*Changing the building regulatory mindset:*
*Just preventing the worst, or enabling the best?*
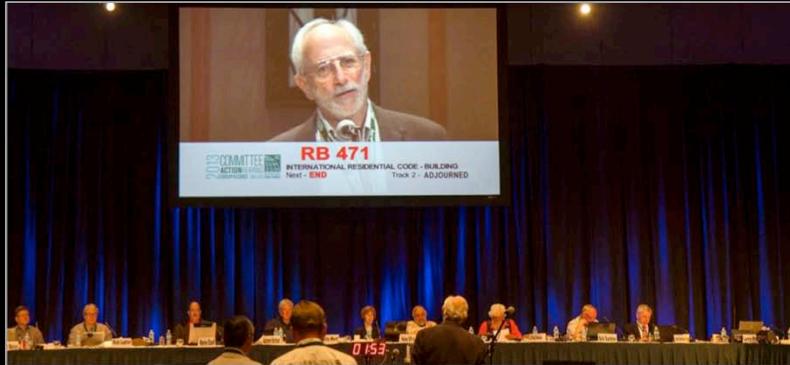
Ryerson University
March 3, 2014
Toronto

David Eisenberg
Director

Development Center for Appropriate Technology

These notes are an approximation of what I said, or at least what I intended to say, in this presentation. Thus they may vary from what I actually said. My intention, in sharing my presentations in this form is that what may be of value in this presentation will have more lasting and widespread benefit. Some of the commentary that accompanies the slides was written previously for other presentations and where it usefully expands on what I may have said in this talk, I have left it in. I hope you will pardon my taking such liberties. – David Eisenberg

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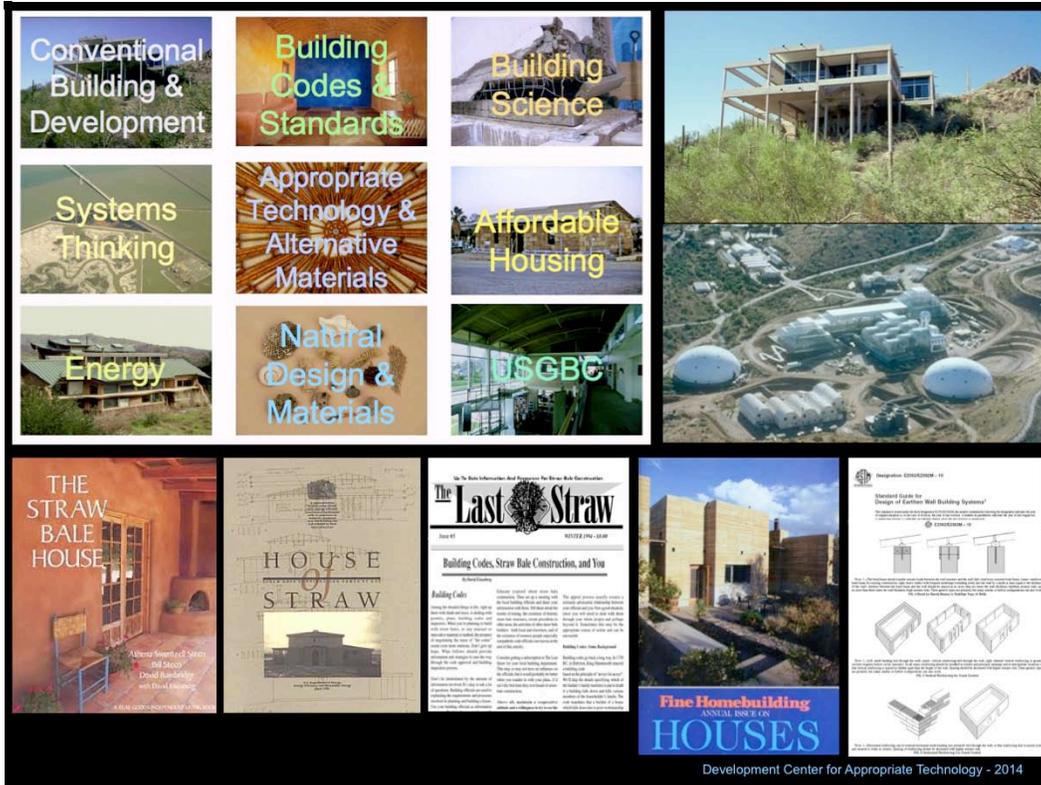
I have a checkered past – a very diverse background starting with a couple of years of architecture school and then a lot building experience. That experience includes building with all kinds of conventional materials and a lot of alternative ones. The large concrete house in the upper right in Tucson, Arizona used 1400 cubic yards of concrete. I was troubleshooter onsite for the construction of the spaceframe and glazing systems of Biosphere 2 in Oracle, Arizona. I co-authored The Straw Bale House book, worked on the straw bale and compressed earth block prototype house for the Navajo Nation in northern Arizona that is documented in the publication "House of Straw" shown, built the rammed earth house featured in Fine Homebuilding Houses, and was vice chair of the ASTM E-6.71 Subcommittee on Sustainability for buildings where we developed an ASTM standard for earthen wall systems, the lowest tech ASTM standard in existence.

My Grandson Joe & Granddaughter Juliette

*Our greatest responsibility
is to be good ancestors.*
- Dr. Jonas Salk

I typically start my presentations with this Jonas Salk quote. "Our greatest responsibility is to be good ancestors." That says it all. This is our grandson Joe, who is now 15, and our granddaughter Juliette, who is about to turn three. They are all the motivation I could ever need, and frankly I think we are not doing a good job of carrying out our responsibility as ancestors.

This is how I translate that quote into a relevant question for this work. I have been looking for it and can't find it. Frankly, I can't think of more serious dereliction of responsibility as adults than this.

Finding the Trailhead…

In 1997, I found myself up in front of close to a thousand building officials at an annual code conference in Phoenix, Arizona—with only ten minutes in which to deliver the 20 minute talk I had prepared…

I want to share a story. In September 1997, I was to give a talk on a plenary panel at the annual business meeting of the International Code Council (ICBO) - the organization representing the building officials for the western half of the U.S. Bob Fowler, the man who lead the effort to consolidate the three regional building code organizations and their codes into a single, national organization and set of codes, the International Code Council and the I-Codes, had invited me to talk about our fairly new program, Building Sustainability into the Codes. We were to each have 20 minutes for our presentation to an audience of perhaps a thousand building officials. I was intimidated by the size of the audience and who they were, so I'd prepared and rehearsed my twenty minute talk. As fate would have it, the session before ours ran halfway into our time and as they finished up, Bob informed the panelists that we'd only have ten minutes each. He said he hoped that would not be a problem and reminded me that I was to go first. I had the terrifying realization that I didn't have time to turn a 20 minute talk into a ten minute talk and that I was just going to have to wing it. We went up and sat down as Bob introduced all the panelists and then introduced me and sat down. I got up and just launched into my talk. A short way in I remember thinking that it felt like the best talk I had ever given. It was just flowing. And then as I was finishing up a point, I realized that I had used my 10 minutes and needed to wrap up. At the same time, I realized that the ending that I had was based on the other 10 minutes of material that I hadn't talked about and didn't have time to talk about. As I finished my point and tried to figure out what to say next, I heard myself talking. I remember thinking that I had better pay attention to this. What I said was something I had never thought before so we all got to hear it for the first time at the same time - even though it came out of my mouth.

In 1997, I found myself up in front of close to a thousand building officials at an annual code conference in Phoenix, Arizona—with only ten minutes in which to deliver the 20 minute talk I had prepared…

What I said was this: "I want to ask you a question. What happens when someone comes into your jurisdiction wanting to do something crazy like build a house out of bales of straw, or use the dirt, the earth, for adobe or rammed earth, or cob - something you've never even heard of? Or maybe they want to use bamboo as a structural material. Or perhaps they want to harvest water off the roof and drink it, or put in a greywater system, or not have a sewer connection or septic system and use composting toilets. Or maybe they want to be off the electrical grid and have photovoltaic panels up on the roof and batteries. Or maybe, they're worried about electro-magnetic fields and don't want any electrical outlets in their bedrooms.

What goes through your mind when people come in seeking permission to do these things? My guess is that your first thought is 'These people need to be protected from themselves.' And your next thought is 'Not in my jurisdiction!' As the laughter died down, I continued, "I want you to think about what's really happening because it is extremely important. The vast majority of people who come in wanting to do these things have made a crucial discovery. They've realized that their lifestyle choices have consequences, many if not most of which are negative. Not negative for them, though. Negative for their children and grandchildren, and my children, and your children. These people are trying to take responsibility for the consequences of their choices. I asked, "Is there anyone in this room who thinks that's a bad thing? I don't think so. So what is your job as a building official? Is it to keep those people from pursuing that goal of taking responsibility for what they do? Or is it to help them find the way to do it well and safely?" And I said to myself, "Shut up and sit down!" I thanked them and sat down to great applause. I thought to myself, "I don't know where that came from but it was really good" and I wrote it down because I didnt want to forget it. Then I started thinking about what had just happened.

