# An Architect's Point of View: Domicology As A Life Raft

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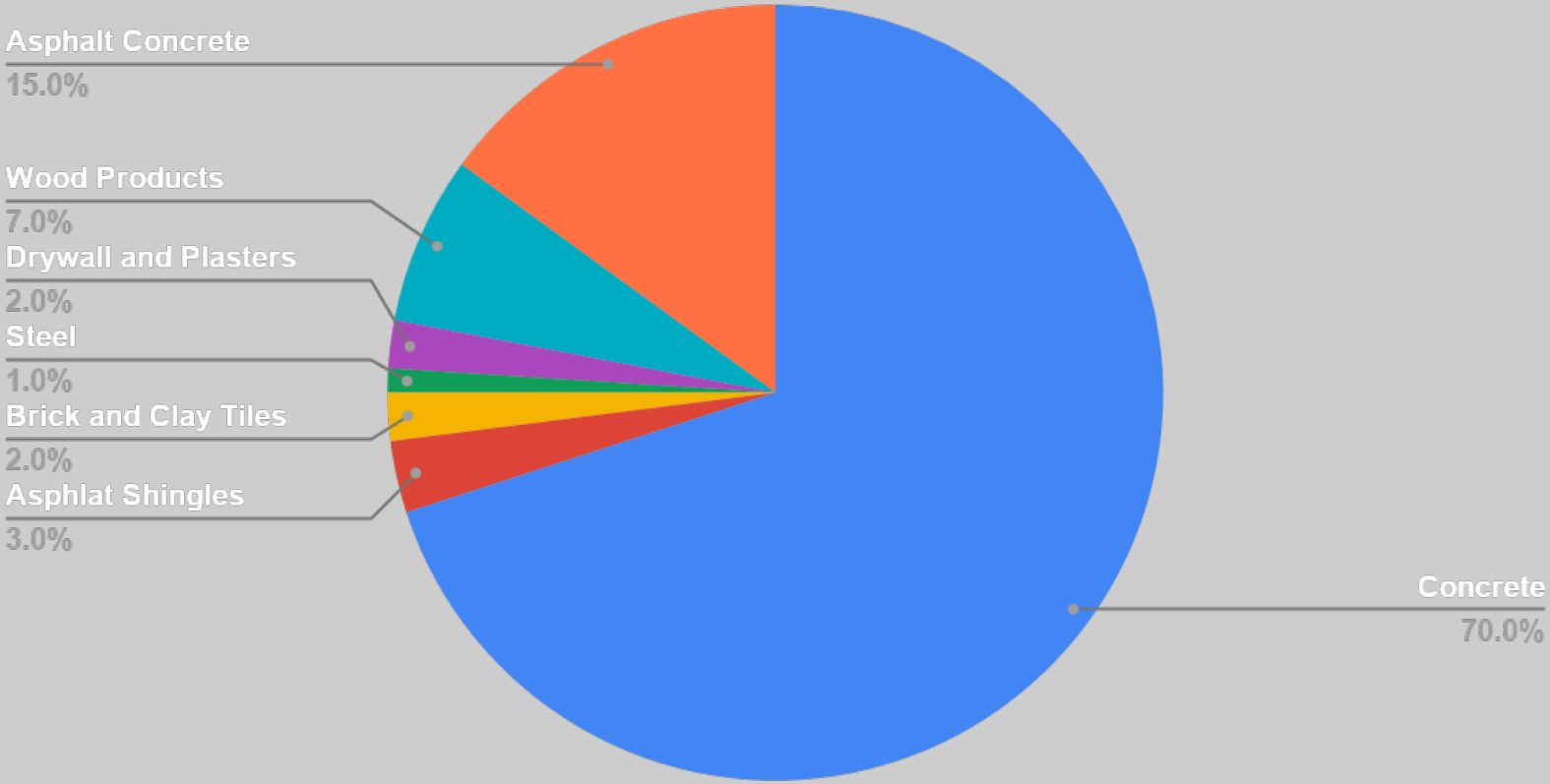
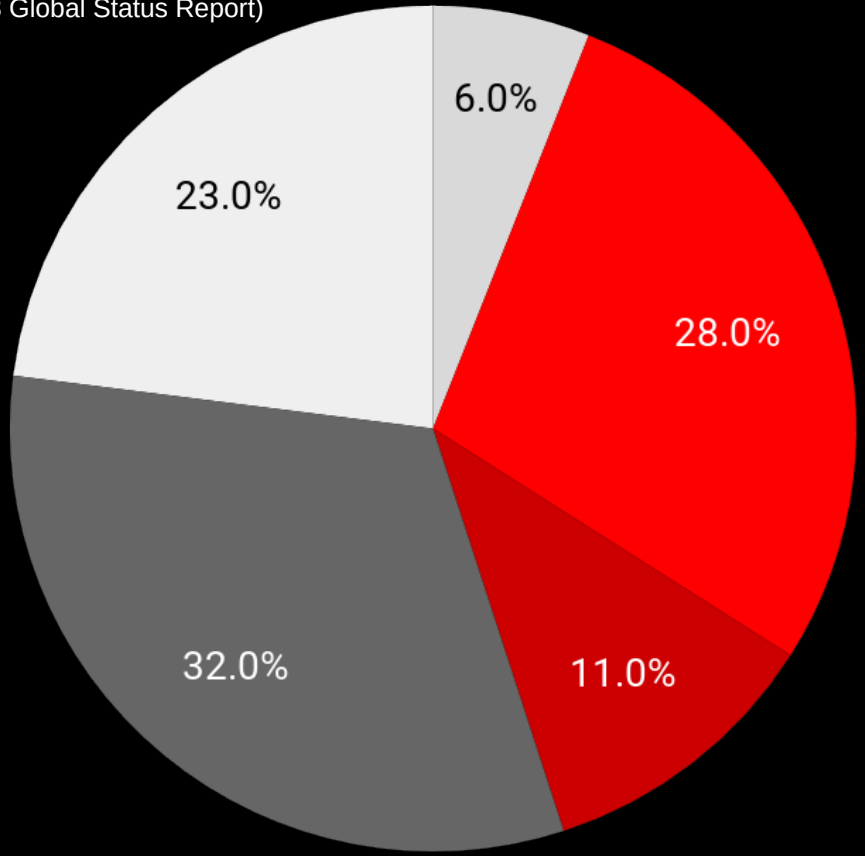
# EPA Estimated 548 Million Tons of Construction and Demolition Debris in 2015!



