

The Bigger Picture: Green Building - Codes and Beyond

Victoria, BC

October 26, 2010

An **ASRI** Presentation

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Appropriate Technology - DCAT*



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These notes are an approximation of the remarks that accompanied these slides on the evening of October 26 in Victoria. They include an approximation of what I said, or at least what I intended to say, and thus they may vary from what I actually said. Because it is my intention, in sharing my presentations in this form, that what may be of value in them will have more lasting and widespread effect, doing so in this format also allows more detail and a more nuanced discussion of what is included than I may have had time to include in my actual presentation.

In Gratitude...

Thanks are due...
to my wife Pat,
Tony Novelli, ASRi,
Eco-Sense, Cascadia,
all the sponsors, and
to all of you and so
many more...

Alternative Solutions
Resource Initiative (ASRi)



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I want to start by saying thanks to a few people. First, off, to my wife Pat, who has supported my work and the work of DCAT from the beginning in both material and all other ways. She is a civil engineer and the chief engineer for the municipal water utility in Tucson, Arizona where we live - a high stress job - being engineering administrator for a city-owned water utility for a million people in the desert. I also want to acknowledge Tony Novelli, who has been working with me at DCAT for the past dozen years or more through thick and a lot of thin. And of course thanks to ASRi and everyone involved in this new organization and to Eco-Sense and Cascadia and all the sponsors. It's a great pleasure to be back in Victoria.

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

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I think this is the right place from which to begin...

This is my grandson Joe, he's 11...

Here's a serious question on Joe's behalf:

Where in our current regulatory systems or decision-making processes is there continuous and explicit representation for the safety, welfare and rights of our children's children?



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And building on that sentiment, this is my grandson Joe. He's 11, about to turn 12, and I'm 61 and the 50 years separating us make it convenient to think about what the world is going to be like 50 years from now, when Joe is my age. So, I ask this question in all seriousness on behalf of Joe and all the other children and grandchildren and great grandchildren in the world. Where in our regulatory systems do we require explicit and continuous representation of the rights and welfare of future generations? I don't see this in evidence in our regulatory decision-making or considerations. It's hard for me to imagine a bigger gap.

What About the Rest of the Risk Profile?

What we've been doing has looked safe *only* because we've greatly limited the risks we've been considering in the building regulatory sphere.

The full risk profile of what we're doing spans energy, water and other natural and human systems across an intergenerational timeframe.



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In the areas of risk that we have focused our attention on we've done a very good job of managing those risks. But when we really look at the full range of impacts our buildings have, including risks to future generations we see a very different picture. It is only the narrowness of the set of risks we've been considering in relation to the built environment that allows us to believe that what we've been doing is safe. There is a much larger set of hazards that need to be addressed across a much longer time frame.

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.

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There are crucial changes and serious problems that have yet to fully register in people's minds. The basic assumptions on which so many of our decisions and public policies are based are no longer valid and yet we proceed as though they are. These include the assumption that we will have a stable and predictable climate, that we will 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 or 9 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 the risks that are associated with the built environment and these larger, emerging problems. These are all seriously questionable assumptions today but we aren't acting as though this is the case.

Where Energy is Concerned...

Whether the constraint is energy supply or price, or carbon/greenhouse gas restrictions, the result will be the same when business-as-usual assumptions can't be achieved.

What will the new "usual" become, and what will that mean for buildings and building regulation? More importantly, what are we doing now to prepare for that eventuality?

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One of the most serious challenges relates to the energy dependencies we have created for virtually every aspect of the built environment. We are rapidly approaching a time when we'll need to face the reality that we no longer have adequate and affordable supplies of energy for all this. And it won't really matter if the constraint is supply and price or paying for carbon emissions. If we can't continue business as usual, what will become the new usual?

Life After Cheap Energy & Stable Climate

Every aspect of the energy dependency of the built environment is going to be affected.

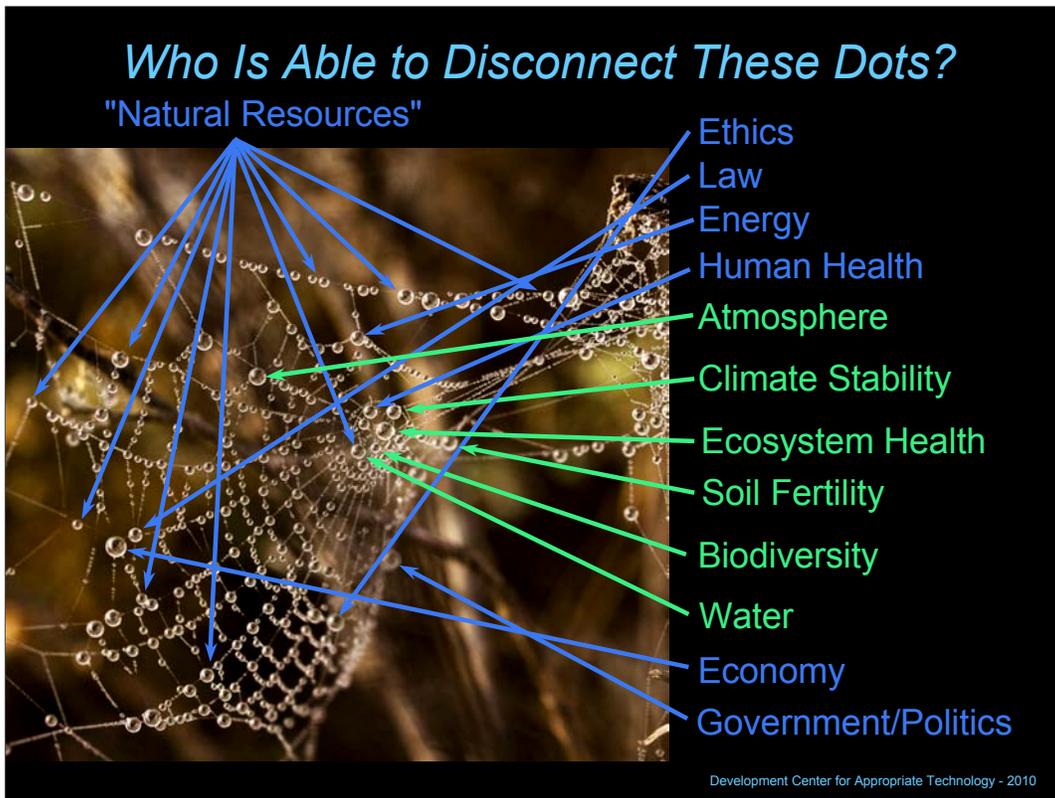
Have we examined our assumptions, like continuing to require high embodied energy building materials and systems?

What are our plans to accelerate and enable the development and acceptance of the very low climate and energy impact alternatives we're going to need?

And beyond that, what about all our other life-support systems...

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The most important thing to realize right now is that because of what we know about climate change and about peak oil, the next 10, 20, 30 50 years are not going to be like the last 50 years. We're entering an era of significant constraint. We've developed an extraordinary level of dependence on low-cost, abundant energy for virtually all of the systems we depend on for everything, and this is clearly true for creating, operating and maintaining the built environment. We have assumed that this would continue indefinitely into the future. Are we realistically examining the implications when those assumptions prove to be unfounded? Have we looked at our regulations from the standpoint of how those requirements can be met in a carbon and energy limited period? Are we doing anything to respond to those implications? Have we thought about all this in terms of our planetary life-support systems?



We are talking, really, about the web of life and our relationship to and place in it. As long as we keep looking at risk in fragmented and isolated ways, seeing ourselves as being independent instead interdependent with living and natural systems, we will continue to undermine our own well-being and future prospects. I put "Natural Resources" in quotes here because some of my Native American friends see everything as their relations - part of their family. They've asked me if we would think of strip mining our children or grandmothers or using up our cousins or sisters? They've pointed out the near complete lack of respect in our modern cultures and systems for what is not manmade. Whether you find any of that of relevance, what is relevant is that these things are all connected and we've not been honoring those connections.

English does not contain a suitable word for "system of problems." Therefore I have had to coin one. I choose to call such a system a "mess." The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed. - Russell L. Ackoff

Or, more simply put...

Optimizing components in isolation tends to pessimize the whole system.

- Paul Hawken, Amory & L. Hunter Lovins

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I love these two quotes. Russell Ackoff was a thinker and innovator and leader in systems theory and practice, design, management and more. The second quote is from the book Natural Capitalism. If we think about codes and regulations, we'll realize that they tend to view buildings in terms of their parts, not as systems of systems nested in larger human and natural systems. They treat each problem as though it was isolated from everything else and the result is that both buildings and the other systems get pessimized.

Greatest Risk = Fragmented View of Risk

How are we:

Identifying, comparing and balancing incremental versus systemic risks?

Recognizing and addressing cumulative harm?

Acknowledging and respecting the importance of ecological, human health, and other system limits?

Including an anticipatory/precautionary function to identify and address emerging hazards and risks?

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My view is that this fragmented approach to addressing and thinking about risk is the riskiest way to address risk. And, at least in the U.S., we have not developed any systematic way of identifying and balancing incremental risks at the building site, with systemic risks in the larger community or region or world. We have ignored the existence of cumulative harm and of limits - system limits, resource limits, ecological and human health thresholds. And we have failed to build any kind of anticipatory or precautionary functions into our regulatory processes, waiting instead for problems to grow to enormous proportions and levels of seriousness before taking regulatory action. In the EU there has been official recognition of the precautionary principle and precautionary approaches to hazards that are not fully understood. In the US this has been very controversial but this thinking is crucial. We shouldn't need absolute scientific proof that something is hazardous when the potential harm irreversible or the risk very large, especially when we have feasible alternatives.

Ecological Collapse = Economic Collapse

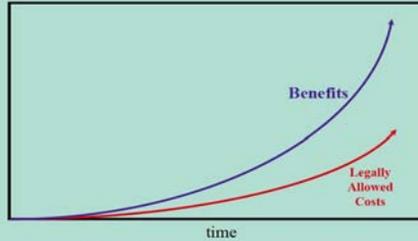


Figure 1: The law promotes all economic activity having a net benefit, allowing both benefits and costs to grow forever as the economy grows.

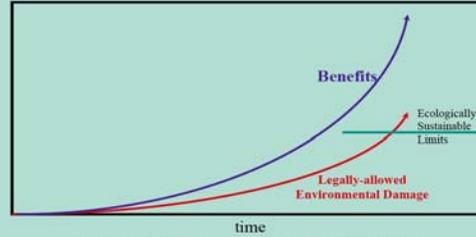


Figure 2: As the economy grows, cumulative environmental damage must eventually surpass the Earth's ecologically sustainable limits.

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.

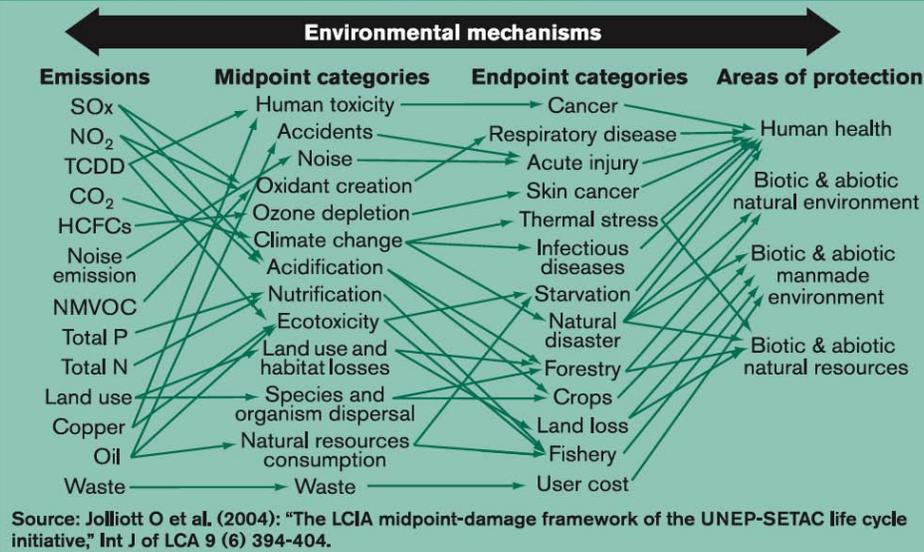
Graphics & concept: Joe Guth, Science & Environmental Health Network www.sehn.org
www.precaution.org/lib/09/ht090219.htm#Cumulative_Impacts_Death_Knell_for_CostBenefit_Analysis

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Most codes and regulations are minimum standards - that is, they establish the minimum level of performance required by law for a given regulated activity. It's important to understand the basis for those regulations. The minimum standards are determined by establishing something called "acceptable risk. That level of risk is based on an economic calculation - a cost-benefit analysis. That analysis is established by looking at each increment of activity and judging whether, in each increment, the potential economic benefit is larger than the potential economic harm. This calculation includes a determination of the economic value for many things including the value of human life. If the calculated economic benefit is greater, the activity is allowed - it's legal. This is done with no regard to the existence of cumulative harm or of system limits, such as ecological system limits or human health limits or finite resource limits. So we have a system that determines risk based on economic calculations, sees economic growth and activity as an unlimited good and sets no limits on growth. In essence, we have a system that enables both infinite potential benefit and infinite harm. In the case of ecological limits, when the system limits are exceeded and there is systemic collapse it is accompanied by economic collapse as well. (These two graphics are from a paper about the problems associated with cost-benefit analysis - called "Cumulative Impacts: Death-knell for Cost-benefit Analysis in Environmental Decisions.")