Finding the Trailhead…

What I learned that day:

the power of an authentic heart-to-heart message

the importance of knowing what the people you're trying to influence think and care about

that asking the right questions is more important than having the right answers

that I could speak the truth about what motivated me deeply and that it could be heard

- I realized that in the last two minutes of a ten minute talk, I had said something that had cut right through the resistance to these ideas in a room full of mostly conservative people. As I thought about it, I realized that the power came from a few sources. First, it was an absolutely authentic heart to heart message about what we all care about - what we are trying to protect, why we have codes. Then I realized that I had connected also because I knew what they cared about and how they thought about it. But I also realized that I had just asked them a bunch of questions. I hadn't told them anything. I had just spoken from the heart about what really mattered to me and I trusted that would also care and that they could understand it. And I acknowledged the importance of their work and invited them to a higher place from which to do it.

Finding the Trailhead…

What I learned that day:

I realized that I was working with a "*caring community*" and began to see it as doing "*heart work with code officials*."

I recognized a deep alignment of purpose, that I wanted what they wanted and more, because I didn't want people building unsafe buildings, but I saw a much larger set of risks to be addressed.

This changed me as much as anyone in the audience, and it changed the work.

I have called that talk in Phoenix, "Finding the Trailhead into the codes work," because it was the first time that I really got at a cellular level that these were people who cared about safeguarding the public. That they were a caring community. And I saw that I wanted what they wanted and more, not less, because the last thing I want is people building unsafe buildings. But I had a much bigger field of view and a broader definition of the categories of risk and responsibility - I wanted a safe planet on which to build those buildings as well…

An image formed, of codes as a train on a track and code officials as the crew. I was flying in the same direction, but with a larger field of view…
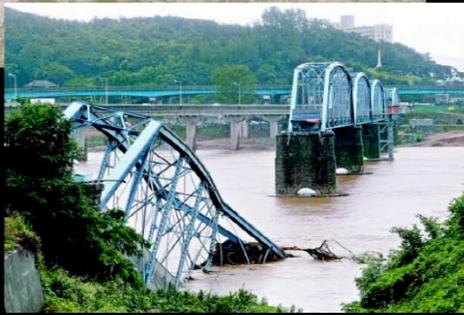
The work then became inviting them up to see what we were seeing.

The image that came to me was of codes as a train on a track heading in the direction of safeguarding the public, and the code officials as the crew. But I saw this from above, flying in the same direction, but with a much broader field of view, including being able to see risks they couldn't see, like the bridge out up ahead – the enormous risks that they were not looking for so were unable to see. And I realized that the work and the real opportunity was in finding ways to invite them up to see what we were seeing.

Path of Commitment

Somewhere along the way I was awakened by a dream. In the dream I was working with a phrase and concept—*Path of Commitment*. This was a dynamic version of the idea of finding *common ground*.

It only became clear to me later that what I had dreamed about was exactly what we had already been doing…

Many months after this I woke in the middle of the night with a concept in mind and got up and wrote about it. What I wrote was about was the phrase and concept that was in my mind - "path of commitment" - basically a dynamic and expanded version of the idea of finding common ground. And it slowly dawned on me that it was a description of the process we were already engaged in.
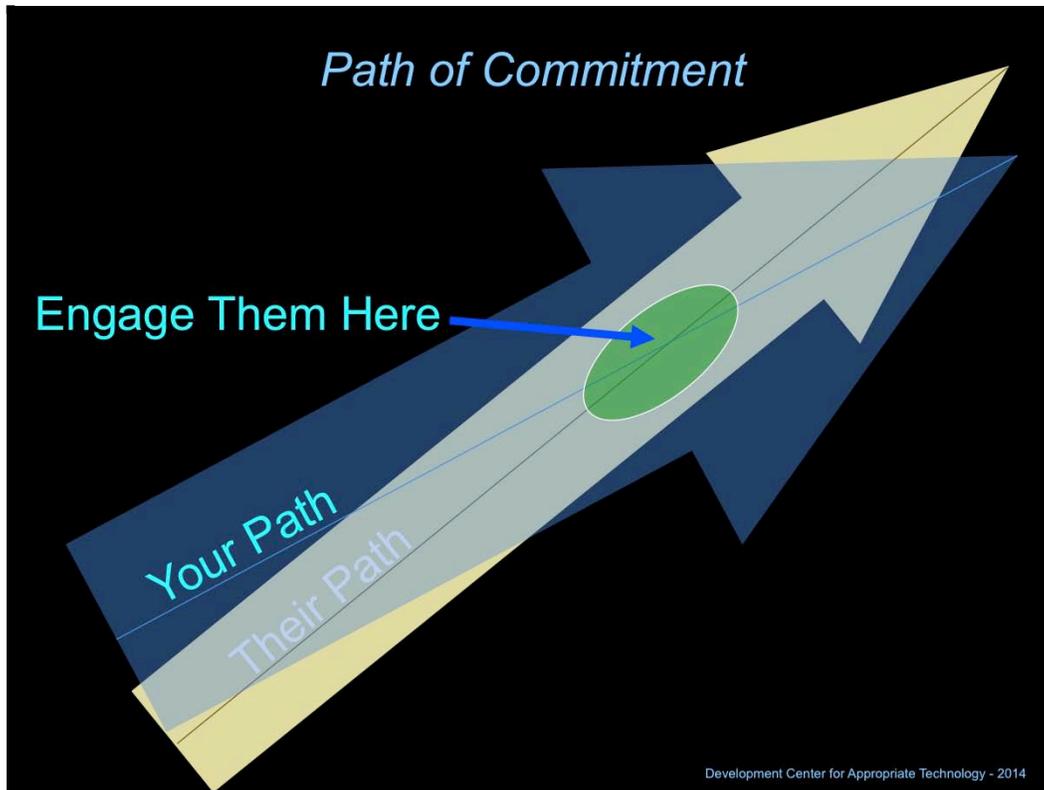
The concept is that when you are trying to influence someone or a group of people, start by mapping out their path of commitment – what they are committed to achieving, where they're heading, what they care about. And then map yours over it and if there is any authentic overlap, construct your engagement with them as close to the center of their path of commitment as you honestly can. Visually, it might look like this. There is potentially a sweet spot for your work. Look for it.

Places to Intervene in a System

I also was helped by awesome systems thinking like Donella Meadows' *Places to Intervene in a System:*

9. Numbers (subsidies, taxes, standards).
8. Material stocks and flows.
7. Regulating negative feedback loops.
6. Driving positive feedback loops.
5. Information flows.
4. The rules of the system (incentives, punishment, constraints).
3. The power of self-organization.
2. The goals of the system.
1. The mindset or paradigm out of which the goals, rules, feedback structure arise.

www.donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system

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I was also greatly influenced by the work of Donella Meadows, a profound systems thinker who co-wrote the landmark books Limits to Growth and Beyond the Limits. Her essay "Places to Intervene in a System" is brilliant and points out that most of the time we are engaging at the least effective places rather than addressing the rules, goals, and mindsets that govern systems. That gave me a bigger framework to be thinking about the systems I was interested in changing.

Along that Path…

Contributing to the magazines
of BOCA, ICBO, SBCCI, ICC…

1998

2000

2002

2003

Creating Awareness and
providing needed information
and access to technical
resources…

2004

2005

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So, we started engaging with the building codes community in a long term
process. We were invited to produce a feature issue of ICBO's magazine
Building Standards in 1998 and another in 2000 and then in 2002 as well as
other articles in the magazines of the other code groups. This was a way to
provide good technical information to the membership and at the same time,
introduce a lot of ideas about why this mattered and how it related to public
health, safety and welfare.

Result of Building Deep Relationships

In 2002, ICBO gave us a regular column in *Building Standards* - "Building Codes for a Small Planet."
In 2003 it moved to ICC's *Building Safety Journal*.
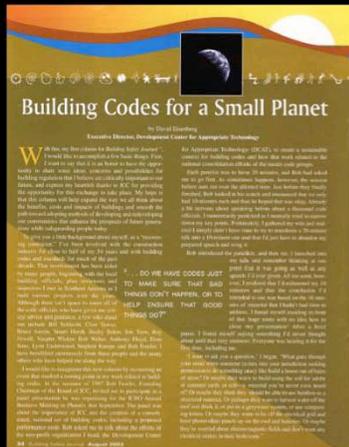
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In late 2001, ICBO leaders asked us if we'd like to write a regular column in Building Standards. Beginning in January 2002 my column, "Building Codes for a Small Planet" began appearing in each issue. This was a huge breakthrough. We had entered the codes arena as outside environmental and social justice advocates and had built the kind of trust and relationships that allowed us to be invited inside and given a platform, as change agents, to educate the members about issues related to sustainability and green building. After ICBO and the two other regional code groups, BOCA and SBCCI consolidated into the International Code Council, the column moved into ICC's Building Safety Journal.