# Global Green House Gas Emissions

(2018 Global Status Report)



# Architecture is sexy.

*Image: KieranTimberlake © Peter Aaron/OTTO*

# Architecture is inspiring.

*Image: KieranTimberlake © Peter Aaron/OTTO*

"Everything's diffe
thing's the same.
integrate materia
it is delivered in c
pieces and elemer
way to build, and
that in the next fi
going to see a hug
construction is d
material waste, fa
time...it's just a s
stronger system."

# Houses of Tomorrow

**The allure of prefab is really about control.** Control over timeline, control over budget, control over the site. But how many projects are built without at least one maddening, last-second complication? Judging from those glimpsed in this issue, not many.

Long before the foundation was poured for Anthrazit House in Santa Barbara, Architects Magnus and EcoSteel explored how to protect the structure from wildfires like the one that destroyed the previous home on the property. The result combines concrete and glass with a fire-resistant prefabricated steel superstructure, an exterior skin of insulated metal panels, and a steel roof. Since most homes in the area are framed in wood, the architects spent additional time locating a steel erection team capable of assembling the structure. Installing the steel-and-glass stair alone required a five-ton hoist.

David Packer and Linda Gaunt's Breezehouse in New York's Hudson Valley was shipped cross-country and installed as painlessly as can be imagined. Yet significant site work needed to be done after Blu Homes, the fabricator, exited the picture. Packer made the decision to tweak the layout, and even added a site-built "connector" to unite the property's three separate prefab buildings. Now the couple has a home that is tailored to their needs, and they had a hand in building it.

An unusual—and gratifying—element of this issue is our cover story, which features the Venice, California, home of designer Jennifer Siegal. Proving that Siegal is rightfully one of the leaders of prefab's possibilities, the story exemplifies how her mind and home are constantly evolving, shifting to include those possibilities.

This is the second time this residence has appeared—the first, in 2007, highlighted how Siegal creatively [illegible] bungalow on the site with a [illegible] trailer. [illegible] property's latest incarnation. The truck trailer is gone, and in its place are three stacked prefab modules, something Siegal calls "vertical urban infill."