Huge Risks are Falling Through the Cracks...

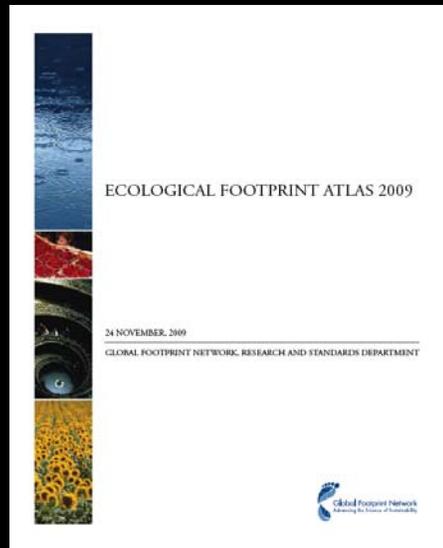
Impact Assessment: Making the Connection from LCI to Entities Needing Protection



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This graphic is of a lifecycle impact assessment of the built environment. I don't expect that you will be able to understand all the relationships that are shown here - I don't claim to. But these are all real impacts from the built environment that many people study and are concerned about. What is clear, however, is that very few of these things are regulated by building codes and standards and many are not regulated at all. These are real and many are very large risks. An important thing to grasp is that the people who are trying to design and build in ways that are attempting to minimize all these kinds of negative impacts, while also addressing the smaller set of risks the codes address, are taking on a much greater responsibility not a lesser one - yet they typically have a much harder time getting their projects approved than those projects contributing the most to such hazards. This is especially true for projects striving to become regenerative - that is to generate more good than harm over their lifetime across the whole spectrum of impacts.

Some Big-Picture Context

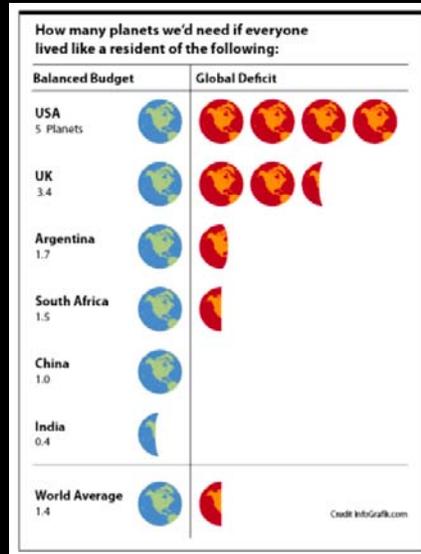


www.footprintnetwork.org

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An excellent way to understand what is happening on a planetary scale in terms of population, land, resources, pollution and nature is through a concept called ecological footprint. It is related to the concept of carrying capacity - that a certain piece of land could support a certain population or level of activity. Ecological footprint comes at it from the opposite direction, asking how much productive land it requires to provide the resources and deal with the pollution and waste of a given population, individual or activity. There is an excellent organization, The Global Footprint Network (website www.footprintnetwork.org), with a wealth of excellent information about this concept. One of the great things about this site and the organization is that everything they do is transparent - you can download their reports and the data on which they are based, their methodology is meticulously described, the quality of the information is also revealed - what's missing and what is of questionable accuracy - it's all open and available. They invite people to critique their methods, to help provide better information, and so on.

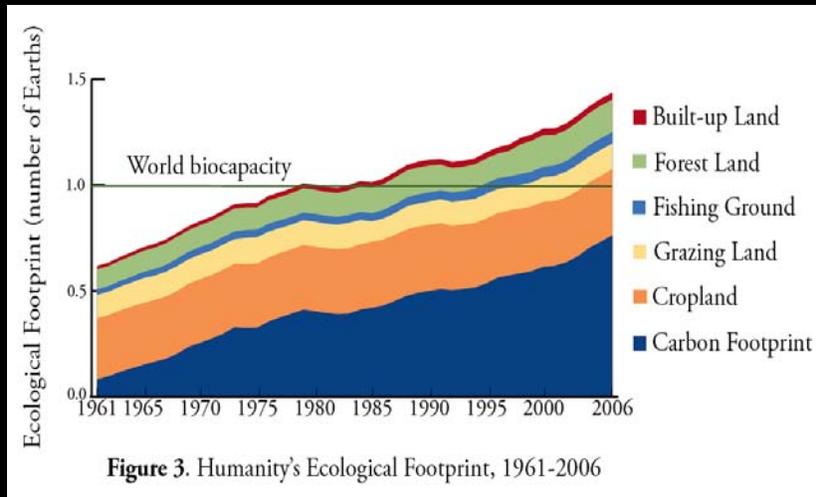
Big Question: How Many More Planets?



www.footprintnetwork.org

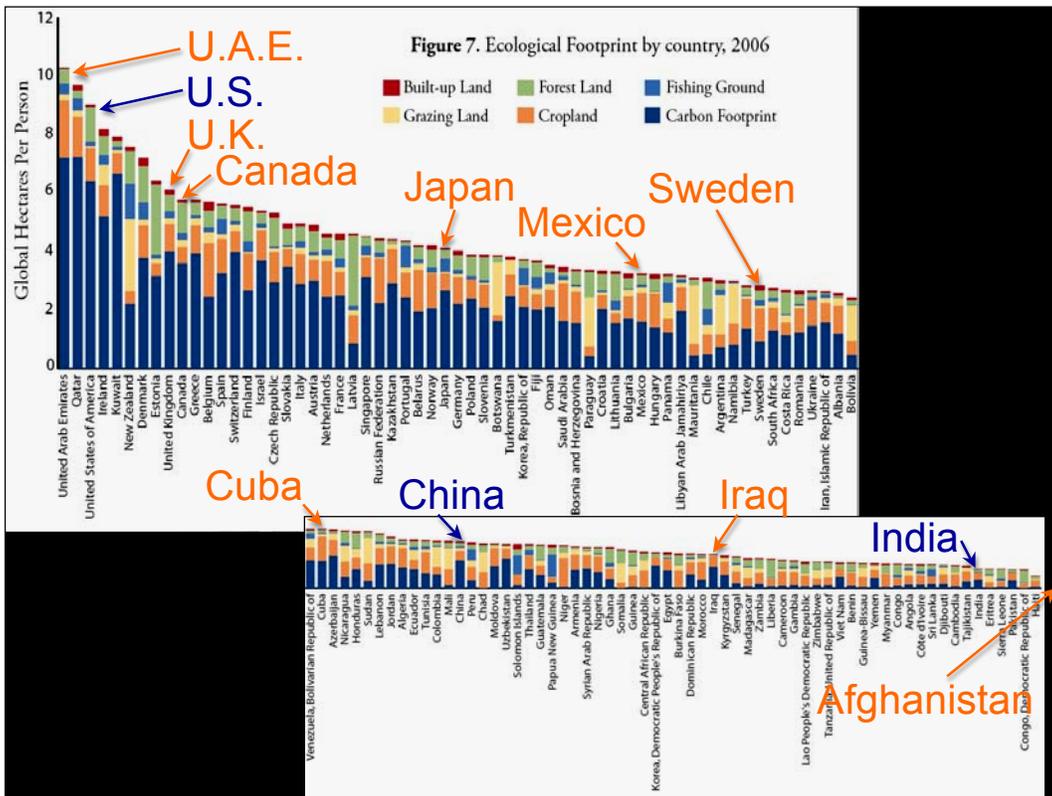
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There is ample evidence that if everyone on the planet was consuming resources and producing waste and pollution at the rate of the average American, Canadian, Northern European, or Japanese citizen, we would need several more planets to support them. And extra planets are hard to find. This graphic shows that we are already in planetary overshoot - that is, that we are already using more of the earth's biological capacity than exists - meaning that we are degrading the ability of the earth to support us. So something needs to change. We have to change how we think and how we do just about everything.



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This graphic shows the global make up of the services and resources that nature provides - and if you notice it is our energy and carbon footprint that is largest and growing the fastest.



This is from the 2009 Global Footprint Atlas showing different countries and the per capita (per person) average global footprint in various countries. As you can see the U.S. is number 3, behind the United Arab Emirates and Qatar - far exceeding our fair share of available bio-capacity. The UAE and Qatar may be higher per capita but we have a LOT more people. This frame of reference is invaluable to understand where we are and what is actually happening in the world. It is worth noting that Sweden with its very high standard of living, has a much smaller footprint than we do. Many statistics reveal that their actual quality of life, health and so forth are actually better than ours. The reason their footprint is smaller is that they have been working to lower it.

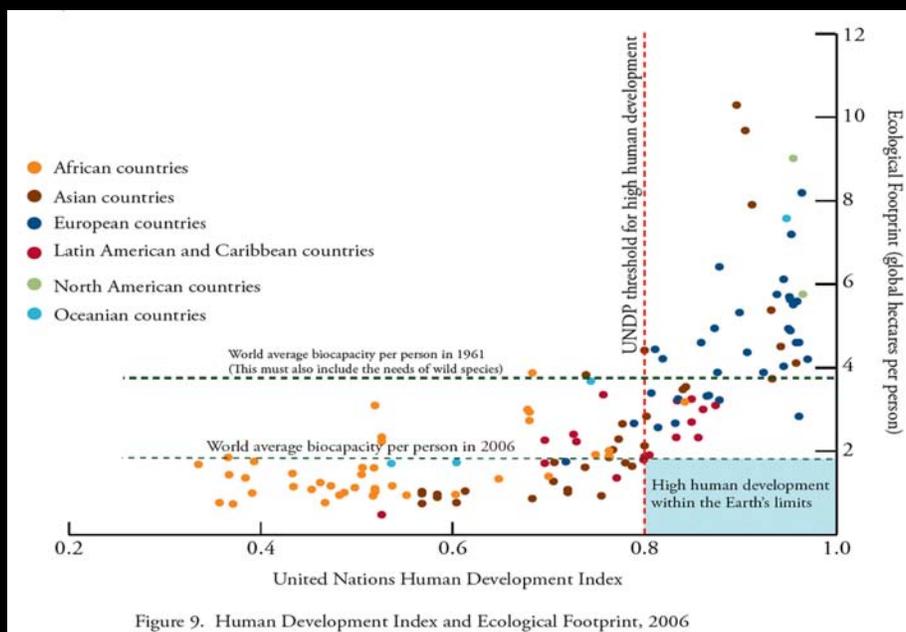
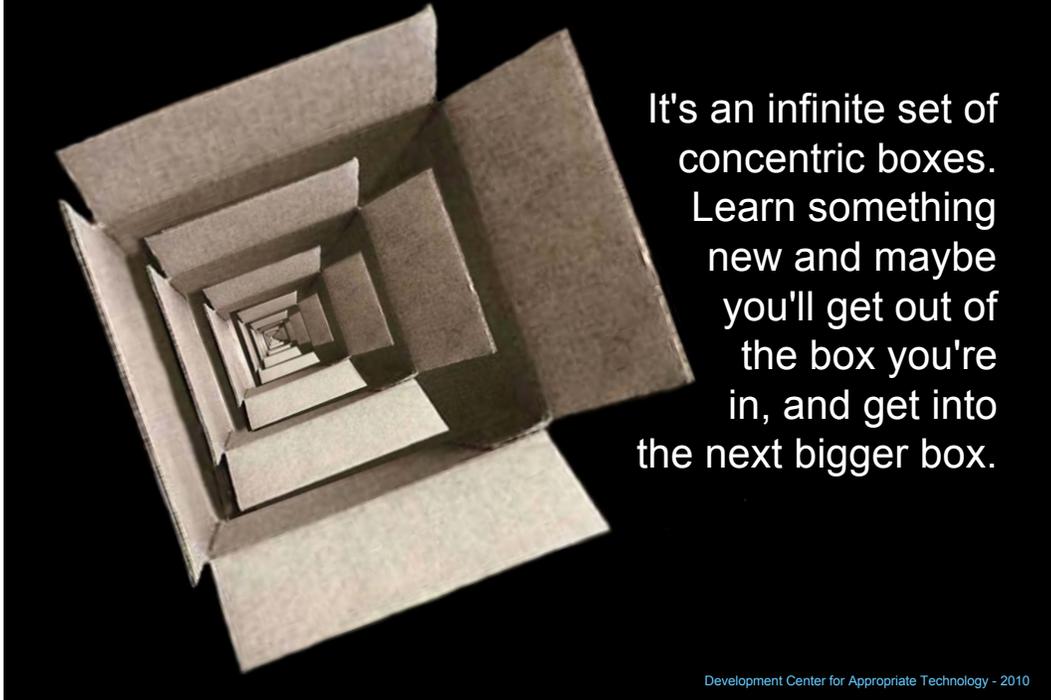


Figure 9. Human Development Index and Ecological Footprint, 2006

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This is a recent tool developed by the Global Footprint Network - combining ecological footprint on the vertical axis with the UN Human Development Index on the horizontal axis. The lower dashed horizontal line is the world average biocapacity in terms of productive land available per person in 2006, ignoring the needs of wild species. (The upper dashed horizontal line was the biocapacity in 1961. It was higher because there were fewer people and our impacts were smaller). The dashed vertical line is the threshold for decent human development - or you might say decent quality of life. So the little box in the lower-right-hand corner represents a good quality of life with a small ecological footprint - in other words, living well within our ecological means. The dots are countries. On the Global Footprint Network website you can find some of these graphics - some are animated over a thirty year period. If you hold the cursor over them when you are at the website you can see the names of the countries). Our goal should be to migrate everyone's lifestyle on the planet into that box - better quality of life with less stuff, recognizing that our welfare, wealth and health is not dependent on how much stuff we have.