By 2007 Things Really Took Off

ICC-USGBC MOU May 2007

Green Codes Summit
July 11-12, 2007
The American Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006

ICC Green Building Home Page

Building Safety

August 2007

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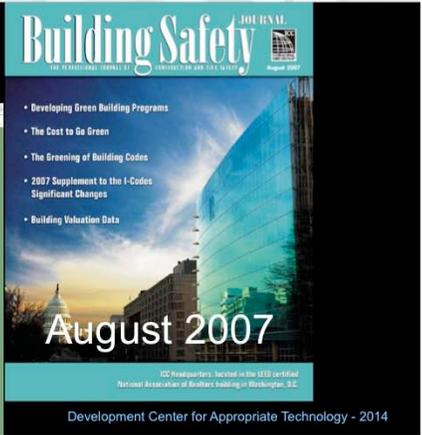
2007 was a year of big chance when a lot of things happened. It was good because for a long time it was hard to tell if we were moving and if so if it was in the right direction.

Two Other 2007 Benchmarks

In Reno, Nevada in October 2007, DCAT received the ICC Affiliate of the Year Award.

In Chicago in November 2007, DCAT received a USGBC Leadership Award.

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Also that year we were given the ICC's 2007 Affiliate of the Year Award and a month after that received the 2007 USGBC Leadership Award for Organizational Excellence, essentially for the same body of work bringing these two organizations and communities together for the common goal of addressing the hazards related to the built environment and making the world a safer place for everyone.

The 2012 International Green Construction Code
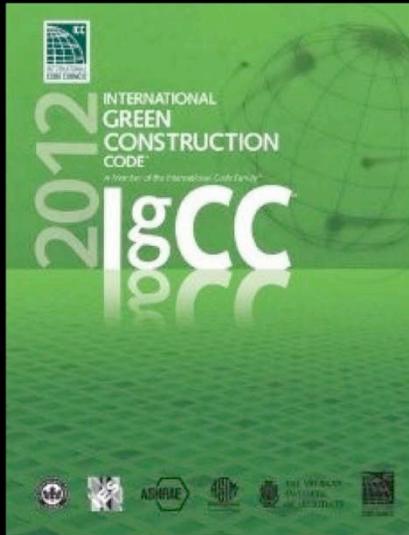
I served on the original drafting committee for the IGCC. It's a big step forward, containing both jurisdictional and project electives—flexibility and above-baseline code choices. It should be a useful transitional tool, but it's still a stand-alone, optional green code.

Things have kept moving. In 2010 I was on the committee that drafted the first version of this new code, the International Green Construction Code - the IGCC - which is now part of the set of 2012 International Codes - which in spite of the name are actually just U.S. building codes. The IGCC is just for commercial buildings, not residential construction at this point.

All Good - But We Still Have So Far To Go!

Huge work remains - to address a changing climate, energy, water, toxicity, lifecycle impacts and many other issues.

Programs like the Living Building Challenge seek to not merely limit harm but also help make the shift toward regenerative systems – integrated ways to enable projects that do more good than harm.

This requires a parallel shift in the regulatory realm to not see these changes as inherently risky and to see that the most dangerous thing we can do is to continue doing what we're doing now.

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The past few years things have changed – this work is now being discussed in the mainstream. When we started we were way out on the fringe, so the analogy I've been using is that it's like you built your house way out in the country and then one day you go outside and you're in the middle of town—but not because you've moved. But we have huge work still to be done. Especially recognizing the challenges that are emerging related to climate change, energy, water and other resource and pollution issues. There are efforts to move design and building beyond net zero for energy to net zero and better for all the impacts built projects have, to start creating regenerative projects that do more good than harm across the spectrum of impacts throughout their lifetime. To achieve that requires a significant shift in the regulatory realm as well. Critical to creating that shift is to see that the riskiest thing we can do is to keep doing what we've been doing.

Some Lessons Learned about Change

You have to start with where people are.

You can't take them farther than they're willing and able to go. Stop before that.

People need time for their own process. And someone or something else may take them farther.

But *Don't be Afraid to Start*… and remember that often what needs to change first are the context and the frames of reference commonly used.

We learned a lot of lessons along the way. We've never stopped learning them. Some came from hard experience…like that you have to start with people where they are, not where you wish they were or hope they are. And you can only take them as far as they are capable of and willing to go. Whatever you do beyond that point with them will often be wasted at best and counterproductive at worst. But if you bring them as far as you can and let them go, you can usually come back later and take them a long ways. And as important, it may not be you who has the opportunity to take them farther. The reality is that they need time. And once they have been introduced to an idea or concept, they will start to see it elsewhere, in magazines or on the news. And then someone else may help them farther or they may not need anyone else. But don't be afraid to start…

Our frame of reference
determines what we see.

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I'm going to talk about frames of reference because they define what we see and how we see it. It's important also to remember that focus is an exclusionary process—by definition—when we focus on something, what we're actually doing is blocking out everything else. Our frame of reference absolutely determines what we are able to see. So we need to pay attention to whether we're working in the details or the big picture or some intermediate level so we can understand the context in which we are working.

Our frame of reference determines what we see.

To see things in context we have to learn to shift our focus between the *details* and *big picture* — so we can see both the *things* and their *relationships*.

To see things in context we need to develop the habit of constantly shifting our focus between the details and the big picture, looking for the patterns while also paying attention to the relationships and spaces between things, not just things themselves. This is how we keep things in perspective and proportion.

The Purpose of Building Codes

International Building Code (USA) - 2012 edition

101.3 *The purpose of this code is to* establish the minimum requirements to *safeguard the public health, safety and general welfare* through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property *from* fire and other *hazards attributed to the built environment* and to provide safety to fire fighters and emergency responders during emergency operations.

Big Picture in White - Details in Blue

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Here is an example of the focus problem. This is the purpose statement from the International Building Code (USA). The statement I've highlighted in white is the Big Picture. The rest is Detail, albeit, very important detail. However the purpose is to safeguard the public from hazards attributable to the built environment. Those hazards, and thus the responsibility to address them, are not limited to just the hazards that occur at the building site or only to hazards occurring during the life of the building, because hazards attributable to the built environment begin far from the building site and often extend far from it as well, and they begin long before the building exists and extend out into the future.

Thinking Outside the Box? Which one?
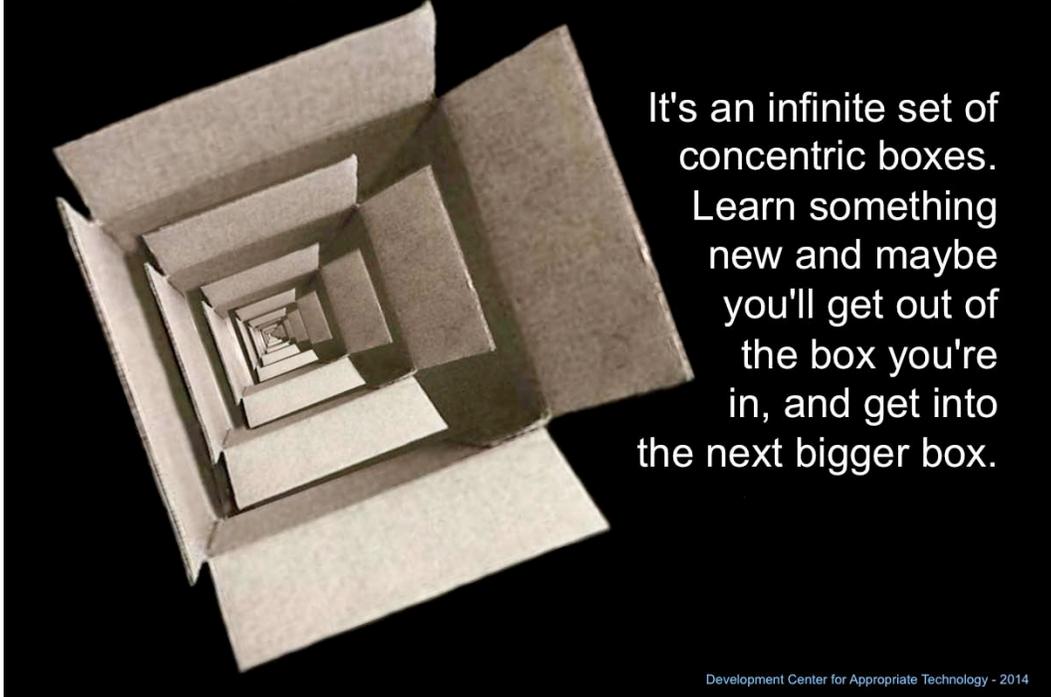
It's an infinite set of concentric boxes. Learn something new and maybe you'll get out of the box you're in, and get into the next bigger box.