[illegible]tion is a complex topic, and one [illegible]r heads around. The method upholds th[illegible] consistency, speed, and customization, as well as materia

It would seem logical that fina[illegible] would follow, but, as is prove[illegible] always the case.

We recently met with New[illegible] McKean to discuss the pros a[illegible] the factors that might be prev[illegible] mass application. He seeme[illegible] lenges stem from the fact tha[illegible] paradigm that simply isn't fa[illegible] construction firms. Our take[illegible] standardized at the producti[illegible] to go at the construction lev[illegible] month's issue show, buildin[illegible] one prefab design to anothe[illegible] conventional methods of bu[illegible] as a challenge to their skill [illegible] that will make their jobs ob[illegible] further from the truth. As a[illegible] McKean, who has a backgro[illegible] started to bring contractor[illegible] initial setup of the envelop[illegible] the contractors to install t[illegible] out having to go through t[illegible] setup, which McKean says[illegible]

The Grow Community s[illegible] tial for prefab on a larger s[illegible] modular construction did[illegible] story should be considere[illegible] believers in sustainable s[illegible] cles, the project is an imp[illegible] as it highlights a case stu[illegible] questions than answers.

We call upon the cons[illegible] as our elected officials, [illegible] Let's embrace the powe[illegible] technology. "As digital t[illegible] cheaper, and more com[illegible] the building process wi[illegible] and attention to creati[illegible] Alchemy Architects sa[illegible] "The more that we can[illegible] error out of the constr[illegible] can use our talents to [illegible]

We are reminded th[illegible] political system—one[illegible] business demands, cc[illegible] codes, and so on—an[illegible] turned with a kit-of-p[illegible]

Amanda Dameron, I[illegible]
amanda@dwell.com

> "Everything's different, but everything's the same. It's just how you integrate materials; how much of it is delivered in chunks versus in pieces and elements. It's a better way to build, and there's no doubt that in the next five years, we're going to see a huge shift in how construction is done. There's less material waste, faster turnaround time...it's just a smarter, faster, stronger system." —JENNIFER SIEGAL

**Architecture can be forward thinking.**

dwell
At Home in the Modern World

All Together Now
Creating Community on Bainbridge Island

Prefab Goes Global
Modular Solutions, From Marfa to Russia

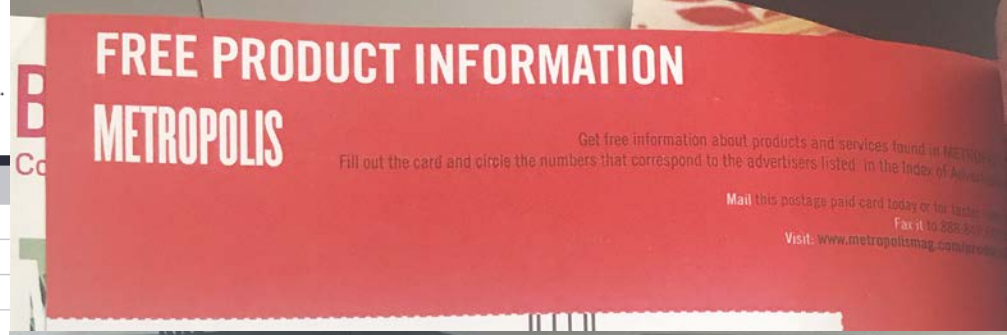
## The Prefab Issue

dwell.com
December 2016

## Product Catalogs for Building Products: ALL DIVISIONS

A library of thousands of Product Catalogs from leading building product manufacturers is available on Sweets. valuable technical data. ....**more**

| Divisions |
|---|
| 01 00 00 - General Requirements |
| 02 00 00 - Existing Conditions |
| 03 00 00 - Concrete |
| 04 00 00 - Masonry |
| 05 00 00 - Metals |
| 06 00 00 - Wood, Plastics, and Composites |
| 07 00 00 - Thermal and Moisture Protection |
| 08 00 00 - Openings |
| 09 00 00 - Finishes |
| 10 00 00 - Specialties |
| 11 00 00 - Equipment |
| 12 00 00 - Furnishings |
| 13 00 00 - Special Construction |
| 14 00 00 - Conveying Equipment |
| 21 00 00 - Fire Suppression |
| 22 00 00 - Plumbing |
| 23 00 00 - Heating, Ventilating, and Air-Conditioning (HVAC) |
| 25 00 00 - Integrated Automation |
| 26 00 00 - Electrical |
| 27 00 00 - Communications |
| 28 00 00 - Electronic Safety and Security |
| 31 00 00 - Earthwork |
| 32 00 00 - Exterior Improvements |
| 33 00 00 - Utilities |
| 34 00 00 - Transportation |





However, it can also be stuck in paralysis of tradition and convenience.