Which box shall we start thinking outside of?



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 the need to think outside the box - especially with all the daunting challenges we're facing today. My experience is that it is really an infinite series of boxes. We expand our thinking and understanding and climb into the next bigger box. I love this image because it reminds me, when I get in paradigm wars, you know, my paradigm is bigger than your paradigm, that they're all tiny inaccurate fractions of reality. It keeps me open to learning more. If someone has a bigger picture, a bigger map, or they can draw in parts that I haven't figured out yet, I'm ready to go look. I may decide I like my version better but I want to have a look at your map. Our job is to make the largest and most accurate map of reality that we can in our time here. We have to be willing to redraw our map constantly...

What's your frame of reference?

What do you see?



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Focus is an act of exclusion - you focus on something and by definition, you exclude everything else. If you don't know that, if you don't pay attention to that, you get lost in the details or you lose sight of them. What you look at determines what you see. So, it's important to know whether you're working in the details or the big picture or some intermediate level, in the past, the present, the future, always trying to understand the context of our focus. They teach artists and architects to shift their focus back and forth all the time. This applies to other frames of reference as well - past, present, future for instance.

What's your frame of reference?

What do you see?

If we want to see things in context — we have to constantly shift our focus between the *details* and *big picture* so we see the *things* and their *relationships*.



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We all need to develop the habit of constantly shifting our focus and looking for the patterns and the spaces between things and their relationships, not just things themselves. This is how we learn to keep things in perspective and proportion. This is true for whatever frame of reference you are using.

The Purpose of Building Codes

International Building Code (USA) - 2006 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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A very clear example of the importance of this relates directly to building codes. This is the purpose statement from the 2006 International Building Code (USA). The part I've highlighted in white is the Big Picture. The rest is Detail, albeit important detail. The purpose is to safeguard the public from hazards attributable to the built environment. The blue outlines the things that have been called out specifically in the code, but this doesn't limit responsibility to only hazards that occur at the building site or to only hazards during the life of the building because the hazards attributable to the built environment begin far from the building site and often end far from it as well and they begin long before the building exists and extend far into the future.

What's Protected and What's at Risk...



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

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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, suffocate them too quickly, and so forth. Thus we think we've eliminated or greatly reduced the risks associated with buildings.

What's Protected and What's at Risk...

In reality, we've just moved those risks in space and time:

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



What we've actually done is move those risks in space and time. We've moved 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.

Bigger Problems Hidden in Plain View



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Thinking about building through building codes is like looking at buildings through a microscope. We can see some of the important risks to people in and around buildings. But important as they are, these risks exist at the smallest and most specific level and they completely fill our field of view. They're very important because they are risks to real people. But outside our field of view there are risks being created that are many orders of magnitude greater - generalized and distributed risks to billions of people that can't be seen through that lens.

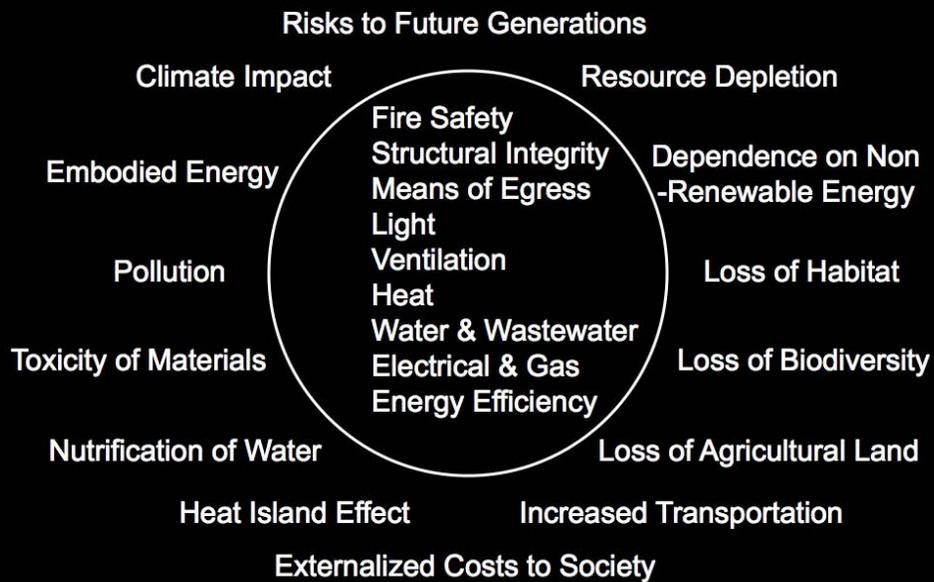
Risk - Through the Microscope of Codes...



Fire Safety
Structural Integrity
Means of Egress
Light
Ventilation
Heat
Water & Wastewater
Electrical & Gas
Energy Efficiency

These are the categories of risk and responsibility laid out in the codes. This is the view through that microscope...

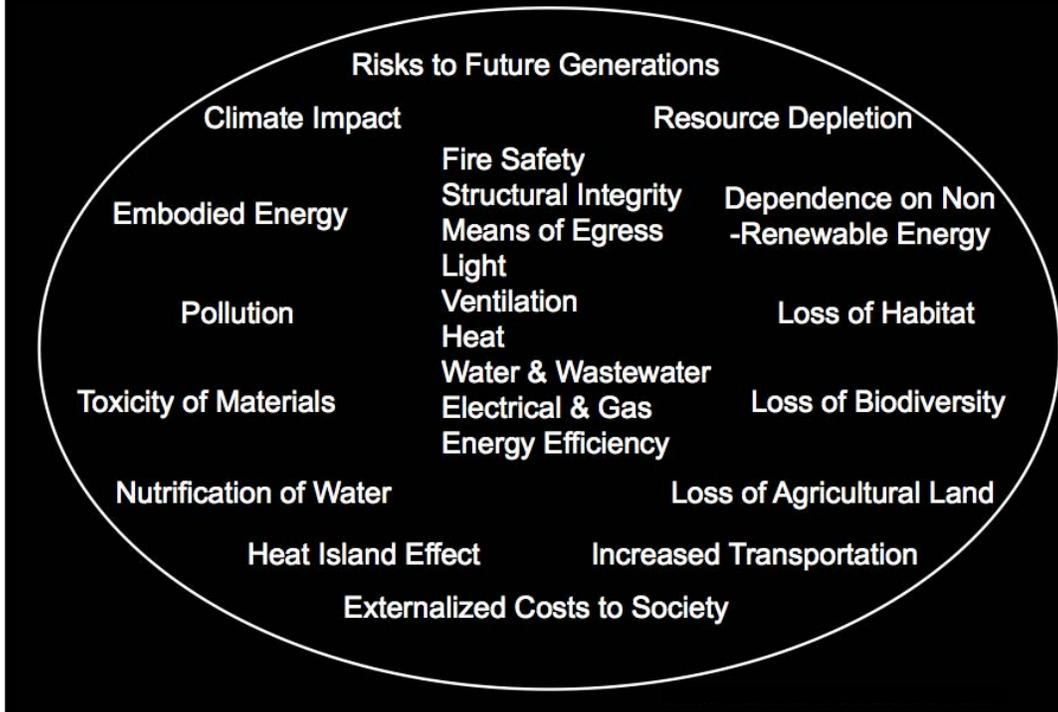
Risk - The Bigger Picture...



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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, most of which are currently unregulated.

Risk - We Need to Balance them All...



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 real breakthrough in my thinking and my work came when I realized that I wanted everything that the building officials wanted and more, not less. The last thing any of us want are unsafe buildings, but I want safe places—a safe planet—on which those buildings exist as well. There are much larger risks that need to be addressed. If the purpose of regulations for the built environment is to safeguard the public, that has to include all this and the future.

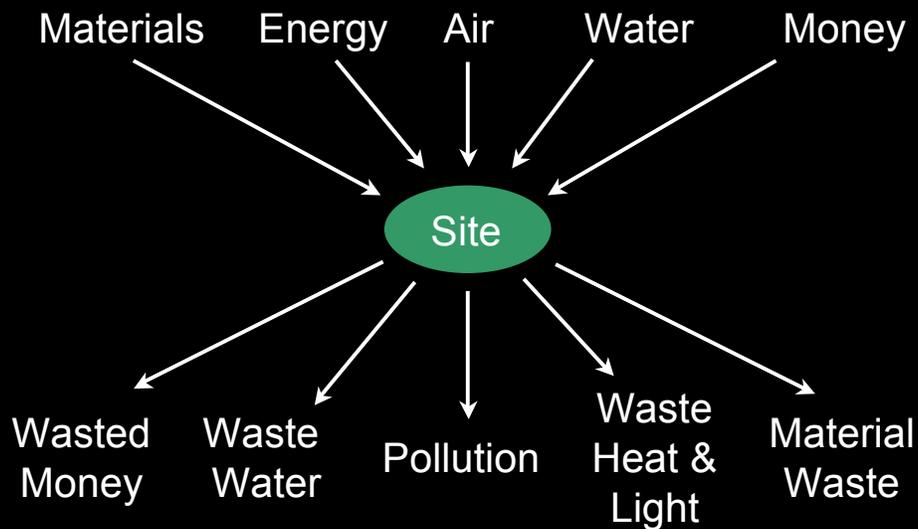
The Whole Lifecycle of Built Projects



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When we think about the entire lifecycle of a building we can more easily see that the impact of a building project starts with the acquisition of resources and their transportation and processing and extends to the impacts of the building on the land and the infrastructure it requires. We 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



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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.

Will We Be Able To Continue To Do This?

For Energy Reserves for Future Generations

For Extraction of Resources

For Construction Processes

For Transportation
to Processing and
Manufacturing Sites

For Building Operation

For Processing
and Manufacturing

For Building Repair
and Maintenance

For Transportation
to Point-of-Use

For Building Upgrades
and Remodeling

For Site Excavation
and Preparation

For End of Building
Life Disposition

For Infrastructure and its Maintenance

Energy Uses

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If we just consider energy and look at how it's used in relation to the built environment we see enormous dependencies. What happens if we can't do these things the way we now require?

Life After Cheap Energy & Stable Climate

"You cannot solve a problem from the same consciousness that created it. You must learn to see the world anew."

Albert Einstein

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This very well known Einstein quote applies to many things, and describes a common challenge and the need to go to a higher level of thinking to actually solve a problem.

Are These Really Regulatory Systems?

Because regulations and regulatory structures are created in response to specific problems they tend to be fully embedded at the level of the problem.

We rarely acknowledge that we're dealing with systems, so systemic problems are seldom addressed through systemic regulatory responses.

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But when we think about the regulatory realm we see that regulations are almost always embedded at the level of the problem because they are responses to specific problems. This is especially true in building regulations because the codes don't treat buildings as systems—actually as systems of systems embedded in larger ecological and human made systems. So the regulatory responses are rarely systemic in nature, thus they also tend to reinforce the status quo, rather than change it.

The Current Situation...

We don't get regulations until we have big, serious, persistent problems - serious enough to demand an official response. So the main navigational tool in the regulatory realm is...

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

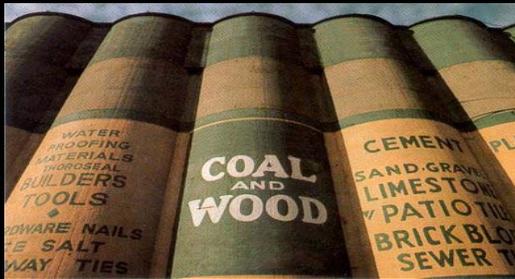
The Rear View Mirror



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...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 Current Situation



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Another big part of the problem is fragmentation. We don't have a true regulatory system for the built environment - one that was intentionally designed and implemented as a comprehensive system, with system principles and system goals. What we have wasn't actually designed at all—it's the result of an enormous number of essentially ad hoc responses to disasters, failures and problems requiring some sort of regulatory action. And anyone who has ever taken a project through the whole approvals process knows how much it resembles a maze of regulatory agencies and entities, with jurisdictional silos and nested levels of responsibility and authority. There are gaps and overlaps. Where there are gaps the risks and hazards are externalized from the projects and systems being regulated to future generations and to the commons – in other words, to everyone including our children and future generations, and to the commonly held natural systems and birthrights, like clean air and water, healthy and productive soil, vital and thriving oceans and all ecosystems. And, where there are overlaps, they don't typically give us more or better coverage – instead they tend to create more gaps often having the effect of relieving each regulatory entity of full responsibility. And the existence of overlapping jurisdictional authority makes innovation and change much more difficult,.