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People talk about thinking outside the box, getting out of the box, etc. In my experience it's just an infinite set of concentric boxes. You have a revelation, something happens and you get out of the box you're in into the next bigger box. This image reminds me that no matter how big or complete or accurate my worldview or paradigm is, it's a tiny, inaccurate fraction of reality…

Critical (and increasingly risky) Assumptions

A stable and predictable climate.

Adequate and affordable supplies of energy, water, food and other critical resources.

The natural systems on Earth are robust enough to withstand whatever humans may choose to do.

Current regulatory systems are capable of dealing adequately with emerging risks.

- The regulatory realm deals with risk. But they don't deal with it in the way that we need to be dealing with it now. Clearly, if your paying attention to what is happening on the planet. The assumptions on which so many of our decisions and public policies are based are increasingly unrealistic and risky. Questionable assumptions include that we will have a stable and predictable climate, that we'll continue to have sufficient and affordable supplies of energy, water and other vital resources that we need, not just for building but for everything we do. We continue to act as though the natural systems on the planet, our life support systems, are robust enough to withstand whatever 7 or 8 billion human beings might choose to do. And in the building regulatory realm, we act as though the current systems we have in place to regulate what gets built are adequate to deal with these larger, emerging problems.

Some Perspective…Water and Atmosphere

Take ALL the WATER on the planet or ALL the ATMOSPHERE and convert their volume into spheres: *this is all we have*…

Images: http://www.sciencephoto.com/images/imagePopUpDetails.html?id=690550330

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Speaking of what we actually have and its limits, I came across these images recently. That sphere of water on the left is all the water on Earth, freshwater, sea water, ice, atmospheric water - all of it. And on the right, that sphere is all the Earth's atmosphere calculated at the atmospheric pressure at sea level. So, put 7 billion people in there and try to imagine that we're not able to alter the atmosphere… And if it seems impossible that the volume of water on Earth could be so small because of the depth of the oceans, consider that if the Earth were the size of a bowling ball, it would be as smooth as a bowling ball…

Some Perspective…Water and Atmosphere

ALL the WATER on the planet on the left and ALL the FRESH WATER on the right…

Fresh Water

Large sphere = volume of all the water on Earth
Small sphere = all fresh water

http://ga.water.usgs.gov/edu/earthhowmuch.html

Image: http://ga.water.usgs.gov/edu/earthhowmuch.html

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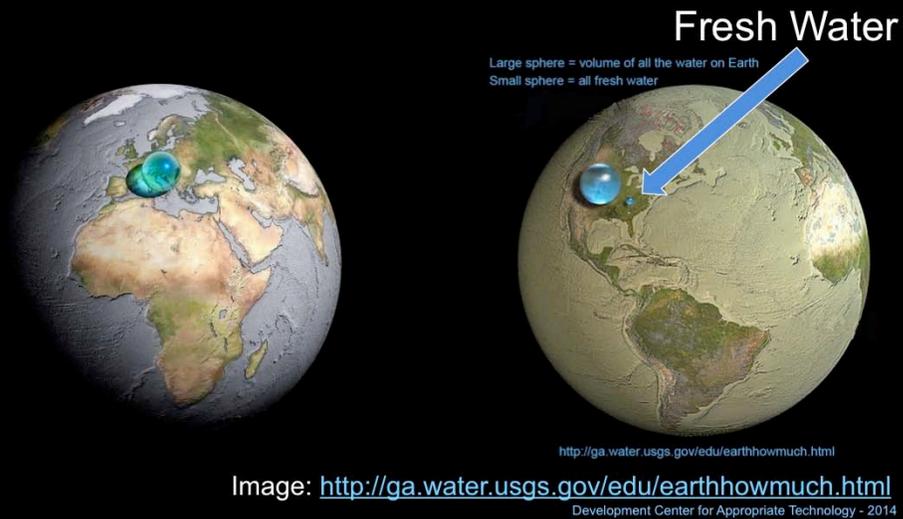
And here is another image that shows all the water, but that tiny nearly invisible dot is all the fresh water on the planet. It makes you realize just how vulnerable our water is…especially when you think about things like fracking…

A Constant Challenge

We don't get regulations until problems are large, serious, and persistent enough to demand an official response. So the main navigational tool in the regulatory realm is…

- And because we don't get regulations until problems are large, serious and persistent, the main navigational tool in the regulatory realm is…

… the rear-view mirror. And since we rarely have preventive or precautionary regulatory structures with anticipatory capabilities built into them, we lose the chance to deal with new risks when they're small and manageable – or better yet – avoidable. Worse, emergent risks or new kinds of risk tend to be problematic for the regulators and so they are often reluctant to acknowledge them or respond to the need for change. The regulatory realm tends to be a powerful agent in reinforcing the status quo.

Changes in Hazards Attributable to the Built Environment
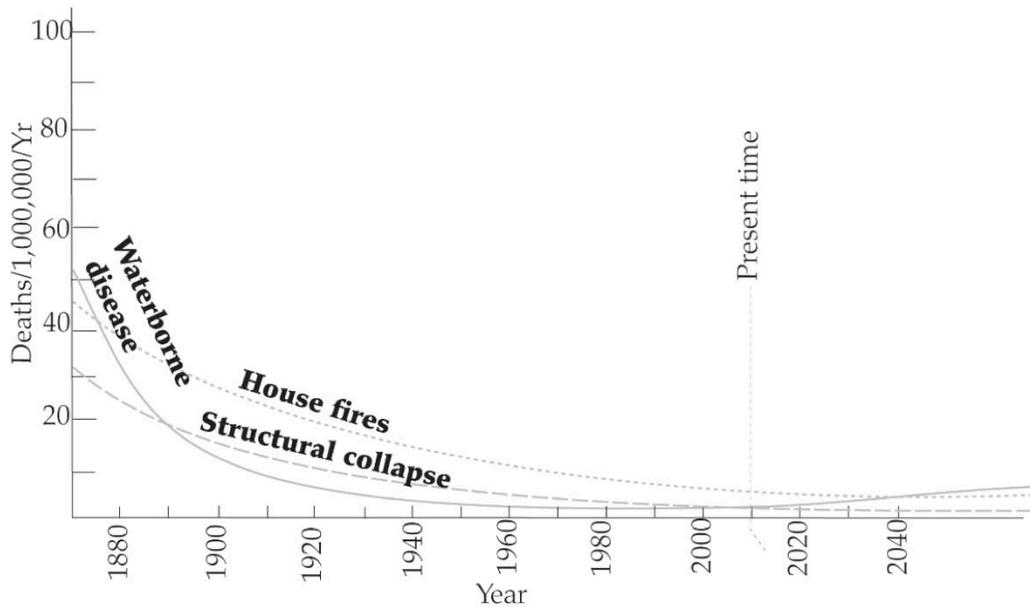
Credit: Art Ludwig, Oasis Design

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A colleague of ours, Art Ludwig from Oasis Design in Santa Barbara, California has pointed out that our codes and regulations largely focus on old risks - he calls them mostly 19th Century hazards like waterborne illness, structural integrity, fires. And, though we've dramatically reduced the incidence and threats from these hazards they maintain the highest place in our regulations and regulatory thinking.

Changes in Hazards Attributable to the Built Environment
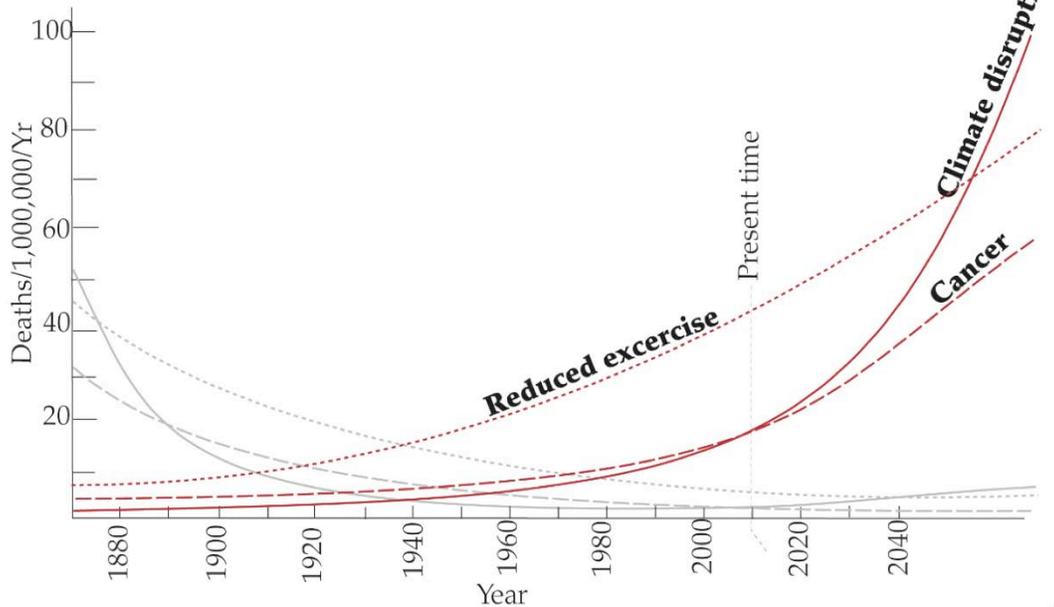
Credit: Art Ludwig, Oasis Design

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Art points out that these older hazards are now dwarfed by emergent hazards that are accelerating rapidly and yet efforts to address these larger and growing risks in codes are resisted and lag behind the continued ratcheting up of requirements dealing with the old risks. The incidence of cancer and respiratory illness related to indoor air environmental quality and the toxicity of materials in buildings, though difficult to prove direct cause and effect, is without a doubt related. And the hazards that will accrue related to climate change will be larger still.