- ☑ Sexy
- ☑ Inspiring
- ☑ Forward Thinking

2006

## Loblolly House

Private residence

Taylors Island, Maryland

2,200 square feet

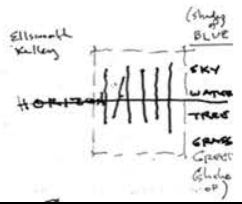
2006

Program: Off-site fabricated, single family home

Awards:
AIA Institute Honor Award
AIA Housing Award
AIA Pennsylvania Honor Award
AIA Philadelphia Gold Medal
AIA TAP BIM Award
Architect R+D Award
Chicago Athenaeum American Architecture Award and International Architecture Award
EPA Lifecycle Building Challenge
World Architecture Festival (shortlisted)

How can we holistically transform the way we make architecture, compressing the construction timespan and making use of technology to create a truly sustainable, aesthetically moving shelter?

Loblolly House was inspired by the childhood urge to build tree houses. An effort to bring back the magic of a house in the trees—one that requires climbing up to gain a view—Loblolly House appeals to a primal instinct about how we inhabit space. It also represents a home that is uniquely integrated with its setting among the tall loblolly pines from which it takes its name.



TAGS:

Environment

Life Cycle Assessment

Prefabrication

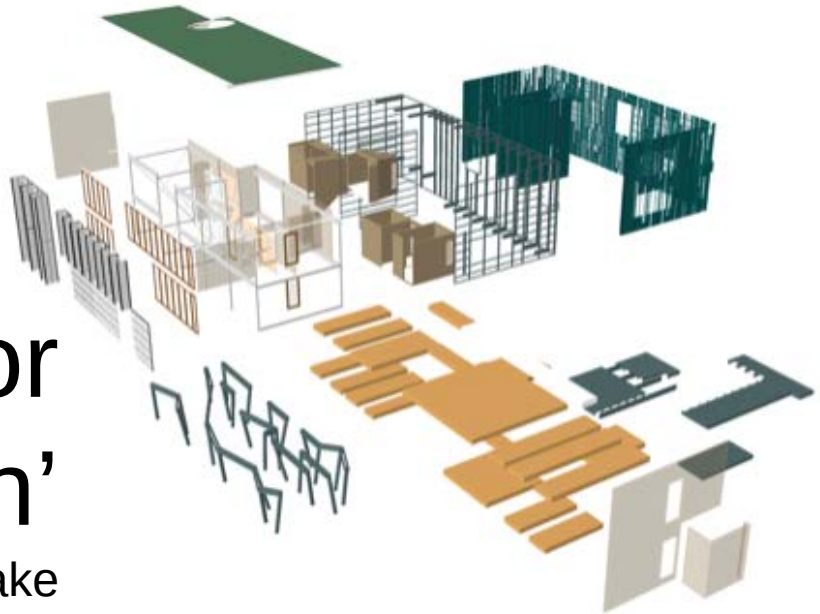
Research

Residential

SHARE:

NOVEMBER 03, 2008

## Unbolt, Detach, Reassemble: Loblolly House Wins EPA Challenge



Loblolly House was assembled from components that will maintain their integrity when they are disassembled at some moment in the future.

# ‘Design for Deconstruction’

-KieranTimberlake

**Rural Studio**
$20k Homes constructed from mostly found and repurposed materials.

Combining the benefits of environmental stewardship and economic equity.


# AIA Committee on the Environment (COTE) Top Ten Toolkit

**Phase 1**
**June 2018**



View Only

View Only

## Quick Links

- Leadership
- Advocacy
- COTE® Top Ten Awards
- COTE® Top Ten Toolkit
- Newsletters
- Resources
- Mission
- COTE® Partners

## Who we are

The AIA Committee on the Environment (COTE®) works to advance, disseminate, and advocate design practices that integrate built and natural systems and enhance both the design quality and environmental performance of the built environment. Expand your positive impact: Explore the COTE Top Ten Toolkit. Engage in our advocacy efforts. Enjoy our latest newsletter (and follow us on Twitter).

