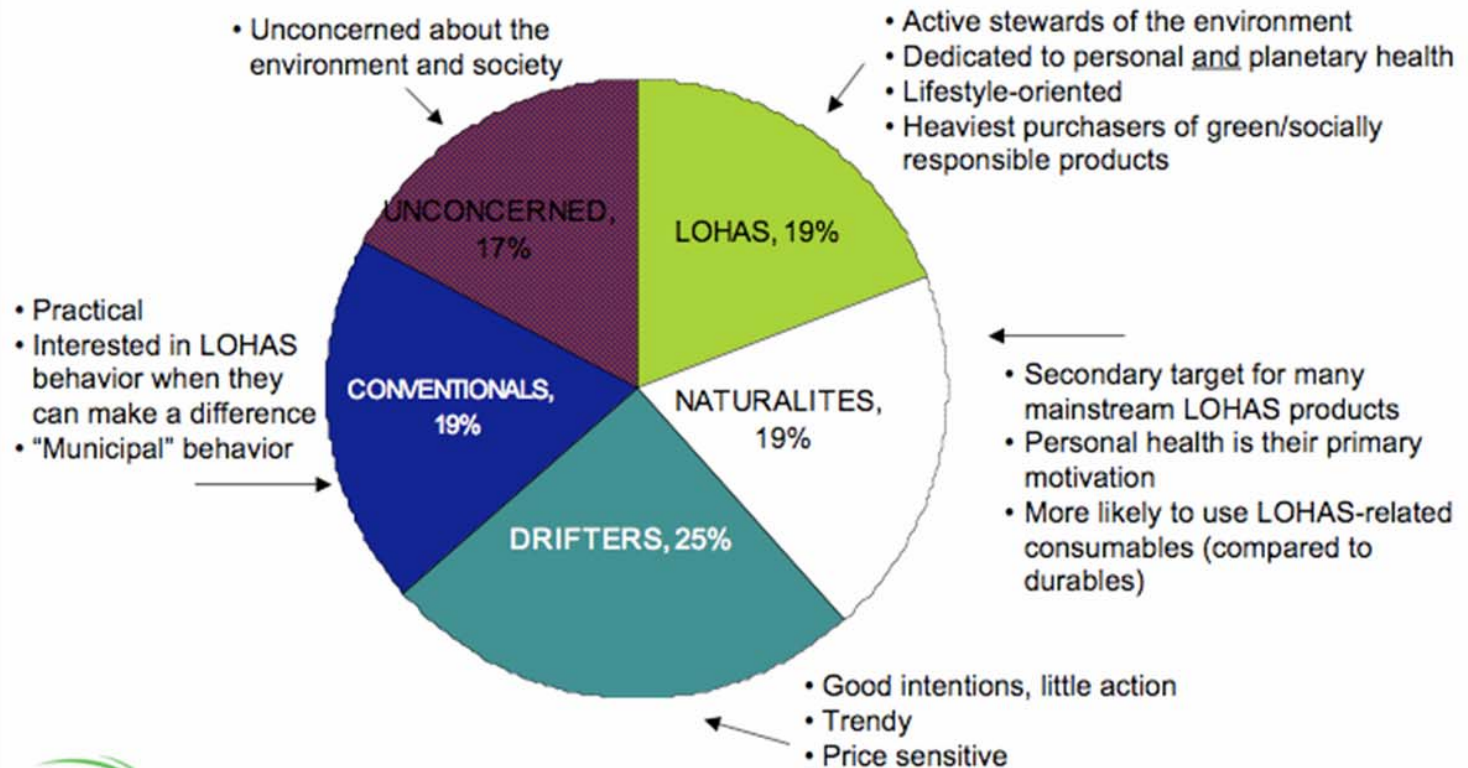
Cultural Creatives are **radically uncertain about what happens next, but answer the call to be in service to the world,** and in service to this emergence of a new, integral culture.

Green Construction

natural marketing institute: the LOHAS consumer

NMI's 2007 LOHAS Consumer Segmentation Model

(% general population in NMI defined consumer segments)



The LOHAS Consumer

(% of population...)

- A trend predictor
- Personal health + planetary health
- Values driven
- Price insensitive
- High influence on others
- Highest green buyers
- Information junkies
- Eco-lifestyle
- CSR seekers (and boycotters)