Building Materials/Chemicals Red Lists

Courtesy of Healthy Building Network
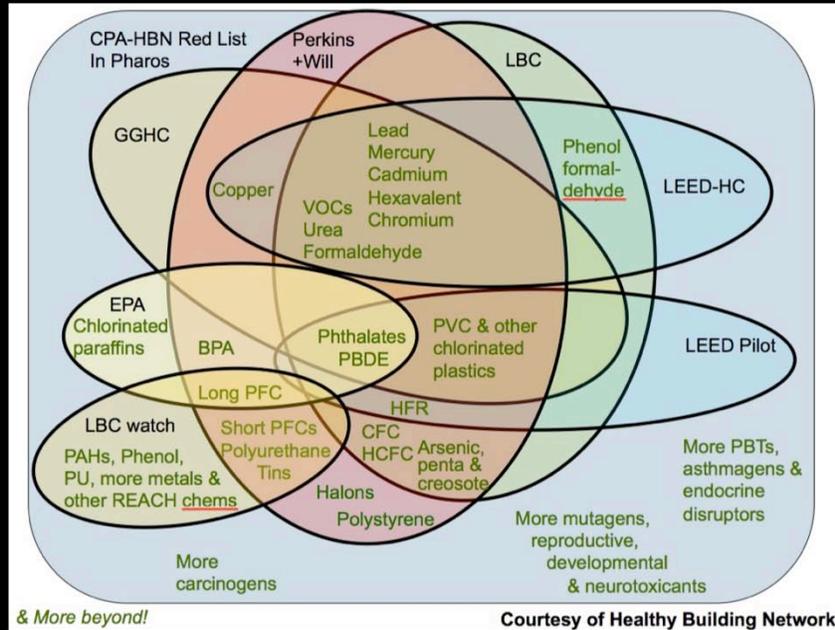
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This graphic from the Healthy Building Network gives an overview of the various chemicals and materials in buildings and building products that have been identified as dangerous by various groups, organizations, agencies, rating systems, etc. These are real, serious hazards that have until very recently been almost entirely ignored by building regulations.

New Work- Toxic Flame Retardants in Foam

www.saferinsulation.org

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Lately we have been drawn into working to get toxic flame retardants out of plastic foam building insulation. We're working with the Green Science Policy Institute. It is important to get these chemicals out of our buildings and especially since they do not provide a real fire-safety benefit. What research has shown is that these chemicals are not as effective as claimed in and are in many cases, unnecessary, but in all cases, they represent the use and introduction of persistent organic pollutants with significant impacts. When foam with HFRs burn, they produce more carbon monoxide, smoke and soot, as well as dioxins and furans, making the fire more toxic for everyone – occupants, first responders, anyone who breathes or comes in contact with the smoke. We are working to eliminate the tests for flame spread and smoke development criteria in applications where there is no fire hazard, such as under concrete slabs, exterior foundation insulation, shallow frost protected foundations. These chemicals give the appearance of adding safety but they are actually increasing risk throughout their entire lifecycle.

One of the Challenges - Industrial "Science"

Industries do their own "scientific" studies, claiming they're unbiased. Two independent members of a US EPA scientific advisory committee wrote that of one set of 16 studies on the herbicide atrazine, "the single best predictor of whether or not the herbicide atrazine had a significant effect in a study was the funding source."

http://www.newyorker.com/reporting/2014/02/10/140210fa_fact_aviv?currentPage=all

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It is important to consider the source and recognize the degree to which industry-funded research tends to skew supposedly scientific research results. True third-party, independently funded and peer-reviewed research results are much more reliable than industry results.

Consider the Source…

Look to see who thinks something is worth pointing to, supporting, promoting…

Search for pages that link to a URL	Find pages that link to a certain page. For example, you can find all the pages that link to google.com.
link:	link:google.com

https://support.google.com/websearch/answer/136861?p=adv_sitespecific&hl=en&rd=1

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Here is a tool to help find out what websites are linked to a specific URL – and thus know a bit more about who thinks something is important and worth supporting or promoting.

Crucial to Recognize System Limits
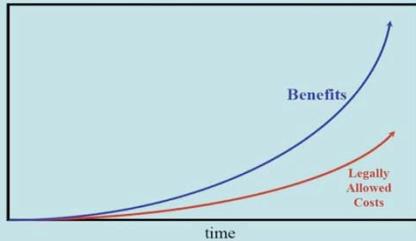
Figure 1: The law promotes all economic activity having a net benefit, allowing both benefits and costs to grow forever as the economy grows
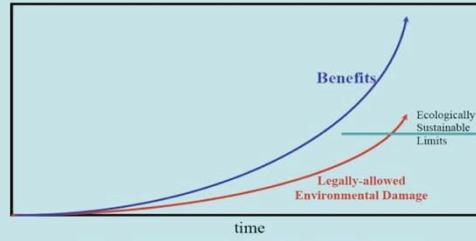
Figure 2: As the economy grows, cumulative environmental damage must eventually surpass the Earth's ecologically sustainable limits

Minimum standards typically set *acceptable levels of risk* using individual, incremental cost-benefit analyses, disregarding the existence of upper limits: unlimited increments of risk = unlimited risk.

Graphics & concept: Joe Guth, Science & Environmental Health Network www.sehn.org

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There is another issue that needs to be addressed in our regulatory systems and that is the reality that there is such a thing as cumulative harm and that there are, in fact, system limits. The current legal framework for most regulations is based on establishing acceptable levels of risk by doing cost-benefit analyses. As long as the potential economic benefit of each individual increment of activity is greater than the potential economic harm, the activity is permitted. Since we allow infinite economic activity and growth, we have legalized infinite harm. There are in fact system limits and cumulative harm happens all the time. The regulatory system has yet to accept this scientific reality. This has contributed greatly to the challenges we are facing in adequately safeguarding the public from hazards attributable to the built environment.

Science & Environmental Health Network

http://www.sehn.org

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I also want to mention an organization that is doing key work on addressing some of the legal challenges to creating truly sustainable or regenerative systems and regulatory structures. The Science and Environmental Health Network is great resource for information about changes needed in the legal system as well as other issues tied to health and ecology and more. Carolyn Raffensperger is the Executive Director of SEHN and is a world-class authority on the Precautionary Principle and much more. She is brilliant and doing extraordinary work.

Codes Do Well with the Risks they Address

Modern building codes enable us to design and build structures that are relatively safe for their occupants, making it seem that we've eliminated or greatly reduced the risks associated with buildings…

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It's worth noting that in the realm of risks tied to the built environment, building codes are pretty good at what they address. Today, our modern building codes are extraordinarily good at enabling us to design and build buildings that rarely burn down, fall down, trap people in emergencies, expose them to raw sewage, electrocute them, let them fall from high places, or, as I often say, suffocate them too quickly. Because they are effective at managing these types of risks, many people think we've eliminated or greatly reduced the risks associated with buildings.

But What About Systemic and Future Risks?

In reality, what we've actually done is to just *move* many forms of risk in space and time:

- away from the building site, out into the natural systems that support us, and

- into the future.

▫
In reality, we've created a very fragmented building regulatory system that doesn't consider systemic risk, cumulative harm, hazards created away from the building site, or risks to future generations. As a result, what we're actually doing is just moving many types of risks in space and time. We're moving them away from the building site out into all the natural systems on the planet - our life support systems - and from the present to our children and grandchildren and all the future generations of all the other species on whose welfare our welfare also depends.

Many Huge Hazards Are Hidden in Plain View

Looking at buildings through codes is a lot like looking through a microscope. We can see important hazards to people in and around buildings. But important as they are, these building-scale or project-scale risks completely fill our field of view. They're important because they're risks to real people. But outside the field of view are other real risks being created that are many orders of magnitude greater - generalized, cumulative, aggregated and distributed risks - to billions of people - that can't be seen through that lens.