Stop Rotation

Founding sponsor

**Top Ten Reasons Buildings Matter**

| | | |
|---|---|---|
| **Integration** | #1 | Ranking of built environment in determining happiness[1] |
| **Community** | 90% | % of time people spend indoors[2] |
| **Ecology** | 45% | Buildings as % of US greenhouse gas emissions[3] |
| **Water** | 80% | Buildings as % of municipal water supply[4] |
| **Economy** | 87% | Buildings as % of global GDP[5] |
| **Energy** | 75% | Buildings as % of US electricity use[6] |
| **Wellness** | 50% | % increase in risk of adverse health effects through poor indoor quality[7] |
| **Resources** | 40% | Buildings as % of raw material use[8] |
| **Change** | 400% | Return on investments in natural disaster preparedness[9] |
| **Discovery** | 73% | Built environment % impact of on student test scores[10] |

**COTE Top Ten Measure of Sustainable Design**

| | |
|---|---|
| Design for Integration | Central Design Concept<br>Beauty and Delight<br>Integrated Process |
| Design for Community | Walkability / Human Scale / Alternative Transportation<br>Community Engagement & Buy-In<br>Social Equity |
| Design for Ecology | Landscape<br>Dark Skies<br>Bird Friendly<br>Site Acoustics<br>Biodiversity / Habitat<br>Bioclimatic Design |
| Design for Water | Indoor Water Efficiency<br>Outdoor Water Use Reduction (Irrigation Reduction / Elimination)<br>Process Water Reuse (ex. Condensate)<br>Recapture/Reuse of Greywater and/or Blackwater<br>Foundation water capture (if pumped)<br>Rainwater/Stormwater Use and Management<br>Net Zero Water Building (NZWB)<br>Climate Change |
| Design for Economy | Building Size<br>Material Use<br>Operational Requirements<br>Maintenance Requirements<br>Financing and Incentives |
| Design for Energy | Energy Benchmarking<br>Energy Modeling<br>Predicted Energy Use Intensity (pEUI)<br>Metered Energy Use Intensity (EUI)<br>Passive Design Features<br>On-Site Renewables (Solar, Wind) |
| | Climate Responsive Design<br>Project Type Response<br>Education<br>Post Occupancy Evaluation<br>Operational Carbon Calculation<br>Net Zero Energy Building (NZEB)<br>Net Zero Carbon Building (NZCB)<br>Commissioning |
| Design for Wellness | Daylighting and Lighting<br>Thermal Comfort<br>Indoor air quality<br>Happiness<br>Biophilia / Connection to Nature<br>Food/Movement/Exercise |
| Design for Resources | Whole Building Life Cycle Analysis (LCA)<br>Tracking building product Environmental Impacts<br>Raw Material Sourcing<br>Tracking Health Impacts<br>Construction Waste Diversion<br>Social Equity within the Supply Chain |
| Design for Change | Reuse<br>Flexibility and Future Adaptability<br>Resilience<br>Passive Survivability<br>Changing Climate |
| Design for Discovery | Post Occupancy Engagement<br>Occupant and Operator Relationships / Graphic Signage / Training<br>Sharing Lessons Learned<br>Discovery that Influences Behavior |

**Measure 5: Design for Economy**

Providing abundance while living within our means is a fundamental challenge of sustainability. How does the project provide "more with less"? Possibilities include "right-sizing" the program, cost-effective design decisions, economic performance analysis, economic equity strategies, notable return-on-investment outcomes, contributing to local and disadvantaged economies, etc. Provide examples of how first cost and lifecycle cost information influenced design choices. Identify any additional first-cost investments and how they are anticipated to improve life-cycle costs and longer-term economic performance.