A Regulatory System

Codes could be a set of principles for what buildings should and shouldn't do.

A good first principle would be a corollary to the Hippocratic Oath: *that buildings first do no harm.*

Another principle — *when accepted practices are shown to have serious unintended human or ecological consequences, alternatives are not merely tolerated, but sought and preferred.*

The goal: a system designed to enable positive outcomes as well as prevent negative ones.

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A good starting place for creating an actual regulatory system would be to start with principles and goals. I've long thought that codes should be a set of principles for what buildings should and shouldn't do. A good first principle would be a sort of Hippocratic corollary - that buildings should first do no harm—but across the whole spectrum of impacts and throughout its lifetime. Another important principle would be that when currently accepted practices are shown to have serious unintended consequences, that alternatives are not merely tolerated or accepted but that they be searched out and preferred. And the ultimate goal of this system must be positive outcomes, not just trying to prevent negative ones.

Representation for the Future and Nature

Regulatory systems and processes must assure continuous and explicit representation of future generations and of the commons—the natural systems our survival and well being depend upon.



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And key, if we are to take our responsibilities seriously should be the goal of continuous and explicit representation for the future and the commons in all regulatory processes. This means that there must be someone whose explicit responsibility is to be the voice of the voiceless - those who can't speak for themselves. This gap in the regulatory sphere is at the heart of many of the most urgent problems we are facing today.

Rethinking Long-Standing Assumptions

We have to begin to develop the transitional strategies that can bridge to a future that works for our great-grandchildren.

For that future to emerge, our technology must become rooted in the rediscovery of the virtues of *reverence* and *justice*. *



**My heartfelt thanks to Paul Woodruff, Barry Lopez and Bill Moyers for this bit of wisdom - <http://www.pbs.org/moyers/journal/04302010/watch3.html>*

Development Center for Appropriate Technology - 2010

There are lots of people who are good at telling us where we are, what's wrong with that, and the perils of where we're headed. And many others are good at describing various utopian solutions. There are far fewer people and organizations working on viable transition strategies to get us from here to there. But that is exactly what is needed. I want to mention something that I think has been largely missing in the regulatory sphere as well as in the realm of technology and development—a commitment to the virtues, justice and reverence. This came into sharper focus for me through a wonderful exchange between Bill Moyers and Barry Lopez in the last episode of Bill Moyers Journal, an excellent program that used to be on public television in the States. Barry Lopez was Moyers' choice as his last guest and I highly recommend listening to this entire program which is available on the PBS website at the link on this slide. At one point in the interview Barry Lopez talks about an interpretation of a bit of Greek mythology that seems very pertinent. Lopez shares the story of Zeus and Prometheus in which Zeus said to Prometheus, "Okay, you stole fire. Great for you. Now your people have technology. Wonderful. But here's something you don't know. You lack two things. And if you don't take these two things that I will give you, this will be a failure. Technology, you know, fire, all your magic, it will fail completely. It will be your undoing. And the two things that you need to make it work are justice and reverence. And if you have these two things, you won't get in trouble with this third thing that you thought was the be all and the end all." I think this is right on the mark. I think the time has come to incorporate the concepts of reverence and justice into the code writing process.

Going Forward

Solutions are going to need to be more community and place based, requiring more local knowledge and engagement on everyone's part.

We need a systems-based approach for the whole regulatory and approvals process, as focused on outcomes and performance as on higher standards.

The shift taking place in the design, development and building communities is starting to be mirrored in the building regulatory realm.

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When we look at the emerging crises we're facing related to things like peak oil, peak water, food security, and issues of ecological and human health, it seems clear that the solutions will, of necessity, be more and more local and regional—place-based and thus requiring more local knowledge and sophistication, as well as more direct engagement rather than depending on distant industrialized systems of supply. There are some big and important shifts taking place on the leading edge of the design and building fields along these lines, and these are slowly beginning to be mirrored and supported in the regulatory realm.

The Living Building Challenge



LIVING BUILDING CHALLENGE™ 2.0

A Visionary Path to a Restorative Future



November 2009

www.ilbi.org

Development Center for Appropriate Technology - 2010

One of the real leading edge programs is the Living Building Challenge, a program designed to help define something beyond all the other green building rating systems and program goals I'm aware of. The Living Building Challenge 2.0 is a set of 20 imperatives - requirements - aimed at moving us toward crating projects that meet or exceed net-zero impact performance across the spectrum of impacts of built projects.

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 imperatives include site, energy, water, materials, social equity, beauty and inspiration, and education. These last ones are there because many of us believe that people don't take care of things they don't care about - they don't care for what they don't love - and people love beautiful buildings and so they last longer - which is much more sustainable.

The Living Building Challenge - www.ilbi.org

SUMMARY MATRIX

The 20 Imperatives of the Living Building Challenge:
Follow across the row associated with each Typology to see which Imperatives apply.

Imperative omitted from Typology

Scale Solutions beyond project footprint are permissible

	Neighborhood	Building	Landscape + Infrastructure	Renovation	
Site		<i>Scale Jumping</i>			Limits to Growth
			<i>Scale Jumping</i>		Urban Agriculture
				<i>Scale Jumping</i>	Habitat Exchange
					Car Free Living
Water			<i>Scale Jumping</i>		Net Zero Water
				<i>Scale Jumping</i>	Ecological Water Flow
Energy			<i>Scale Jumping</i>		Net Zero Energy
Health					Civilized Environment
					Healthy Air
					Biophilia
Materials					Red List
		<i>Scale Jumping</i>			Embodied Carbon Footprint
					Responsible Industry
					Appropriate Sourcing
					Conservation + Reuse
Equity					Human Scale + Humane Places
					Democracy + Social Justice
					Rights to Nature
Beauty					Beauty + Spirit
					Inspiration + Education

Living Building Challenge™ 2.0

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I'm not going to take the time to go into the Living Building Challenge program but I encourage you, if you're not already familiar with it, to go to the International Living Building Institute website and learn more about it.

The Living Building Challenge

The International Living Building Institute just announced the certification of the first two Living Building Projects: the Tyson Living Learning Center in Missouri and the Omega Center for Sustainable Living in New York.

More info at:
<http://ilbi.org>

TYSON LIVING LEARNING CENTER Eureka, Missouri
 Tyson provides a landmark-scale experimental venue for studies on ecosystem sustainability; an outdoor laboratory for important research and teaching opportunities from Washington University and other institutions; and research and educational opportunities for undergraduate and graduate students related to the environment and sustainability. "One of the most rewarding aspects of receiving Living Building Certification is that it formally recognizes the exceptional commitment it took to complete this project. From design and construction through over 18 months of commissioning and performance monitoring, achieving this goal required the full dedication of everyone involved in the project." - Kevin D. Smith, Associate Director, Tyson Research Center



General Information	Location	Project Team
Location: Eureka, MO, USA	Region: Heartland	Owner: Washington U in St. Louis
Living Transit: L3	Type: Building	Generalist: Green Consulting
Typology: Education/Research	Project Area: 2,209 sqm / 24,751 sf	Civil: Williams Creek Consulting
Building Area: 278 sqm / 2,988 sf	Start of Construction: 12/2009	Landscaper: Lewis
Start of Occupancy Period: 8/2009		Structural: ASOQ, LLC
		Architectural: Hatfield + Bockius Architects
		Planning: Solutions AEC
		Mechanical: Solutions AEC
		Electrical: Solutions AEC
		Specialty Consultants:
		Blackwater Systems: Chris Mulum
		Solar Energy: Straight Up-Solar
		Contractor: Bingham Construction Company

THE OMEGA CENTER FOR SUSTAINABLE LIVING Rhinebeck, New York
 Omega provides innovative educational experiences that awaken the best in the human spirit. The Center for Sustainable Living is a wastewater filtration facility that is designed to use its treated water for garden irrigation and in a greywater recovery system. Omega will use the system and building as a teaching tool in their educational program designed around the ecological impact of their campus. "Omega is proud to have exceeded the finish line, and hopeful that projects like ours will mark a new era in sustainable design, one that reflects a fully integrated approach to creating built environments that are in harmony with the natural world." - Dick Backus, CEO of Omega



General Information	Location	Project Team
Location: Rhinebeck, NY, USA	Region: Northeast	Owner: Omega Institute
Living Transit: L3	Type: Building	Generalist: Chazen
Typology: Business/Education	Project Area: 13,132 sqm / 141,363 sf	Civil: Chazen
Building Area: 383 sqm / 4,149 sf	Start of Construction: 11/2007	Landscaper: Conservation Design Forum
Start of Occupancy Period: 9/2008		Structural: Topping/Mar + Associates
		Architectural: BNM Architects
		Interior Design: BNM Architects
		Planning: BGR Consulting Engineers
		Mechanical: BGR Consulting Engineers
		Electrical: BGR Consulting Engineers
		Lighting Design: BNM Architects / BGR Consulting Engineers
		Specialty Consultants:
		Biocycled Materials: Thoral Rustle
		Water Systems Engineer: Natural Systems International
		Ecological Design: John Todd Ecological Design
		Contractor: David Sankler Construction

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Just within the past couple of weeks the first Living Building projects have been certified including these two in Missouri and New York. These two projects met the full certification which includes having to be in full operation for a year before they can be certified.

The Living Building Challenge

The ILBI also announced "Petal" certification of the Eco-Sense Project, the multi-generational home of Ann and Gord Baird in Victoria, BC, which earned 4 of 7 petals - Site, Health, Water and Beauty.

ECOSENSE Victoria, British Columbia
The creation of Eco-Sense was the dream of Ann and Gord Baird to build a sustainable home for their three-generation family of six. A home that functions as a part of the eco-system where there is no line that separates where the dwelling ends and where nature begins. *"Imagine working on a project where the only emissions generated came from human breath. The positive examples set by our home have inspired many others to build in similar ways or to incorporate aspects of Eco-Sense into their existing homes."* - Ann Baird, Owner



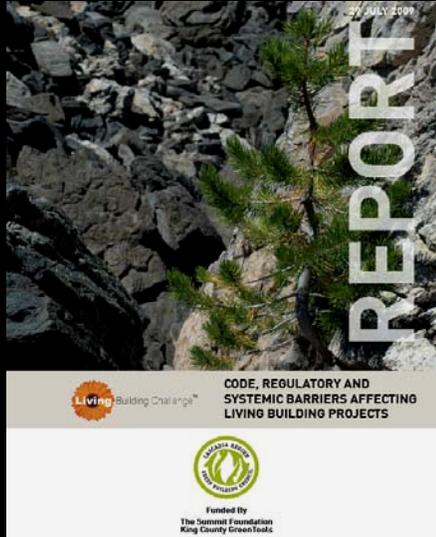
General Information		Project Team	
Location:	Victoria, BC, Canada	Owner:	Ann and Gord Baird
Bioregion:	Cold North	Geotechnical:	C.N.Ryzuk
Living Transect:	L3	Structural:	Kris Dick, Building Alternatives
Typology:	Building	Architectural:	Ann and Gord Baird
Occupancy Type:	Multigenerational family home / home-based business/ Education / Research	Interior Design:	Ann and Gord Baird
Project Area:		Plumbing:	Byron Merriam (A-Tech Plumbing), and Gord Baird
Building Area:	232 sqm / 2,500 sf	Mechanical:	Gord Baird
Start of Construction:	3/2007	Electrical:	Mike Isbrucker (Alternative Electric)
Start of Occupancy Period:	12/2008	Lighting Design:	Ann Baird

Image Credits:
Tyson: © 2009 Joe Angeles, WUSTL Photographer
Omega: © 2009 Farshid Assassi, Courtesy of BNIM Architects
Eco-Sense: © 2008 Ann + Gord Baird

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Along with those two projects there was also a local project here in Victoria - the first residential LBC project - the Eco-Sense home built by Ann and Gord Baird. Though they didn't get the full LBC certification for all the categories, they achieved many and this is a huge step forward, in part because of the extremely low-impact outcome and the beauty, performance, use of earthen materials and more. But as important for the future, their approach to doing this project and their goal of making progress in the regulatory realm so that those who follow have an easier, not a harder time, is an extraordinarily great example of how to do it all well! They deserve our congratulations and gratitude.

The Living Building Challenge



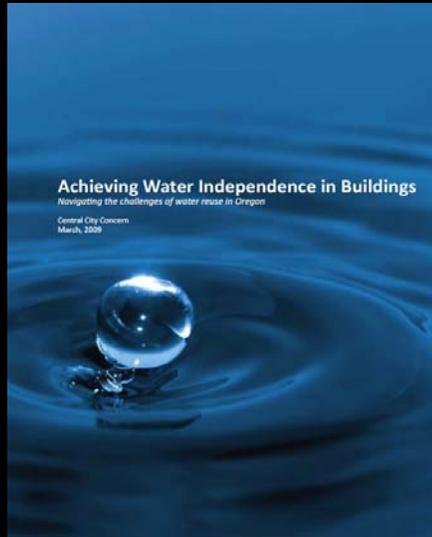
This is a recent report from the Cascadia Region Green Building Council that looks at the whole spectrum of building regulatory issues related to LBC and deep green projects.

www.dcat.net/resources/index.php

Development Center for Appropriate Technology - 2010

DCAT, my organization 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.