These are the categories of risk and responsibility laid out in the codes. This is the view through that microscope…
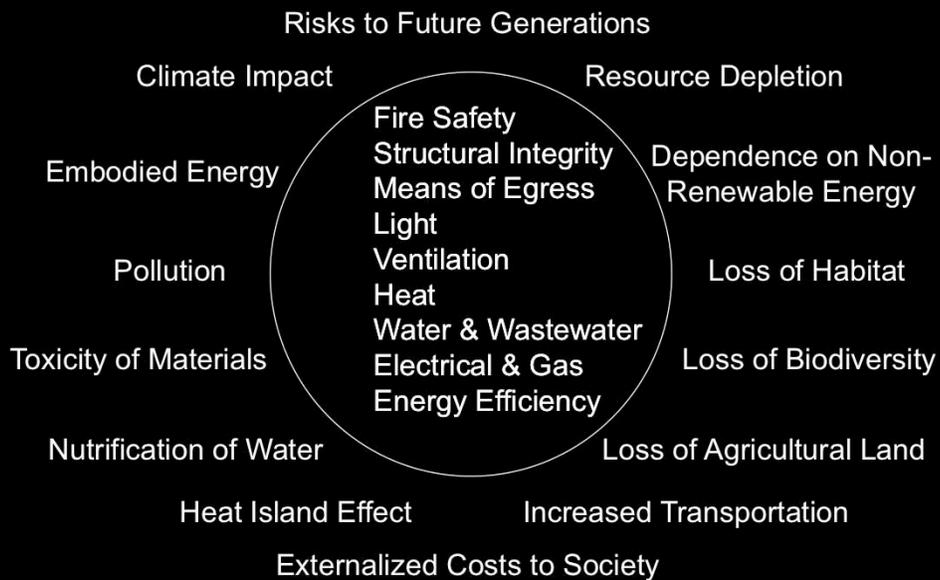
Here are some of the larger risks which are also attributable to the built environment and therefore part of the responsibility for safeguarding the public. However, most of these types of hazard are not currently addressed in building codes, and many not addressed in any current regulatory system.

It Isn't Either/Or…It's About Balance…

Risks to Future Generations

Climate Impact — Resource Depletion

Fire Safety
Structural Integrity — Dependence on Non-Renewable Energy
Means of Egress
Light
Embodied Energy

Pollution — Ventilation — Loss of Habitat
Heat

Water & Wastewater
Toxicity of Materials — Electrical & Gas — Loss of Biodiversity
Energy Efficiency

Nutrification of Water — Loss of Agricultural Land

Heat Island Effect — Increased Transportation

Externalized Costs to Society

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It isn't either-or… we have to learn to address all these risks at the same time. What is needed is a more complete and balanced regulatory response to address and balance all these risks together.

The Whole Lifecycle of Built Projects

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And the impacts of buildings take place throughout their lifecycle. When we think about the entire lifecycle of a building we can see that the impacts begin with the acquisition of resources and their transportation and processing and then extend to the impacts on the land, as well as from the infrastructure required. We then need to consider the impacts of the construction process, the wastes generated, toxic chemicals used, the flow of resources through the building over its lifetime for repair, maintenance and refurbishing and for the services we demand of our buildings. And then we'd need to think of the impacts at the end of the life of the building and out into the future, and whether the materials are reusable, recyclable, toxic, or will just end up in the landfill. Then we can be conscious of the upstream and downstream impacts of the whole project starting far from the site and before the project starts to wherever those impacts eventually occur, including long after it is gone.

Lifecycle of Buildings - Think in Terms of Flow

Materials Energy Air Water Money

Site

Wasted Money Waste Water GHG & Pollution Waste Heat & Light Material Waste
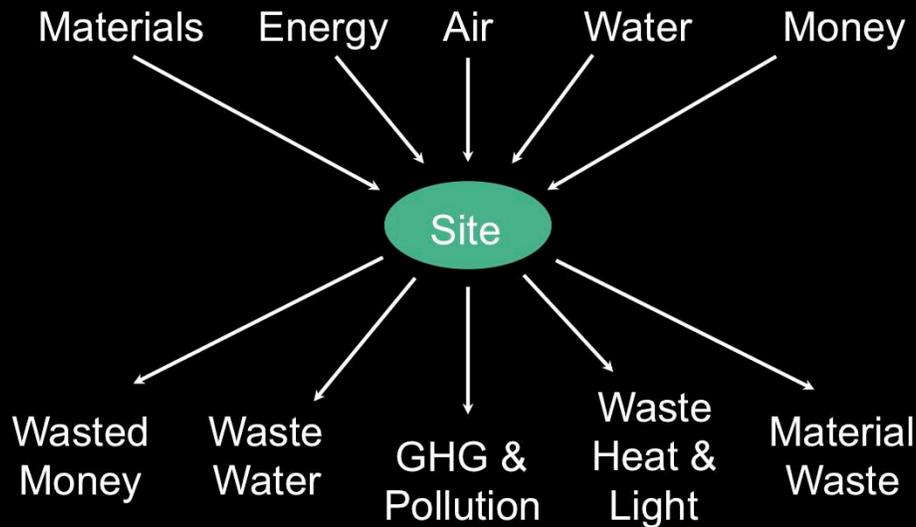
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I like to think of built projects not in terms of what they are made of, but instead, to think of them in terms of flow. You start at a specific project site and often take materials away from that site, and certainly bring materials to the site. So rather than thinking about them as objects, think about where things come from, what happens along the way, then what happens during use, and then at the end of their life or the life of the project.

My friend, the British Architect John F.C. Turner used a phrase in one of his books - either Freedom to Build or Housing By People - "Housing is a Verb." What he meant was that while we focus almost all of our attention on what houses and buildings ARE physically - what matters is what they DO for their occupants. What services they provide, what security and other benefits are derived from them. That is a hugely important insight into what is missing in how we think about the built environment.

One of the biggest obstacles we face is the widely held and largely unexamined belief that what is in the codes now is safe and that anything new can't in any way reduce that safety. To change that view you have to see that the label of safe was only made possible in many cases by greatly narrowing the set of hazards and risks that could be considered in making that determination.

I spoke earlier about the issue of halogenated flame retardants increasing harm and risk without actually providing a fire safety benefit or risk reduction.

An example of the problem of not seeing the whole system in regulatory thinking, relates to greywater reuse. There has been longstanding and intense fear about public health risks related to greywater reuse. Surprisingly, though, the opponents of reusing greywater have yet to produce documented evidence of the risk. There are roughly a dozen water-borne diseases that would likely be caused by greywater contamination and for the past 60 years or so nine of them have been reportable to the U.S. Center for Disease Control in Atlanta, Georgia. There are millions of reports of these illnesses, each requiring some level of investigation and yet in the whole CDC database on these diseases there is no mention of greywater in all this time. No doubt, some people have gotten sick from such exposure since there are millions of un-permitted greywater systems scattered around the U.S. and have been for decades, mostly surface irrigation of lawns, trees and gardens using washing machine discharge water. If there was a serious hazard it certainly would have shown up by now and it hasn't. So we decided to reframe the issue by asking a new question: Other than drinking or somehow ingesting it, what is the most dangerous thing you can do with greywater? And the answer is – require everyone to turn it into blackwater, hugely increasing the amount of this much more dangerous water, and then put it in a failing or overloaded septic or sewer system or a combined sewer and stormwater system where it's likelihood of ending up contaminating ground or surface water goes way up. Or, as in places like Victoria, just increase the volume of blackwater being dumped, untreated into the ocean. But there is nowhere in the regulatory system to consider and balance a slight increase in risk at the site for a

What Ifs…

What if we were thinking about dependencies created by regulatory requirements – for sources of power, water and wastewater, functioning mechanical systems, etc. - "*Passive Survivability*"

What if on entering the building regulatory realm you found much more than the extremely detailed elaboration of the line separating what's illegal from what's barely acceptable?

What if it freed us to see all the possibilities whether high or low-tech?

- It is also important to think about the degree that regulatory requirements might undermine safety by mandating dependence on external utility power and water and wastewater, mechanical systems for heating, cooling and ventilation and more.

  Additionally it is valuable to understand that because regulations are almost exclusively minimum standards, what you find in the regulatory realm is the intricate and arbitrary boundary between what is illegal and what is barely acceptable. It would be better if we were creating systems aimed at delivering the best buildings and developments not merely preventing the worst. It would be a big improvement to find something like a good restaurant – with those minimums but also a menu of good, better and best practices in an intelligent framework that included incentives and information that led to better building through better decision making.

What is "Appropriate Technology"?

Classic definition: the lowest or simplest level of technology that can do the job well. It can be high-tech, intermediate-tech, low-tech or no-tech, or a combination based on specific uses and needs.

Best definition: technology that doesn't make people or their communities dependent on systems over which they have no control - thus, technologies that enhance the local capacity to meet local needs.*

Appropriateness also relates to where technology is used & cultural, economic, & environmental *context*.

*my thanks to John FC Turner for this definition and understanding.