**Focus topics:**

1. Building Size
2. Material use
3. Operational requirements
4. Maintenance Requirements
5. Financing and incentives

**If you can do only one (or two) things…**

1. Reduce the program size or re-use an existing building.
2. Cut back on finish materials.

Sustainable design needs to be accessible to everyone. The strategies that lead to high performing buildings across all measures are only effective if they are implemented in real buildings and they will only be implemented on a broad scale if they make sense financially. There is a misconception in the industry that sustainable design add costs; and so only a few projects with high budgets and ambitious goals can afford to "be sustainable" or achieve high levels of performance across measures. *This could not be further from the truth.* While flashy features, such as solar panels do add additional upfront costs, most of the best practices in this guide are either cost neutral or come with significant savings. Right-sizing is one such strategy. Decreasing a building's square footage will save costs while conserving energy and material resources. Reusing an existing structure is another example of strategies for both lower cost and lower embodied energy.

**Suggested Best Practices**

1. **Building Size:**
   a. Space should be seen as a resource to conserve, just like water or energy. Efficient use of space is a good indicator of economical design. Showing a smaller SF (per person, per other metric) is the goal here.
   b. Strategies for reducing square footage include efficient building planning, designing program elements to overlap, building reuse, and eliminating program redundancies. Building programs should be designed for typical building operations and not for an occasional overflow event.
   c. Building efficiency ratio, or net square footage divided by gross square footage, can be benchmarked by building type and tracked during design as a project goal. (See Efficiency Ratio Benchmarking below)

2. **Material use:**
   a. Limiting the material use is an indicator of economy. This can be accomplished by limiting finish products or eliminating superfluous materials to decrease total cost/SF. Consider using materials that serve multiple functions. For example, structural shear walls are intrinsically impact resistant as well as good sound and fire barriers.
   b. Think about how material choices improve building life span or ROI. More durable materials might cost more upfront, but could have significant long term ROIs
   c. Doing Life Cycle Analysis (LCA) can inform material selections/efficient material use.

3. **Operational requirements:**
   a. Designing to achieve a better energy and water performance also decreases the operational costs of a building. Designing for economy should focus on optimizing both upfront and operational costs. Strategies that improve performance without increasing costs are particularly effective.

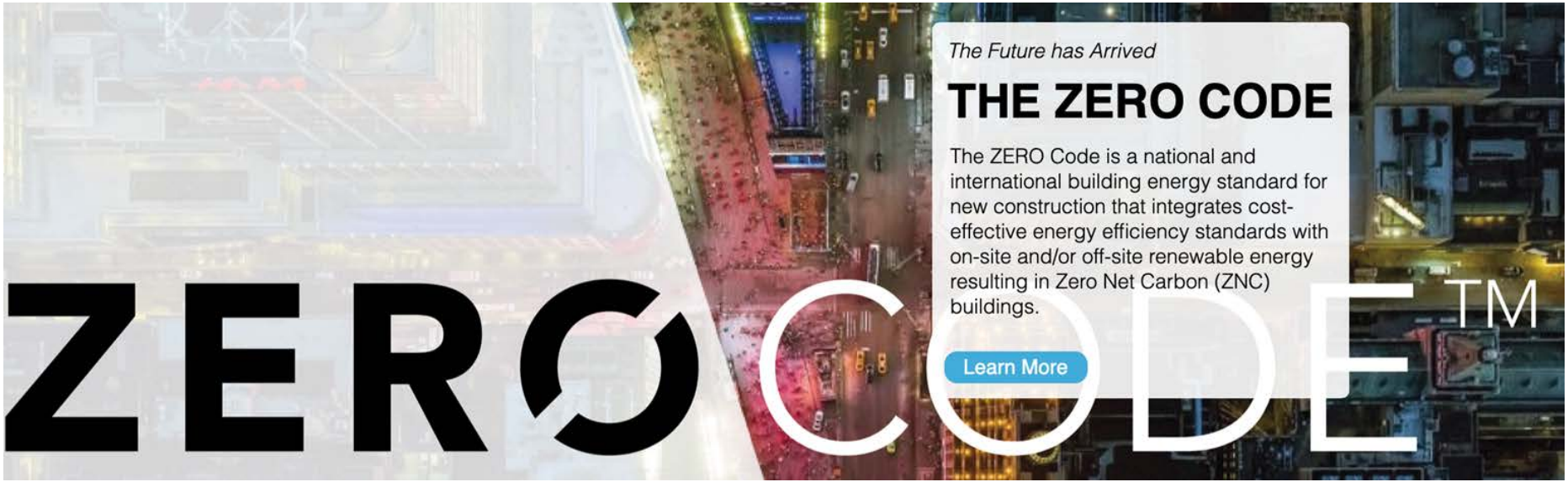
4. **Maintenance Requirements:**
   a. Lowering maintenance requirements, by choosing more durable materials or materials that require less intensive cleaning or longer replacement cycles will make projects more economical to operate.