LOHAS 19%

40 million
consumers

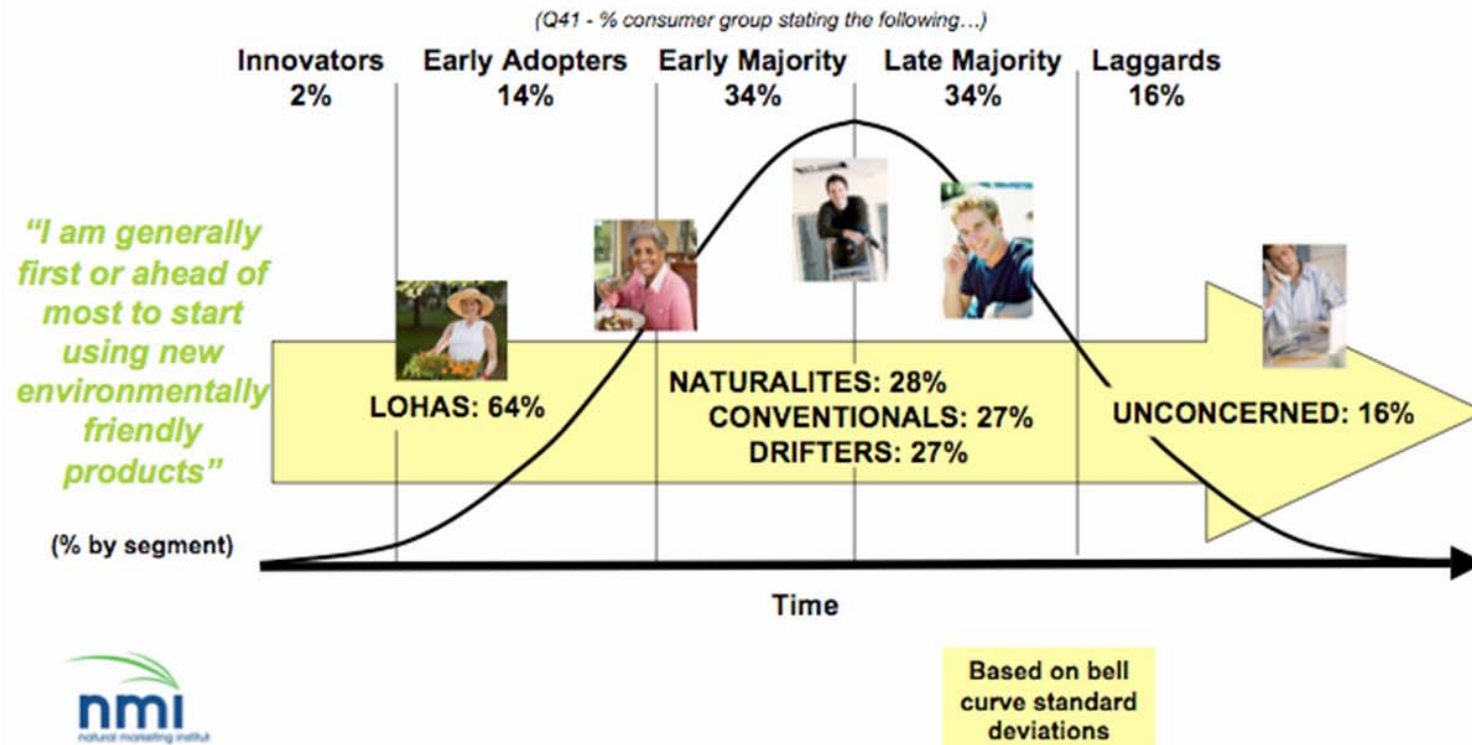


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natural marketing institute: the LOHAS consumer

Other LOHAS Key Characteristics

Early Adopters



Green Construction



Despite the economic downturn in the U.S. and the heavy employment losses being felt by the construction industry, the outlook for the Green Building market remains very positive for 2009. Additionally, Turner's Green Building Market Barometer survey conducted in November 2008 found that 75% of commercial real estate executives said that the credit crisis would not hinder their 'Green' building activity in 2009.

Market Outlook

Combined, the Commercial and Residential Green Building market will reach \$52.3 billion in 2009 and grow to \$128.6 billion in 2013. In 2009, the Commercial and Institutional (\$26.5 billion) market will be slightly higher than the Residential (\$25.8 billion) market, but by 2013 the Residential market will exceed the size of the commercial market by \$2.6 billion.

The Commercial and Institutional Green Building market will grow by an annual average of 24.3% from 2009 to 2013, and reach a total value of \$63.0 billion in 2013.

The Residential Green Building market will grow by an annual average of 26.5% from 2009 to 2013, and reach a total value of \$65.6 billion in 2013.

Sector Activity

In 2009, Commercial Real Estate executives expect Green Building activity to be most prevalent in the Public Facilities, Education, and Commercial sectors. Combined these three sectors will account for 74% (30%, 24%, 20%, respectively) of Green Building activity.

Industry Drivers

1. Lower Energy Costs
2. Operating Cost Savings
3. Green Building Price Premiums

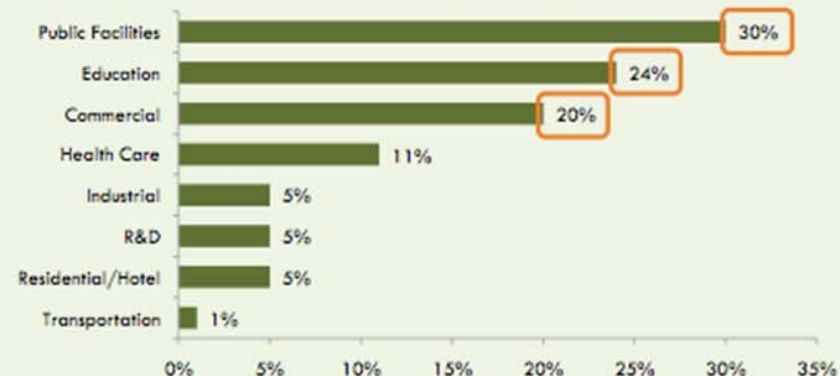
Recommendation

Capitalize on Green Building initiatives now rather than later to capture the largest share of the green building market.