Creating a "Regulatory System"



This excellent report documents how a project striving to achieve very deep green goals can improve the regulatory system. It demonstrates the type of collaborative efforts both needed and possible.

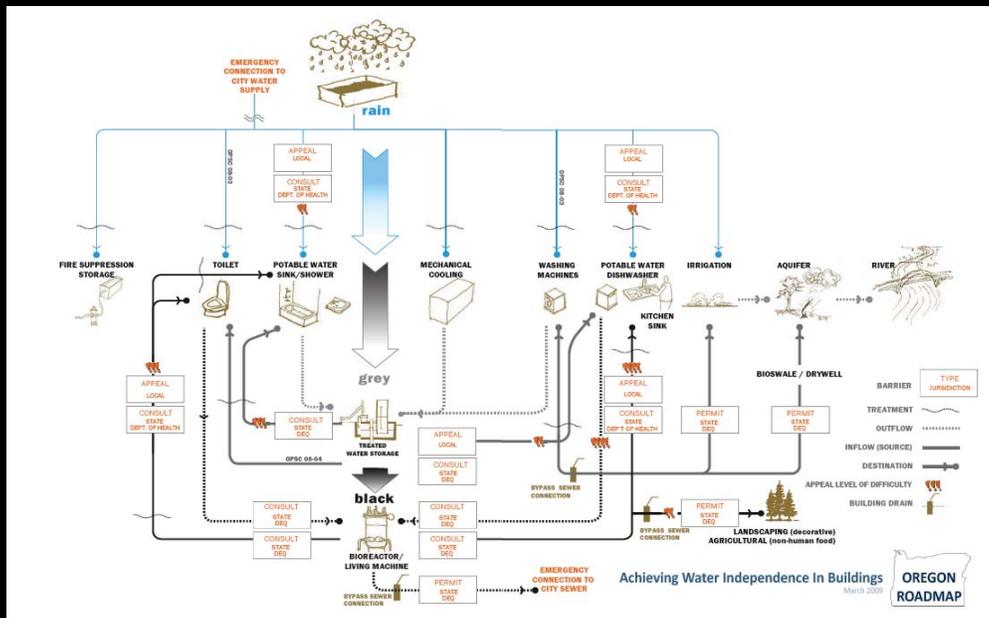
<http://ilbi.org/resources/reports/REPwater>

Development Center for Appropriate Technology - 2010

There is an excellent report on the ILBI website about a project seeking to meet Living Building Challenge requirements for water in Portland, Oregon, a very progressive city in a very progressive state. What they found was the incredible number of places where the codes, standards, policies and approvals processes made it illegal to do the right thing - design a building to be water self-sufficient in the middle of the city. The cool thing about this project is that the design team and clients embarked on an effort to change the regulatory systems to enable these kinds of projects to be done and they succeeded in doing that.

The regulation of almost all aspects of water reveals the problematic patterns of regulatory systems related to incremental and systemic risk, comparative risk and more. Here's how I describe the normal and, at long last, evolving situation. *In most places* all water entering a building is required by law to be potable water—drinking water—regardless of how it will be used. And once used, regardless of the use, it's required to be treated as black water—as if it had gone through the toilet. In most places, if a public sewer system is available you're required to connect to it and if not you're required to put in a water-based septic system of some kind. In most places it's also illegal to use grey water or rainwater for toilet flushing...meaning that in most places we are required by law to intentionally pollute drinking water with human excrement, an act that in any other circumstance would be both illegal and so socially reprehensible as to result in excommunication from nearly any community...but we mandate that behavior in buildings.

The Water Approvals Flowchart



Development Center for Appropriate Technology - 2010

Sera Architects, designers of the project in Portland, developed a great tool to graphically illustrate the problems the project faced, which helped facilitate changing the regulations in Oregon. What it revealed were all the places where the rules required appeals processes in order to do more sustainable options. It showed where codes, standards and policies were preventing the best practices, not just the worst ones. One of the big issues they faced, which is indicative 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 - turn it into blackwater, and by doing so, increase the volume of this much more dangerous water by 30, 40, 50 percent 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.

City of Seattle LBC Pilot Program



The screenshot shows the City of Seattle website's Department of Planning and Development page for the Living Building Pilot program. The page is titled "Green Permitting Living Building Pilot" and includes a navigation menu with options like "Overview", "Green Q", "Residential Deconstruction", "Priority Green Permitting", "Innovation Advisory Committee", "Living Building Pilot", "Related Documents", "Related Links", and "Key Contacts". The main content area explains that the program is designed to assist projects in meeting the requirements of the Living Building Challenge by providing additional flexibility in the application of development standards. It also mentions that the program will accept up to 12 projects over a 3-year period, starting in early 2010. A sidebar on the right features "Helpful Resources" including "Seattle Climate Action Now", "Our Commitment", "city green building", and "architecture 2030".

The Pilot Program allows additional flexibility in the application of development standards in the Land Use Code through the design review process in order to accommodate innovative technologies or design approaches that might otherwise be discouraged or prohibited. The Pilot Program will accept up to 12 projects over a 3-year period.

www.seattle.gov/dpd/Permits/GreenPermitting/LivingBuildingPilot/default.asp

Development Center for Appropriate Technology - 2010

A fantastic example of political leadership occurred recently in Seattle, where the city leaders voted to create a pilot program allowing increased flexibility in the building and land use codes to allow Living Building Projects to be built in the city so that the city could understand more fully what would need to change in order for such projects to become as easy to build as mainstream projects are now.

Clark County, Washington LBC Pilot



Pilot Program allows additional flexibility in codes for up to five years and six Living Building Challenge projects.

www.co.clark.wa.us/news/news-release.asp?pkNewsSeq=2108

Development Center for Appropriate Technology - 2010

And recently, Clark County, Washington followed with a similar ordinance of their own. These are hugely encouraging signs, when jurisdictions recognize that their regulatory structures are inhibiting the best and most sustainable projects while allowing projects with much larger negative impacts to be approved much more easily.

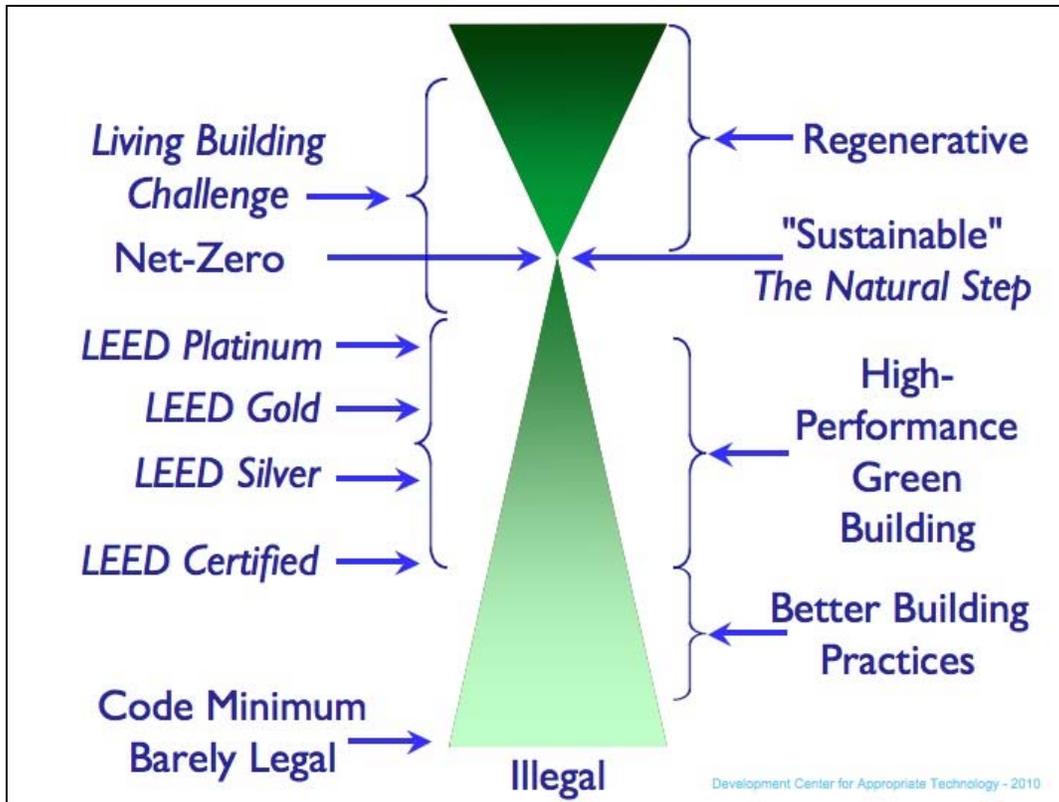
Codes, Standards, Programs & Resources



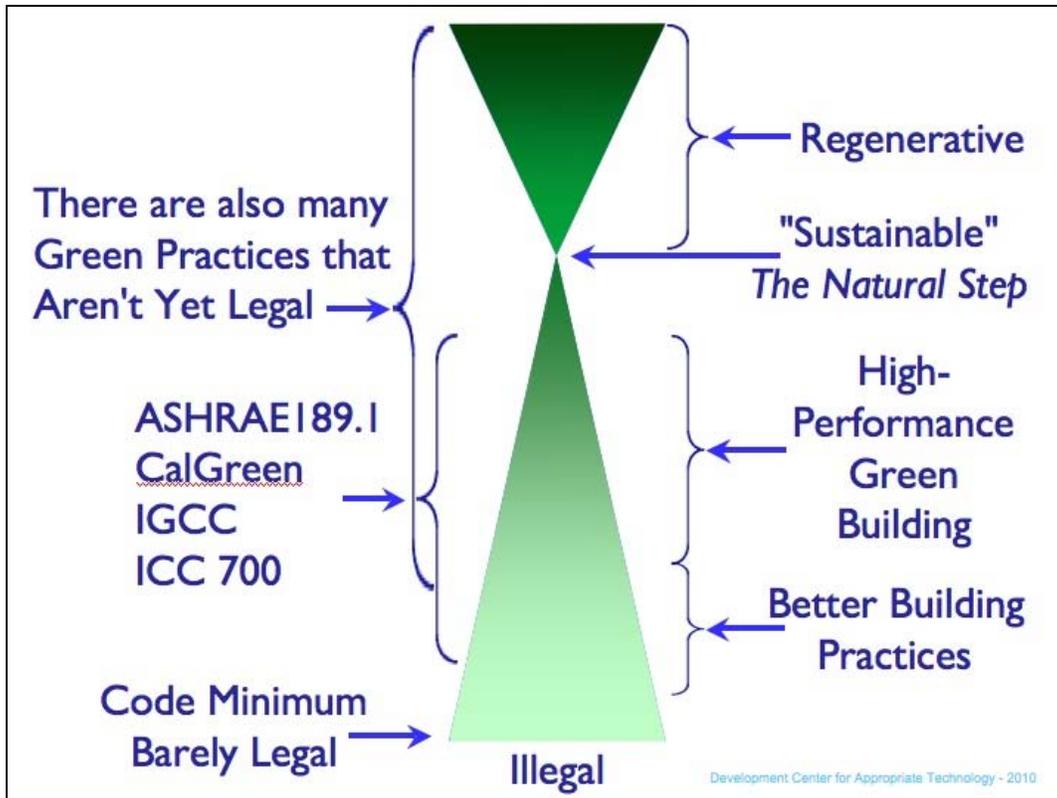
And a lot of local and regional green building programs.

Development Center for Appropriate Technology - 2010

There are a lot of things going on in the States with new codes and standards and green building programs and rating systems. None of these is perfect or goes as far as is needed, but the Living Building Challenge and some others are helping move things forward.



I like to put all this into perspective, so we can think about the level of sustainability or greenness of projects as a range from illegal, to code minimum (because codes are minimum standards, if anything is done to a lower standard it's illegal) to better and higher performance/green buildings, through the various levels of LEED and other green building rating systems, to a place of net-zero - sustainable or what Bill McDonough says is 100 percent less bad and Paul Hawken has defined as the midpoint between destruction and restoration. There are a variety of systems or tools you can look at or use - The Natural Step is a good one - www.thenaturalstep.org/en/canada - to get a sense of how we can think about and work with the system limits and conditions of nature. 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.



We can also see where some of the new codes and standards that are emerging fit into this spectrum. And it is worth noting that there are some very sustainable practices that are not yet accepted by the regulatory realm - things which aren't yet legal. Part of the reason for this is that for many low tech or traditional but non-industrial materials and methods of construction or for systems using off-the-shelf components - like greywater and rainwater harvesting systems or passive design strategies that are design-based rather than technology-based, there has been no source of funding for the full scale research, testing, development and deployment necessary to get them fully recognized and accepted by the codes and standards organizations. For others, because there isn't full risk assessment and risk balancing, the risks inherent in mainstream practices are ignored while the risks in the alternatives are highlighted and sometimes exaggerated, so their benefits are dismissed.