5. **Financing and incentives**
   a. Researching and maximizing the use of local, state and national incentives, grants, and financing options can justify long-term investments to improve performance. Examples include energy cost payback, water savings, measured productivity gains, third party power purchase agreements (PPA), etc.
   b. Always seek equitable economic solutions that improve opportunities for disadvantaged economies.

6. **Community links:**
   a. Locally sourced materials or constructions systems can form a link to the local economy. Choose materials that local craftspeople have experience with and give them some freedom to express their skills.
   b. Seek out opportunities for workforce training opportunities during the construction of a project. These opportunities teach valuable skills and provide the experience necessary for career growth and future employment.

**Definitions and Technical Terms**

- **Economy:** careful management of available resources.
- **Simple Return on Investment (ROI):** amount of return on an investment, relative to the investment's cost
- **Life Cycle Assessment:** a technique to assess environmental impacts associated with all the stages of a product's life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance




AIA 2030 online series™

2030 PALETTE

CARBON SMART MATERIALS PALETTE™

ZERO CODE™

EPD Quicksheet

## The Challenges

**The 2030 Challenge** – AIA created the 2030 Commitment—a national framework with simple metrics and a standardized reporting format—to provide a structure for tracking progress and help you meet the 2030 Challenge targets. Over 400 A/E/P firms have adopted the 2030 Commitment with over 2.6 billion sq ft of project work reported in 2015 alone.

**The 2030 Challenge for Planning** – This Challenge is the goal set for the 2030 Districts Network, a membership of 18 private-sector-led, high performance urban building districts across North America. 2030 Districts are led by the private sector, with local building industry leaders, community groups and government to achieve significant energy, water, and emissions reductions.

**The 2030 Challenge for Products** – This Challenge spawned the Embodied Carbon Network, which now has over 300 members. Architecture 2030 and the Network are currently working on attribute-based embodied carbon standards for major building elements that will guide building design and construction, and government procurement policies.

CARBON SMART
MATERIALS PALETTE™

A DATABASE OF SUSTAINABLE DESIGN PRINCIPLES, STRATEGIES, TOOLS AND RESOURCES AT YOUR FINGERTIPS

- Building Facades
- Clerestories and Skylights
- Cool Roof
- Cross Ventilation
- Daylighting from Multiple Sides
- Direct Gain: Glazing
- Direct Gain: Heat Storage
- Double Roof
- Earth Sheltering
- East/West Shading
- Evaporative Cooling Towers
- Form For Cooling
- Form For Daylighting
- Form For Heating
- Green Roof
- Indirect Gain: Sunspace
- Intermediate Light Shelves
- Night Vent Cooling
- Shading Devices
- Side Daylighting
- Side Daylighting Controls
- Solar Greenhouse
- Solar Shading
- Stack Ventilation
- Thermal Storage Wall
- Top Daylighting
- Top Daylighting Controls

Consider using recycled aggregate, where appropriate

Utilize salvaged or reclaimed structural steel

Design for adaptability and deconstruction

Use recycled steel

Specify reclaimed wood products

Plan for reuse

Get to know the supply chain for your specific project

Use salvaged and/or recycling materials

Understand your region and source locally

## HIGH-IMPACT MATERIALS

Predominant building materials with high-impact potential for emissions reductions