U.S. Green Building Market by Segment | 2009 and 2013 Projections¹
in Billions of U.S. Dollars
(Compound Annual Growth Rate from 2009 to 2013 in Parentheses)



Percent of Expected Green Building Activity by Sector in 2009²



¹Source: McGraw-Hill Construction Report [2008].

²Source: Data based on 754 surveys of commercial real-estate executives conducted for Turner's Green Building Market Barometer (November 2008).

Green Construction

the size of the market

Green Construction Economic Impact

From 2000–2008, the green construction market has:

- Generated \$173 billion dollars in GDP
- Supported over 2.4 million jobs
- Provided \$123 billion dollars in labor earnings

From 2009–2013, this study forecasts that green construction will:

- Generate an additional \$554 billion dollars in GDP
- Support over 7.9 million jobs
- Provide \$396 billion in labor earnings

Source: Booz Allen Hamilton for the USGBC 2009

USGBC Economic Impact

Between 2000–2008, LEED related construction spending has:

- Generated \$830 million in GDP
- Supported 15,000 jobs
- Provided \$703 million in labor earnings

Between 2009–2013, we forecast that LEED related spending will:

- Generate an additional \$12.5 billion dollars in GDP
- Support 230,000 jobs
- Provide \$10.7 billion in labor earnings



Green Construction

what is green?



**Green
Government**

An initiative of the National Association of Counties

Counties & Residential Green Building Standards



**NAHB NATIONAL
GREEN BUILDING
PROGRAM™**



Green Construction

what is green?



Green Construction

what is green?



Green Construction

what is green?



AIR QUALITY

- NON-TOXIC
- NON-ALLERGENIC
- NO OR VERY LOW VOCs
- NO COMBUSTION GASSES
- NO PARTICULATES
- MOLD FIGHTER
- AIR PURIFIER
- SOUND INSULATOR



CONSERVATION

- RECYCLED, RECLAIMED, REUSED
- RAPIDLY RENEWABLE
- PROTECTED/STEWARDED
- NON-POLLUTING
- SAFER CHEMISTRY
- DURABLE
- WATER SAVER
- WASTE REDUCER



LOCAL

- LOW CARBON FOOTPRINT
- LOCAL BUSINESS STIMULANT



ENERGY

- ENERGY-CONSERVING DESIGN
- RENEWABLE ENERGY SOURCE
- DAYLIGHTING
- LOCAL



RESPONSIBILITY

- RESPONSIBLE MANUFACTURING
- DEVELOPMENT OF GREEN JOBS
- ENVIRONMENTAL PROTECTION
- WORKER PROTECTION
- TRUTHFUL MARKETING

Green Construction

green scorecard concept

iBUILD
GREEN
FACTS

FUTURE HOME scorecard

BAMBOO

CARBON IMPACT SCORE

CARBON FOOTPRINT (TONS)

CO₂e STORAGE (TONS)

TOTAL CO₂e IMPACT (TONS)

LAND/FOREST CONSERVATION SCORE

PER ACRE YIELD

LEED POINTS (GREEN BUILDING COUNCIL SCORE)

ENERGY CONSERVATION

SOCIAL RESPONSIBILITY SCORE

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Where It is Headed

Sean Penrith, executive director of the [Earth Advantage Institute](#),
a non-profit based in Portland that certifies green buildings



1. The smart grid and connected home.
2. Energy labeling for homes and office buildings.
3. Increased use of building information modeling (BIM) software.
4. Buy-in to green building by the financial community.
5. "Right-sizing" of homes.
6. Proliferation of eco-districts.
7. Water conservation gains.
8. Carbon calculations of building materials and processes.
9. More net zero energy buildings.
10. Continued demand for sustainable building education.

Green Construction

what does the green home buyer want?



- a safe community with shared values
- food centered
- more experiential, less material
- new urbanist lifestyle





Our Agenda

the cost of building green and

Democratizing Green



At Bamboo Living we believe in democratizing the cost of green building
- the stakes are high, and the ultimate costs are far greater than the cost of the building materials

- it is not a question of if we can build green. it's a question of how
- it is possible to make building green possible for every family's income level
- to get there we must combine best practices, optimum efficiencies, science, technology, innovation, but most importantly, **visionary leadership.**

The Bamboo Living Agenda

From the spirit of bamboo to the future of bamboo



BAMBOO LIVING: FROM POLE TO PANEL











small is beautiful



A close-up photograph of a bamboo joint. A small, brown, pointed shoot is emerging from the joint on the left. A white, fibrous band is wrapped around the joint, extending to the right. The bamboo stalk is green and has some water droplets on it. The background is a blurred green forest.

Next Steps:

Our BIG idea



LUAAU ON THE LANAI'S

PAKALANA IN PAKO

5.20.12 SUNSET TIL SUNRISE









thanks!