International Green Construction Code

The International Green Construction Code (IgCC) will be part of the family of 2012 I-Codes. The hearings for comments to the first public draft were held recently. The second public draft will go through the 2011 code development cycle with the rest of the 2012 I-Codes.



www.iccsafe.org/CS/IGCC/Pages/default.aspx

Development Center for Appropriate Technology - 2010

Last year the U.S. organization of building code officials, the International Code Council, - yes, I know, well, we're Americans and we have the World Series and such so we think we're entitled to call whatever we do "international" - created a committee, the Sustainable Building Technology Committee, charged by the ICC Board of Directors with drafting a new I-code, the International Green Construction Code, a commercial green building code intended to be part of the 2012 family of I-codes. I was on this committee and we produced the First Public Draft of the IGCC in March and there were public hearings recently in Chicago to hear the 1700 public comments it received. I attended 6 of the 7 days of those hearings.

COMMENT FORM

Comment #: 5-136
(To be filed in by ICC)

Section: **NEW Section 508 - Strawbale Construction**

Commenter: **Martin Hammer**
Company: **Martin Hammer, Architect**

Representing: **California Straw Building Association
Colorado Straw Bale Association
Straw Bale Construction Association – New Mexico
Ontario Straw Bale Building Coalition
Development Center for Appropriate Technology
Ecological Building Network**

Reason:

Strawbale construction has proven to be a safe, resource efficient, environmentally responsible, and fully viable method of construction. First practiced in Nebraska in the late 1800's, with buildings over 100 years old still in service, strawbale construction was rediscovered in the 1980's in the American southwest. Since then it has been further developed and explored, including considerable testing and research regarding vertical and lateral structure, moisture, fire, and its thermal and acoustic properties.

Currently only Oregon and New Mexico have adopted statewide strawbale building codes. California has legislated strawbale construction guidelines that are voluntarily adopted at the local level. Otherwise, nine U.S. cities or counties have adopted strawbale building codes. Two countries outside the United States - Germany and Belarus - have very limited strawbale building codes.

Most of the strawbale building codes that do exist are derived from the first such code, created for and adopted by Tucson / Pima County, Arizona in 1996. Much experience, testing, and research since then have proven these codes to be deficient. They are often either too restrictive, or not restrictive enough, and in some cases don't address important issues at all.

Although strawbale codes are both few and flawed, strawbale buildings are now found in 49 of the 50 United States, and strawbale construction is practiced in over 45 countries throughout the world, including in every climate. There are an estimated 600-1000 strawbale buildings in California alone. The practice of, and the desire to utilize strawbale construction continues to increase, and promises to accelerate as we face increased pressure on our environment and natural resources.

There is great need for a comprehensive strawbale code that addresses the various regional and local conditions, with full benefit of the experience and knowledge about this method of construction that has been gained to date. The following proposed Strawbale Construction section of the IGCC was created to fulfill this need. It is based on the

Among the things that happened there was that a comment from California architect, Martin Hammer, for the inclusion of the straw bale code that has been in development there over many years, was approved for inclusion into the Second Public Draft of the IGCC. This was very encouraging. Hopefully it will be incorporated into the final version of the code next year.

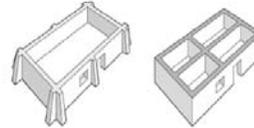
ASTM Earthen Building Standards



Designation: E2392/E2392M - 10

Standard Guide for Design of Earthen Wall Building Systems¹

This standard is issued under the fixed designation E2392/E2392M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last approval. A superscript (1) indicates an editorial change since the last revision or approval.



Note 1.—Earthen pilasters (left) should be built at corners and intermediate locations, with generous corner from the roof and support at the foundation. Pilasters can be sloped as shown or vertical, but should project from the face of the wall by a distance at least as great as the wall thickness. Alternatively, the minimum length of a wall between interior areas walls should be limited to eight feet. In other cases, bracing systems should be of the same construction as the wall, spaced with the wall, not be farther apart than 12 times the wall thickness (vertical interior walls), and not more than 12 times the wall thickness (high exterior walls).

FIG. 7 Wall Placement or Wall Density for Curved-Phase Stability



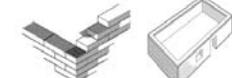
Note 1.—The roof beams should support evenly loads between the roof structure and the wall (left), maintain a constant load between spans supported by the beams, and provide a slight crown (right) between spans. The crown should be a slight curve over the span. The crown should be the thickness of the wall. Between the roof beams and the wall should be spaced at an even distance from the wall thickness (uniformly spaced) and not more than four times the wall thickness (uniformly spaced). These three types are given as typical configurations but are not exhaustive.

FIG. 8 Roof (or Beam) Spacing to Reinforce Type of Walls



Note 1.—Each wall section should be built through the wall, corner, vertical walling and through the wall, right internal vertical walling or ground level (horizontal walling) with a vertical wall. All wall sections should be spaced at corners and vertical walling and at decorative locations or ground level, but may include higher configurations as well. These three types are given as typical configurations but are not exhaustive.

FIG. 9 Vertical Walling for Crack Control



Note 1.—Vertical walling may be placed at corners and vertical walling and through the wall, or the walling may be placed at ground level to create a corner. Spacing of walling should be consistent with higher sections of the wall, or the walling may be placed at ground level to create a corner. Spacing of walling should be consistent with higher sections of the wall, or the walling may be placed at ground level to create a corner.



Note 1.—A wet mass of soil is worked in the hand so as to extrude a ribbon of damp soil about the size of a finger. The ribbon should be able to hang from the hand without breaking for at least the same length as the hand. This test will establish plasticity and cohesion of the earth mixture, but not the strength or durability of the cured earthen material.

FIG. 2 Ribbon Test

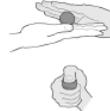
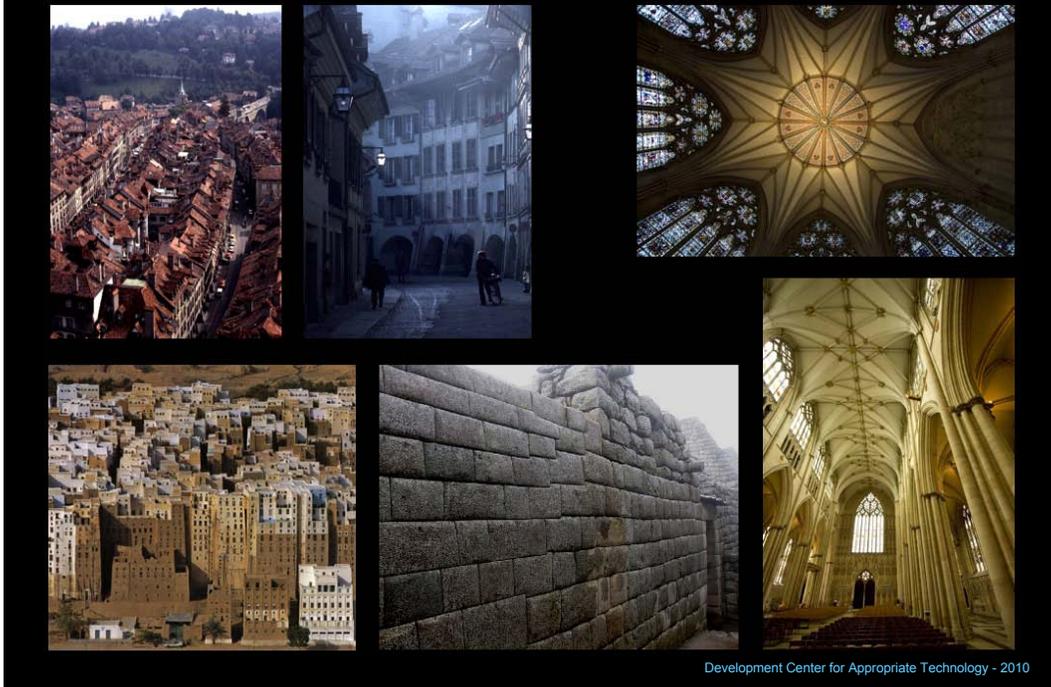


FIGURE 7a Moisture protection strategies
Unstabilized earthen walls should be protected by every means possible from rain, driving or splashing rain, snow, and other sources of moisture and erosion.

Development Center for Appropriate Technology - 2010

Martin Hammer also proposed including the newly approved ASTM (American Society for Testing and Materials - a U.S. standards development organization) standard for earthen wall systems, the result of an effort I initiated almost 10 years ago. The committee didn't ultimately approve referencing this standard in the IGCC because it isn't all written in mandatory code language but we hope to still get it included in the final version. I undertook this effort because I had been hearing that earthen building was being banned in developing countries because it was viewed as unsafe and a poverty material. At the same time, wealthy people in the U.S. and elsewhere were building beautiful buildings of adobe and rammed earth, though in many places struggling to get their buildings approved by local building authorities. Knowing that these materials and building systems were in need of incremental improvement and better design and detailing, not abandonment, and that they usually had a much smaller environmental impact and provided greater comfort and beauty as well, I started thinking about what could be done. I thought if we could create new, globally appropriate standards for earthen building in the U.S., you could take those standards anywhere in the world and say "If these are inferior, unsafe building methods, why would the United States have just created new standards for them?" For five years I served as vice-chair of the ASTM sub-committee on sustainability for buildings where I led this effort. We had to stop doing that work because of lack of funding, but it was resumed under the guidance of our colleague Bruce King of the Ecological Building Network (www.ecobuildnetwork.org) and the new standard now finalized! It is hoped that this will become an ISO standard which will make it more easily available internationally, but having this standard developed and in the world is a big step forward. This is a great example of an elegant and low-tech, sophisticated standard that could be used anywhere in the world - including the United States.

Non-Industrial ≠ Primitive

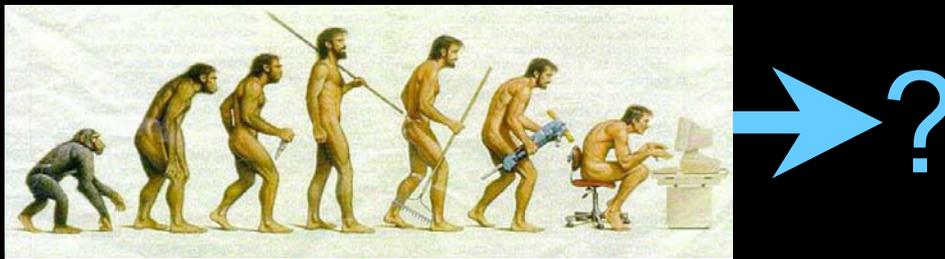


These buildings are all pre-industrial or using non-industrial materials and building systems. When I was testifying on behalf of including the earthen standard and straw bale code at the IGCC hearings I pointed out that non-industrial does not mean primitive. Martin Hammer also proposed the inclusion of the New Mexico straw clay guidelines in the IGCC, also turned down by the committee, but in my testimony on behalf of those guidelines I mentioned that I had been in buildings using those materials in France and Germany that were more than twice as old as the United States. The buildings shown here include buildings in Berne Switzerland and the Cathedral in York England which are 800 years old and have been in continuous use all this time. I often ask building officials how long they expect our modern code-approved buildings to last?

'Post-Industrial Evolution?' ...

The Industrial Revolution *has been* about increasing human productivity by replacing labor with resources and technology. With more people and fewer resources to go around why is this still a priority?

Human labor, intelligence and skill are renewable and abundant resources. They can begin to replace energy, resource and technology intensity...



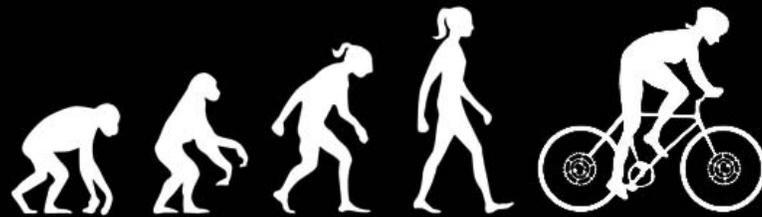
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It is important to realize that the industrial revolution has been an ongoing process increasing human productivity by replacing labor with resources and technology. Now, even though we have so many more people and fewer and fewer resources to go around, we're still racing to continue this trend. I like to point out that human labor, intelligence, skill, and creativity are renewable and abundant resources that we might view as important ways to address some of our emerging crises.

'Post-Industrial Evolution?' ...

The Industrial Revolution *has been* about increasing human productivity by replacing labor with resources and technology. With more people and fewer resources to go around why is this still a priority?

Human labor, intelligence and skill are renewable and abundant resources. They can begin to replace energy, resource and technology intensity...



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So perhaps we could begin to see appropriate technology as part of the evolutionary process going forward, not a step backward.

Rethinking Long-Standing Assumptions

Traditional, non-industrial materials & systems were abandoned mostly because of their labor intensity, not because they're inherently inferior.

Labor-intensity = jobs.

Lack of support for testing, research, and standards development for traditional materials and systems has made it more difficult to gain approval for their use.