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I want to take a minute to talk about appropriate technology. The name of my organization is the Development Center for Appropriate Technology so people ask what makes technology appropriate? A standard definition of appropriate technology is that it is the simplest or lowest level of technology that you can use to do well what needs to be done. I contrast that with our cultural bias that tells us that higher technology is always better, that there is an obligation to always use the highest level of available technology one can afford, and that when new technology is introduced the old technology becomes obsolete and is no longer useful. The reason we care about the level of technology is that higher levels of technology come with higher levels of unintended consequences and at some point the consequences are not merely unknown, they're unknowable, especially in the time frame in which we must make our choices. Appropriate technology isn't necessarily low tech. It is the right level of technology for what must be done, based on the specific use and real needs, circumstances, and to the degree that they are knowable, the consequences flowing from its use. It can be high-tech or no-tech or anything in between. My favorite definition of appropriate technology comes from John Turner, who I mentioned earlier: it's technology that doesn't make people or their communities dependent on systems over which they have no control. If we think about this seriously, it means technologies that enhance the local capacity to meet local needs - which is the true foundation for sustainability and for real security.

I think it's worthwhile to mention that our codes are nearly exclusively designed around industrialized building. There is a very strong resistance to the idea that non-industrial or pre-industrial building materials or systems could be acceptable. In fact there is a widespread belief that non-industrial means primitive. What you see in these pictures defies that thinking. The two photos in the upper left are of Berne Switzerland. You're looking at buildings that have been in continuous use for 800 years. The two right hand images next to the books are of the cathedral at York in England, which I visited a year and a half ago. This is one of the most magnificent buildings I have ever been in and it is also 800 years old, predating the industrial revolution by many centuries. We have much to learn from the past including from traditional ways of building developed in indigenous cultures over thousands of years.

The Living Building Challenge

LIVING BUILDING CHALLENGE™ 2.0

A Visionary Path to a Restorative Future

INTERNATIONAL LIVING BUILDING INSTITUTE™

November 2009

www.ilbi.org

Development Center for Appropriate Technology - 2010

I'll just touch briefly on the Living Building Challenge, which is a voluntary certification program aimed at creating projects that are restorative or regenerative - projects that create more benefit than harm across the spectrum of impacts over the life of the project.

The Living Building Challenge

The LBC aims to inspire the shift toward truly regenerative projects. To be certified, projects must meet 20 Imperatives and have been in operation for a year. They must:

- harvest all of their own energy and water
- offset their land use and carbon impacts
- be adapted to their site and climate
- be free of toxics and operate pollution free
- provide healthy and humane indoor environments
- and be beautiful, inspirational and educational

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The Living Building Challenge 2.0 includes site, energy, water, materials, and also beauty and inspiration and education, and social equity. This is a program very much worth looking at.

The Living Building Challenge
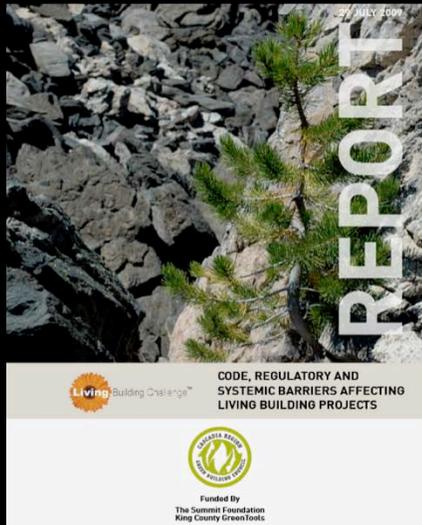
This is DCAT's 2009 report on the full spectrum of regulatory issues affecting Living Building projects. Sonja Persram was my co-author on this report.

For many more excellent resources, visit the website of the International Living Future Institute www.ilfi.org

http://living-future.org/ilfi/ideas-action/research/building-codes
www.dcat.net/resources/index.php

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DCAT was hired by the Cascadia Green Building Council to produce a report on the code and regulatory barriers to Living Building Challenge projects. This report, which was published last summer, covers a wide range of regulatory issues in depth, and offers many recommendations, I won't going to go into detail about the report, but you can find it on the DCAT, ILBI and Sustainable Alternatives (www.sustainable-alternatives.ca co-author Sonja Persram's Toronto-based company) websites.

DCAT was also part of a team of consultants in the US working on helping local governments analyze and improve their building and land use codes for energy efficiency and climate change mitigation and adaptation funded by the recovery act. This gave us an opportunity to evaluate a lot of codes and standards and policies and make recommendations to communities around the US.

US EPA Toolkit and Guide
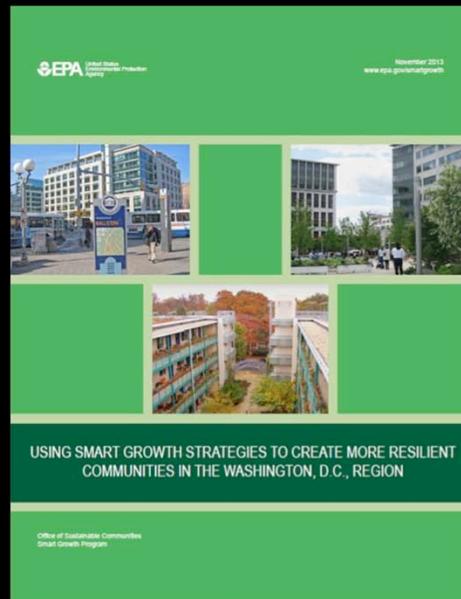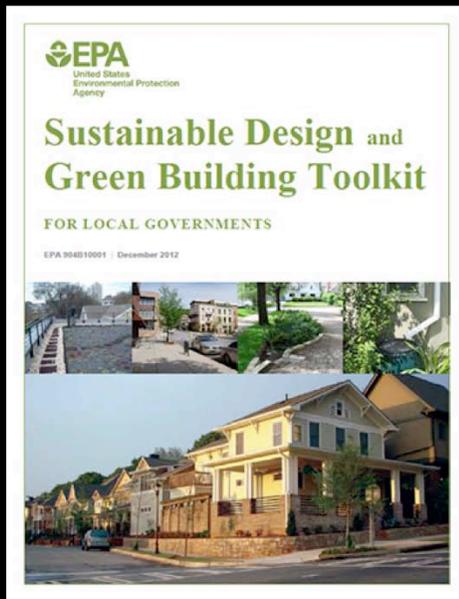
We also had the opportunity to help develop these two US EPA publications, one a toolkit for state and local governments for assessing and greening codes, standards and policies and the other for the Washington DC Metropolitan Association of Governments guide to more resilient communities.