CONCRETE


STEEL


WOOD


INSULATION

## CARBON-SMART MATERIALS

Low carbon/carbon sequestering materials


HEMPCRETE


SHEEP'S WOOL


STRAW-BALE


WOOD

## WHOLE BUILDING

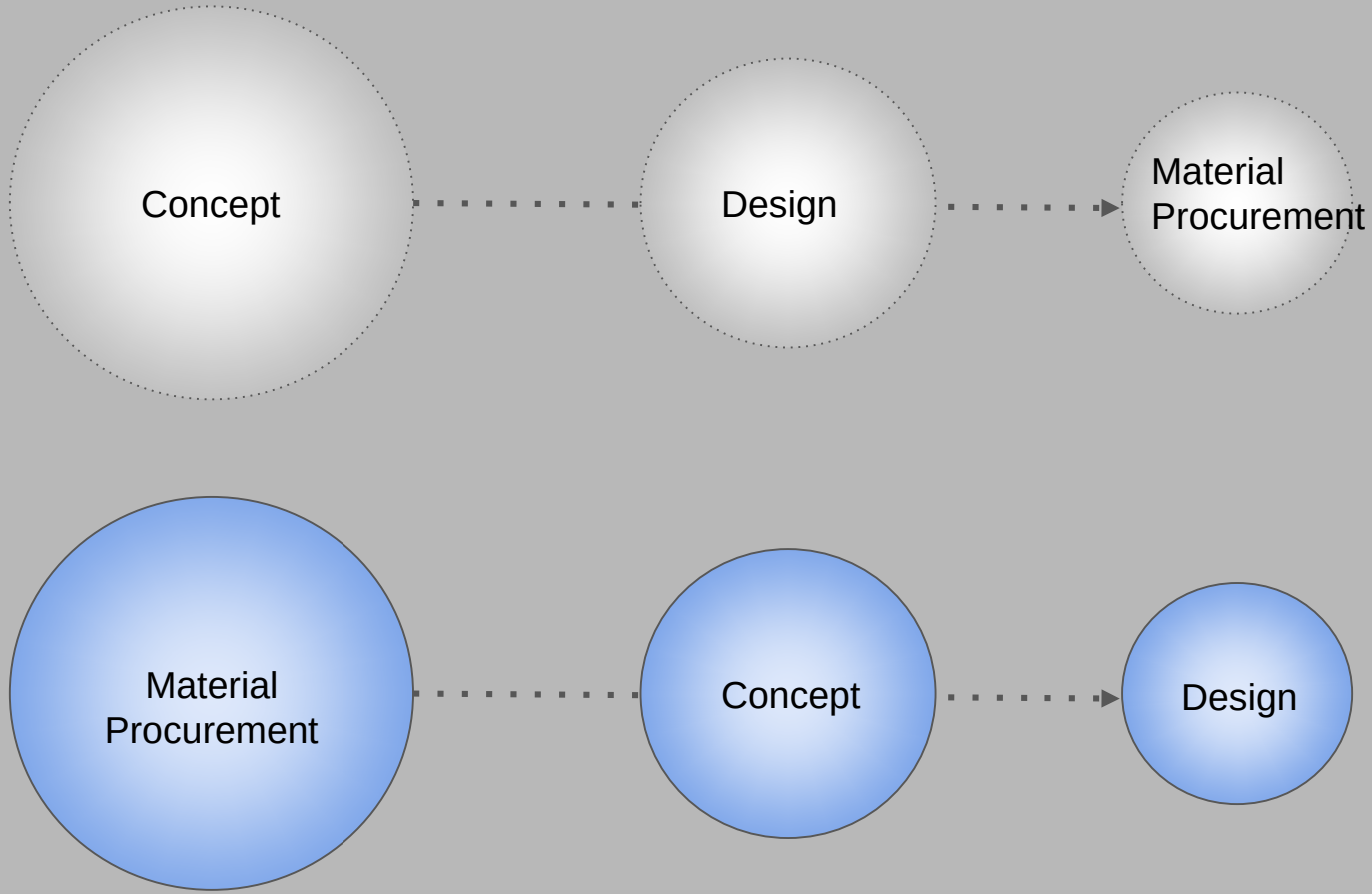
Whole building approaches to emissions reductions

## 2030 Palette Integration

The 2030 Palette is featured in the AIA+2030 Online Series and integrated into several software platforms, including Sefaira, Insight 360, and Climate Consultant.

CARBON SMART MATERIALS PALETTE™

Reformed Design Process



# Reformed Design Process

- Localized reclaimed materials become the departure point for design inspiration.
- New found working relationships in “material auditing” of material stock as preliminary steps of an architectural project.
- Inherently stimulates local economy.
- History becomes new again, and reuse/disassembly raises one’s comprehension of material and construction history.
- Our work as architect’s can live a second life - it doesn’t end up in a landfill.


Domicologists
RNLI

# Thank you