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It's important to realize that traditional and non-industrial materials and building systems were largely rejected, not because they are inherently inferior, but because they're labor-intensive. Most of the traditional building materials and systems were being abandoned at the time modern codes and standards were developed because the newly emerging alternatives were more labor-efficient and so more profitable. So they weren't included in modern codes. Without a big industry backing research and development expenses, like for cement or steel it's been nearly impossible to bring them into codes, making it difficult to use them. The buildings in this picture are in Yemen. They are 8 to 9 story tall buildings made of earth and in some cases stone, many of which are hundreds of years old and in continuous use. Yet we imagine that such materials can't be used for larger structures.

Awareness of Consequences

Awareness of unintended consequences shifts preferences toward *local, simple, less*.

A crucial benefit of doing things locally is that the feedback loops are shorter and higher quality: the unintended consequences of what you're doing are much more obvious.



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When we realize how large, unknown and unknowable are the actual consequences of so much of what we do in modern life today, we can begin to realize that most of those consequences are unintended. Thinking about that leads toward a very different set of criteria for our decision-making. If we care about minimizing our unintended consequences, we discover a natural preference for doing things as simply as possible, as locally as possible, and doing as little as possible of those things about which we know there are serious risks, or about which our knowledge is limited. There is no more rational approach to managing risk than one based on acknowledging the known and unknown and the degree of risk associated with it. Doing things locally is increasingly important and there are many benefits for doing that - including economic and social ones and limiting energy for transportation and more. But one of the biggest benefits is that the feedback loops are much shorter and higher quality when you do things locally as opposed to a thousand miles away or the other side of the world where you will never have a clue about what is actually happening. You're much more likely to run into the unintended consequences of what you're doing if you do it where you are.

What is "Appropriate Technology"?

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

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

Ideal definition: technology that doesn't make us dependent on systems over which we have no control - thus, technologies that enhance the local capacity to meet local needs.*

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

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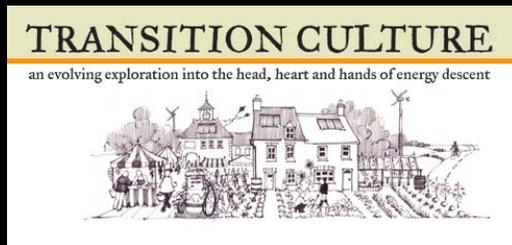
The name of my organization is the Development Center for Appropriate Technology. Many people ask what makes technology appropriate? A standard definition of appropriate technology is that it is the simplest or lowest level of technology that you can use to do well what needs to be done. In contrast 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 that is used is that higher levels of technology come with higher levels of unintended consequences and at some point the consequences are not merely unknown, they are 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.

The best definition of truly appropriate technology is that it is technology that doesn't make us or our communities dependent on systems over which we 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.

Resilience

Resilience: the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to retain essentially the same function, structure, identity and feedbacks.



How might our response to peak oil and climate change look more like a party than a protest march?

www.transitionculture.org

www.transitionculture.org/2009/10/21/resilience-thinking-an-article-for-the-latest-resurgence

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There are some excellent things happening around the world in response to many of the challenges we're facing related to climate change, peak oil and more. One is the Transition Towns movement that has been focusing on the idea of resilience - a great conceptual frame of reference for what we're trying to do. I love the slogan they use - How might our response to peak oil and climate change look more like a party than a protest march? This is part of the relocalization movement, and tied to things like local food and food security, transportation, and more.

Post Carbon Cities



The image shows a screenshot of the Post Carbon Cities website and the cover of the book "Post Carbon Cities: Planning for Energy and Climate Uncertainty". The website header includes the title "Post Carbon Cities" and the subtitle "Preparing local governments for energy and climate uncertainty". The navigation menu includes Home, Publications, Presentations, Research, Archives, and About. The main content area features a section for "Post Carbon Cities staff slideshows" with a list of presentations by Daniel Lerch and John Kaufmann. The book cover on the left shows a wind turbine and the title "Post Carbon Cities: Planning for Energy and Climate Uncertainty".

Post Carbon Cities
AN INITIATIVE OF POST CARBON INSTITUTE

Post Carbon Cities
Preparing local governments for energy and climate uncertainty

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Post Carbon Cities staff slideshows
Click below to download these slideshows by Post Carbon Cities staff. Files in .ppt format are for MS PowerPoint 2003 for PC, but can also be opened with the free, open-source OpenOffice Impress.

Daniel Lerch's slideshows
You are free to re-use materials from Daniel's slideshows, but please attribute them to us and let us know that you're using them.

- May 2009 presentation (PPT)
Detroit, Calgary
- December 2008 presentation (PPT)
Salt Lake City, Barcelona, Bilbao
- Summer 2008 presentation (PPT)
Bellingham (Wash.), Anchorage and Homer (Alaska)

John Kaufmann's slideshows
Please contact John for permission to use materials from his slideshows; some material may be non-distributable.

- 1 May 2008 "Portland Peak Oil Task Force Report" (PDF)
APA conference

If you have difficulty opening the .ppt files in MS PowerPoint 2003, you may need to download MS Office 2003 Service Pack 3. Please contact us if you need a copy of a presentation in Adobe PDF format.

= 4969 reads

Post Carbon Cities: Planning for Energy and Climate Uncertainty
A Guidebook on Peak Oil and Global Warming for Local Governments
DANIEL LERCH
POST CARBON INSTITUTE

Is your city ready for \$150+ oil?
Post Carbon Cities: Planning for Energy and Climate Uncertainty
By Daniel Lerch
The first major guidebook on peak oil for local governments. 113 pages, \$38.

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Portland eases rules for installing solar panels, wind turbines, eco-roofs, water systems
Citewire.net - Sustaining Sustainability: It Ain't Always Easy
CNN: Research Shows Walkability, Housing Choice and Transit Reduce Oil Dependence and Promote Health
Urban Resilience & Planning

www.postcarboncities.net

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This is also a great book and website and Post Carbon Cities is another excellent resource for the transitions taking place.

And for Land Use Codes RMLUI's SCDC

The Rocky Mountain Land Use Institute's (RMLUI) *Sustainable Community Development Code* is an excellent resource—a template for community flexibility in sustainability goals & policies.



<http://www.law.du.edu/index.php/rmlui>

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I also want to point out that you have here, in the region, an extraordinary resource in the person of James van Hemert, who was formerly the Executive Director of the Rocky Mountain Land Use Institute and one of the authors of this Sustainable Community Development Code - which is actually a brilliantly conceived and organized framework filled with useful information and references to best practices from everywhere. This goes beyond most of the smart growth and other land use resources and regulations I've seen. There is a huge amount of information and resources embedded in this document and I highly recommend it. It is downloadable at the url shown. I hope you all take advantage of the fact that James is now employed as a planning and development official by the city of Duncan.

Way Back When: 3 Phases to Our Codes Work

Back in 1995 we thought our efforts to create a sustainable context for building codes would involve:

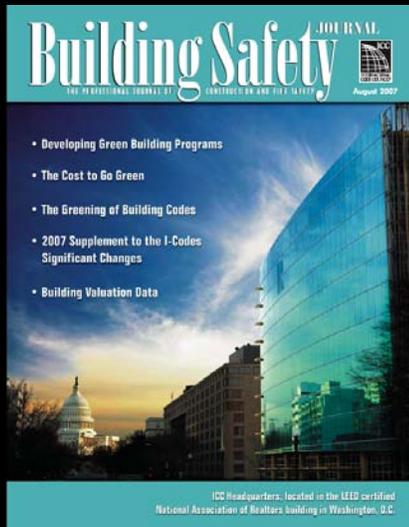
- Building Awareness about the need for change,
- Creating the Capacity for Change, and
- Transferring Leadership to the Codes Community

And we worked on those first two phases for a long time...

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So, I want to end by looking back a bit about what we've been seeing over the past few years. I've used the analogy lately about our work at DCAT in the codes arena - because it was seemingly so far out on the fringe for so long - that it's like you build your house out in the country and one day you go outside and your in the middle of town, and it isn't because you moved. Back about 15 years ago, when I started down the slippery slope into trying to create a sustainable context for building regulations, we envisioned three phases to the work. The first was awareness building - helping people in the regulatory world see that there was a real and urgent need for change. The second phase we saw as capacity building - helping the people who realized that change was needed to develop the capabilities required to enable those changes to take place. That included both people in the regulatory sphere and those affected by it and working with it. And finally - and this was my imagined escape route since I never wanted to be dealing with building codes in the first place - we hoped for a transfer of leadership, from us and the others who were working on this from the outside, to the regulators themselves, as they fully understood the issues and incorporated our concerns into their own processes and ways of thinking. We spent a long time and to a degree are still working on those first two phases.

Celebrating Our Achievements We Didn't Do



The August 2007 issue of Building Safety Journal was a watershed issue as far as DCAT is concerned.

Not because it has a cover feature on green building - we'd done those before...

This is *the first green building feature* that DCAT had NO PART in creating.

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But 2007 was a real breakthrough year for this work. We had worked with the code organizations in the U.S. writing and helping produce many articles and feature issues of their magazines focused on alternative materials, green building and the concepts of sustainability. One day in the summer of 2007, though, I had a very interesting experience. I went to the post office to get the DCAT mail and in it was this copy of Building Safety Journal, ICC's magazine. And it was a feature issue on green building. I opened it up and flipped through it and it looked pretty good. But, we had nothing to do with creating it. My first reaction was an ego reaction - "How could they do this without us?" - after all we had been intimately involved in all of their previous features like this over many years. Then it dawned on me that this was the proof of concept of the third phase of our program, transfer of leadership! What's wonderful about this is that it is one of the only times I can recall when we felt justified and willing to take credit for something we had no direct part in creating!

Some 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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A bit later that year we were given the ICC's 2007 Affiliate of the Year Award and a month later received the USGBC Leadership Award for Organizational Excellence, essentially for the same body of work bringing these two communities together.

Acknowledgment is Vital

External recognition is important and valuable, but more important is that we, ourselves stop and acknowledge our accomplishments.

There is a pattern I see in those of us doing aspirational work... We don't tend to acknowledge our accomplishments. We focus instead on the goals we failed to achieve in our projects or efforts.

Don't worry, you won't forget the gap! Remember to recognize and celebrate what you've actually achieved—it's the only way to recover and recycle the energy you've invested in your work!

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That recognition was wonderful to receive. Vital to us in many ways. But over the years another pattern emerged that took quite a while to recognize. And it is at least as important as external recognition. It is learning to stop and fully acknowledge our own accomplishments. But the pattern I saw in us I started to realize shows up in almost every person, group or organization doing aspirational work - trying to change the world for the better. The pattern is this. We get involved in projects or programs with goals that are well above where things are happening in the mainstream - those aspirational goals we care about. In the course of doing the work, however, compromises are made, things don't work out as planned, and we end up somewhere between the goals we started with and what is the norm for everyone else. And what we feel about these projects, where we tend to focus our attention, is on the gap between the goals we started with and where we ended up - we focus on the goals we didn't achieve - and so experience the projects as failures, ignoring what we actually accomplished above the norm. And this pattern tends to repeat and it keeps robbing us of the only way we can regain any of the energy we've invested in this work - which is available to us only if we stop and recognize and acknowledge and celebrate what we've achieved. And to those of you who are worried that we need to stay focused on that gap, I say don't worry, I've never met anyone doing this kind of work that can ignore the tension that exists in that gap. But I've met a huge number of people who forget to celebrate their real accomplishments.

There is more to be done...

Much of the work is out there in front of us and it is both the work on ourselves and the work with the people who don't see things the way we do.

Ultimately for me what I found was that I benefited greatly from working with people who are different from me and the way I see the world. It's changed me and it's changing them.

But when like-minded people gather, how often do you hear these words... "we're just preaching to the choir?" It might be that, but it might be choir practice...getting together to get to...

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One last bit, that I think is important to share and since this talk is in a church, it seems even more appropriate. I gave the closing keynote recently for the Colorado Straw Building Association and it was on a Sunday morning - so I got to give a little sermonette. And here's what I talked about: There is a huge amount of work yet to be done. I've found that I've benefited enormously over the years by working with people who didn't always see the world the way I do. I've spent a lot of my time over the past 15 years working out there. I also observe that it's almost inevitable when we get together with like-minded people to work on or talk about important issues, that someone will say something along the lines of, "well, we're just preaching to the choir." But my time working so much with people who were rarely mistaken for the choir at least in environmental circles, I developed a different take on this. I started thinking of those gatherings as choir practice, where we get together in order to...

Grateful for Choir Practice

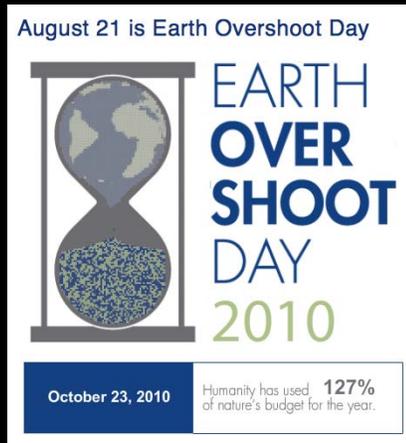
- be sure we're all singing from the same page,
- identify all the parts,
- find out who does which parts best,
- learn to harmonize our voices,
- remember the whole is greater than the sum of the parts,
- remember that we're not alone, and
- reconnect and get re-energized

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Identify all the parts, make sure we're all singing from the same page, figure out who does what parts best, learn how to harmonize our voices, remember that whole is greater than the sum of its parts, remember that we're not alone, that we're part of something bigger than ourselves, which allows us to reconnect with each other and recharge our batteries. I am grateful for choir practice!