To put things
in Perspective…

Net-Zero

Regenerative

"Sustainable"
The Natural Step

High-
Performance
Green
Building

Better Building
Practices

Code Minimum
Barely Legal

Illegal

Development Center for Appropriate Technology - 2014

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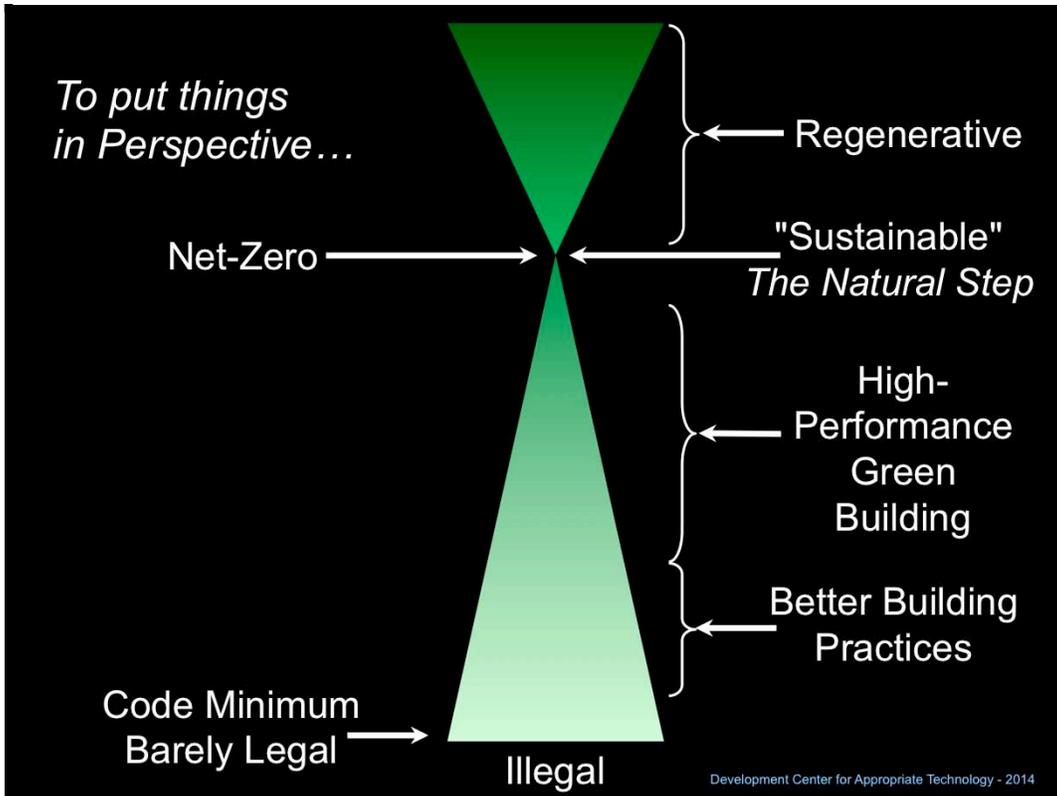
This graphic may help put some of this into perspective. We can think about the level of sustainability or greenness as a range extending from not meeting the minimum requirements established by codes and thus being illegal (since codes are minimum standards, if anything is done to a lower standard it's a violation of the law) to better and higher performance/green buildings, to a place of net-zero or "sustainable." What Bill McDonough says is 100 percent less bad and Paul Hawken has defined as the midpoint between destruction and restoration. The goal is to get to a place where we're creating regenerative projects and systems - the way nature and natural systems work - creating more benefit than harm across the range of impacts over the life of a project.
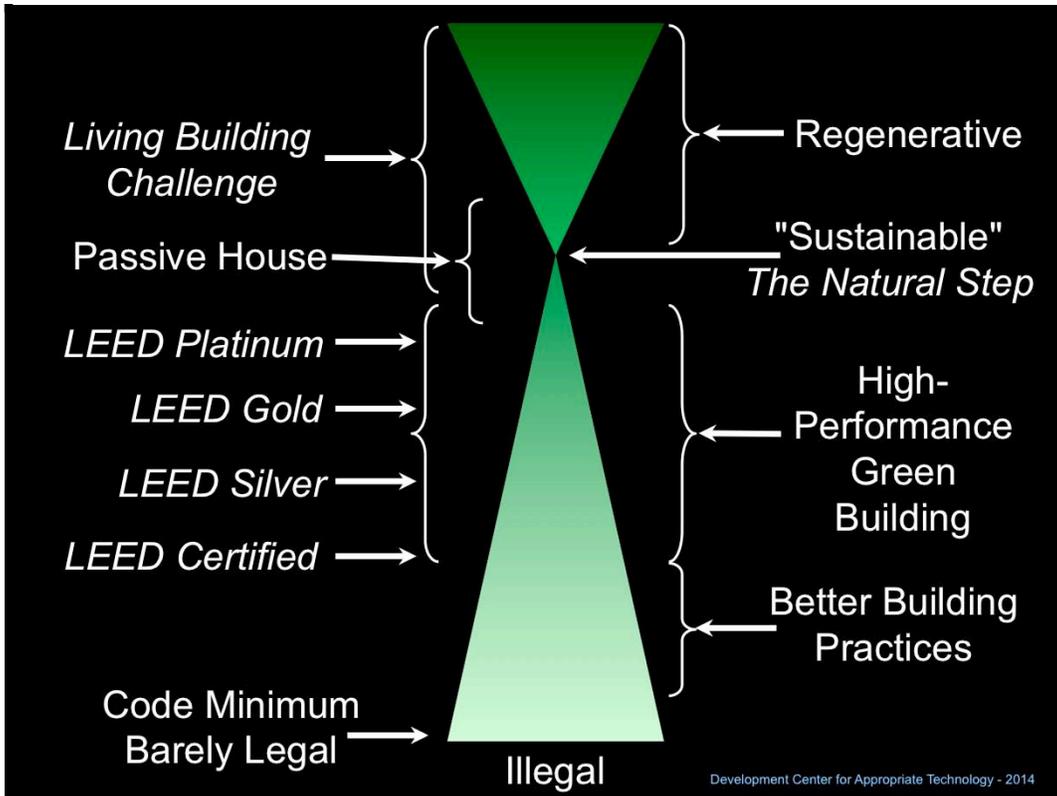
Here we can see where the various levels of LEED (or it could be other green building rating systems) might fit into this framework as well as the Passive House. System. And we can also see the Living Building Challenge, which I will discuss a bit more in a few moments. We can argue about whether this accurately positions these things, but it gives a sense of the relationships.

Yet, some of the most sustainable practices aren't yet legal in many places - such as very small house sizes, ultra-low tech/low-impact materials & systems, greywater, rainwater harvesting, composting/ non-water/ urine separating toilets, sharing energy or water across property lines, etc

Code Minimum Barely Legal

Illegal

Regenerative

"Sustainable" *The Natural Step*

High-Performance Green Building

Better Building Practices

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It is worth noting that many of the most sustainable practices are not yet approved or allowed in many places - in other words, some of the lowest impact, most viable and beneficial building materials, systems and practices are, in essence, illegal. That is an area needing investment for research, development and deployment.

A Potential Evolution of Codes…

Protecting Human Health and Safety
(Traditional Building Codes),

while also Protecting the Natural Environment
(Green Building Codes),

while also Respecting, Protecting (and Expressing)
Cultural Values
(Tribal Building Codes)…

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We've also been doing work lately with Native American tribes to help them develop their own systems to manage building on tribal lands. It may be valuable, as we look at codes, to think about what has been happening as a kind of evolution, with traditional codes focusing on protecting human health and safety, as well as property, primarily from physical threats related to the built environment. The advent of green codes has added to that set of responsibilities protection of the natural environment as well as some things like indoor environmental quality and resource conservation. Taking this to the next step, tribal codes would also recognize, respect, reflect and protect cultural values.

It is also important to remember the limitations of codes - they can only do certain things well and there are other things that they can't do at all. So the universe of possibility and potential systems that might emerge from this process is bigger still…

PPN Draft Tribal Green Building Code

We're working with the Pinoleville Pomo Nation in Ukiah, California on a new code concept and structure.

The intent is to respond to conventional code concerns and emerging risks through culturally & environmentally appropriate regenerative building and land use.

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We are working with Pinoleville Pomo Nation in Ukiah, California on their own new code which aims to integrate cultural and environmental goals into their built projects. These next few slides are from a presentation I gave to tribal leadership there just a couple of weeks ago. The goal is to develop a system that works to deliver buildings and development on their lands that deal appropriately with the conventional risks as well as the emerging ones in harmony with their cultural values.

PPN Draft Tribal Green Building Code

□

This diagram is a rough approximation of the concept with the tribal committee and the pool of technical members. We are also envisioning a regional circle made up of people representing the same set of things but perhaps coming from different tribes and other organizations. And similarly, there could be a national circle that would also, hopefully be tied to a national entity that would host the emerging library of best practices, case studies, standards, as well as potentially educational resources and more. We've begun talking with Dr. Daniel Wildcat at Haskell Indian University about the possibility of them being the repository for this.

This diagram is a rough approximation of the concept with the tribal committee and the pool of technical members. We are also envisioning a regional circle made up of people representing the same set of things but perhaps coming from different tribes and other organizations. And similarly, there could be a national circle that would also, hopefully be tied to a national entity that would host the emerging library of best practices, case studies, standards, as well as potentially educational resources and more. We've begun talking with Dr. Daniel Wildcat at Haskell Indian University about the possibility of them being the repository for this.

- In my presentation to the PPN tribal leadership I included this slide, inserting the PPN code into this framework so they could see what they were creating and why it is important not just for the tribe.

How Do We Get Everyone Home Safe?

We have huge challenges, including that some people have looked at what's happening to the biosphere and think it may be too late to reverse the trends.

No one knows how this will all play out. Let's just keep our minds, eyes and hearts open and make the best choices we can each time.

each wave invites
each grain of sand to dance
while also waltzing with feather and breeze
you don't have to be the wave
to change the shape of the future
you just have to show up willing to dance

photograph and words © david eisenberg - 2013
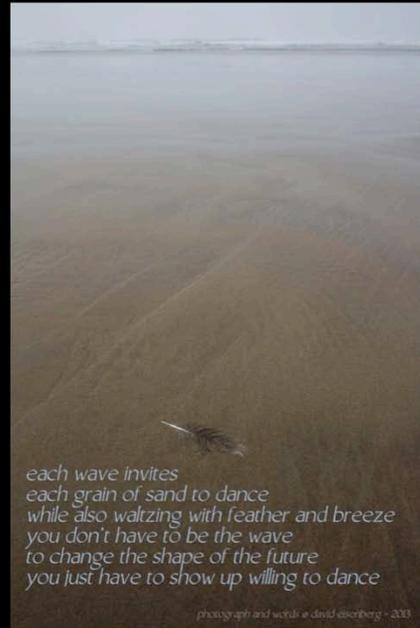
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But the reality is that these changes are changes that must take place within each of us first, not just out there in the world of technology and economics. There are many people who are questioning whether it may be too late already to turn around all the negative changes that are taking place in the world. We don't know how it is going to play out and I think there's too much at stake to not keep our eyes and minds and hearts open and do the best we can, make the best choices every day.

Our greatest responsibility
is to be good ancestors.
- Dr. Jonas Salk

This quote and these kids are what keeps me in the game.

And Finally, Remember

The way to subvert the dominant paradigm is to have more fun than they do and make sure they know it!

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And finally, a critical piece in this puzzle is that we must nurture our spirits and find joy in this work.

Thank you!

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Thank you.