A Scary Reality: Earth Overshoot Day

How are we going to balance THIS budget deficit?

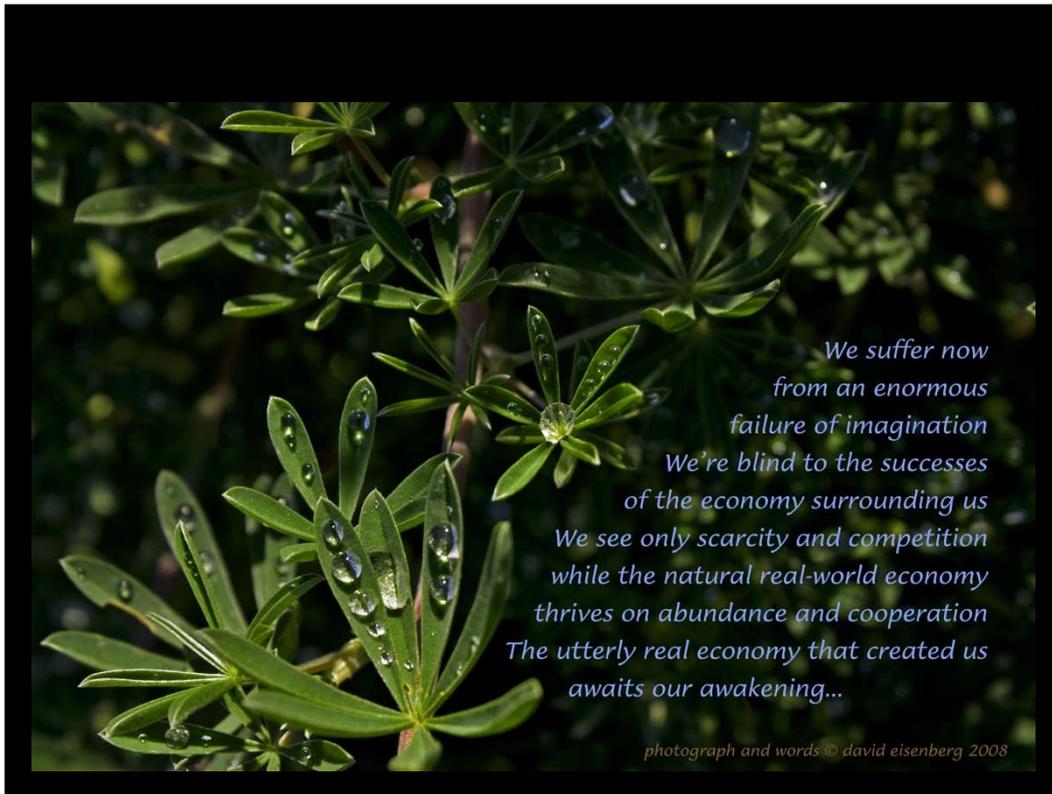


The Global Footprint Network estimates that this year, by August 21st, humans had appropriated 100% of nature's total estimated annual ecological capacity. We are eroding the Earth's ability to support us.

www.footprintnetwork.org/en/index.php/GFN/page/earth_overshoot_day

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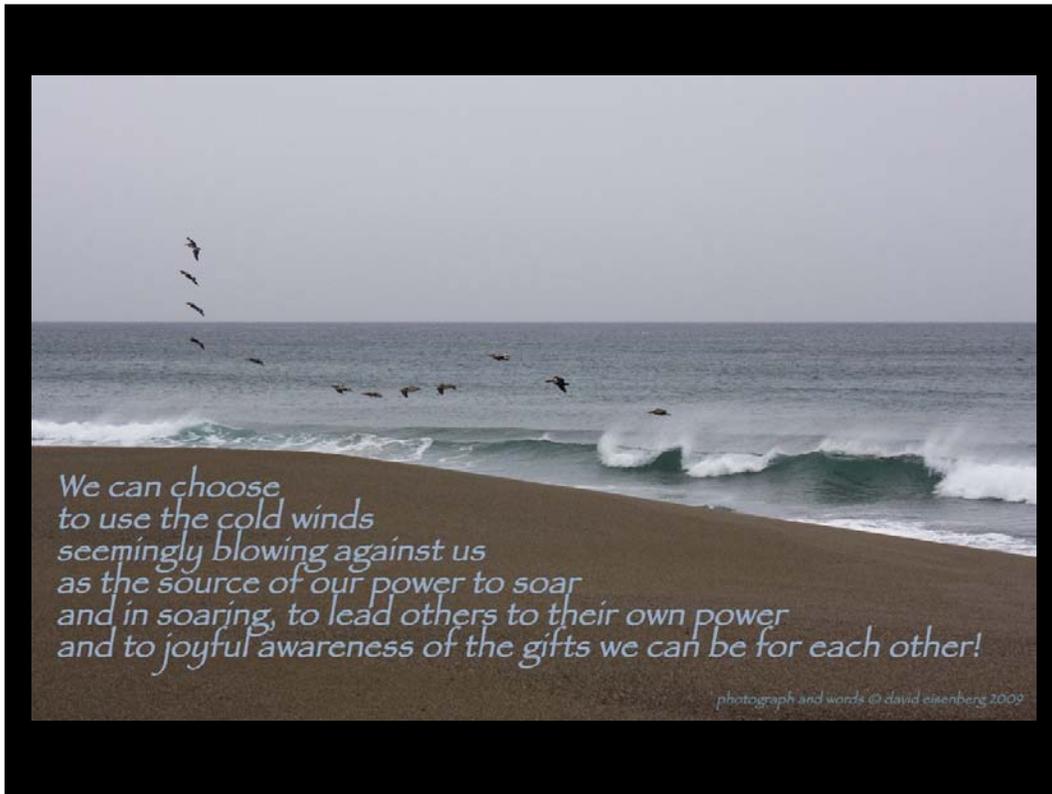
I don't want to end on a negative but wanted to share this recent tool developed by the Global Footprint Network - based on their work trying to understand ecosystem capacities and human demands on them. According to their extensive research, this year humans had used the total global ecosystem productive capacity by August 21st - Global Overshoot Day. You can go to their website for more information about how they calculate this and much more, including to see of the earth's biological systems ability to provide support for us we've used on any given day of the year. If this seems impossible to you, think about it as degrading the Earth's ability to provide clean air, water, food, fibre, etc. I share it because it can be a way to get some people to begin to look at this set of realities and take them more seriously.



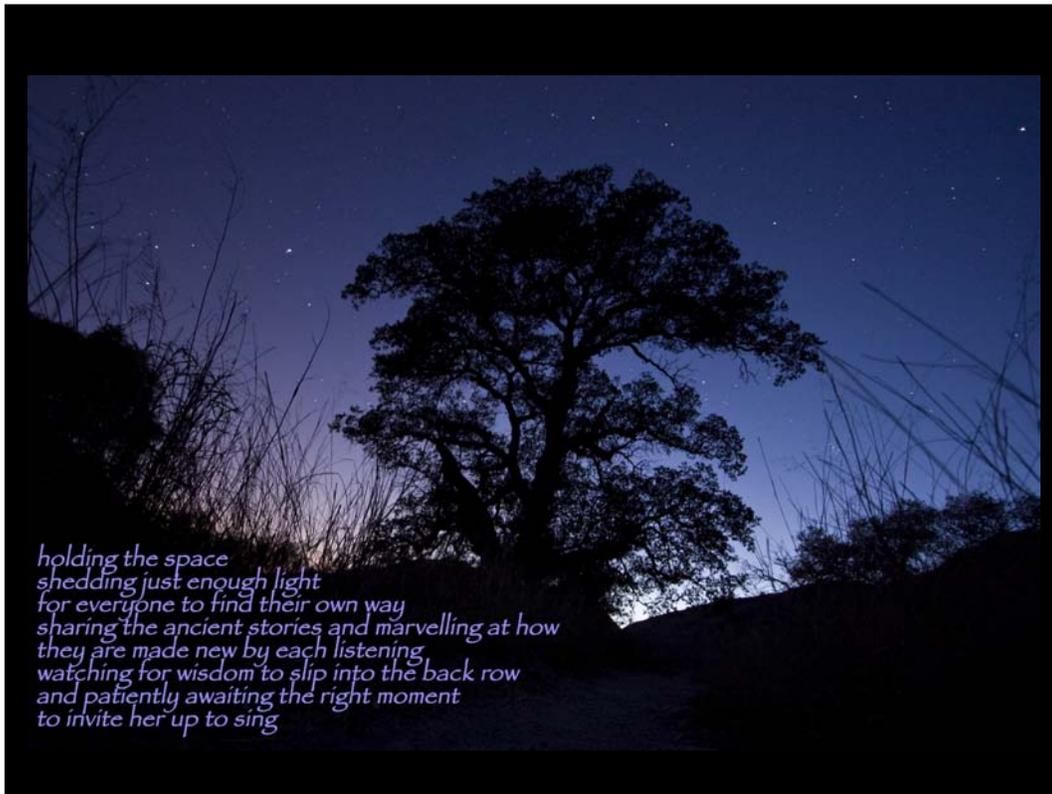
*We suffer now
from an enormous
failure of imagination
We're blind to the successes
of the economy surrounding us
We see only scarcity and competition
while the natural real-world economy
thrives on abundance and cooperation
The utterly real economy that created us
awaits our awakening...*

photograph and words © david eisenberg 2008

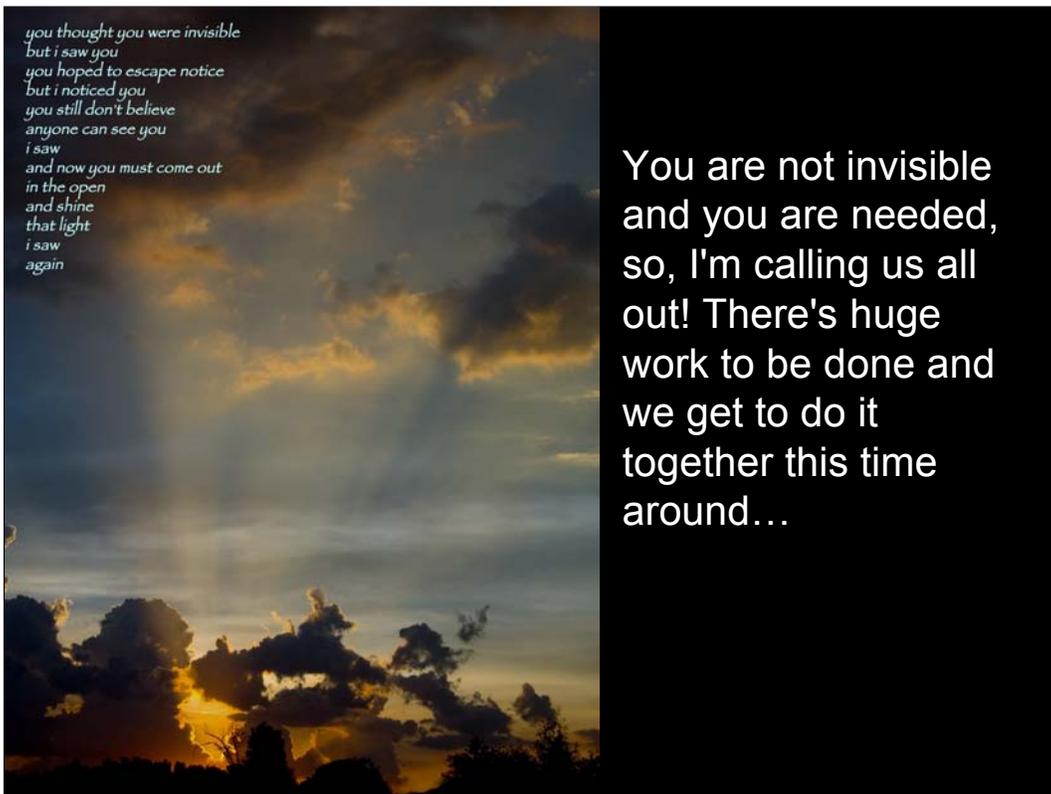
I want to share something else with you. Over the past few years I've struggled with depression and one of the things that came out of that was starting to take some of my photos and write on them. Some remarkable things came out that process and I've continued to do that over the years. I want to share just a few here now that I think are relevant to what we're doing. This one is based in my frustration at the degree to which we are trapped inside our ideas about money and debt and what it is that needs to be done. Our belief in these things - which exist only in our imaginations and our agreements seems to be stronger than our belief in the need to act to save the real natural world and our selves as a species. I hope we wake up soon.



I wrote this one for my dear friend Gail Lindsey, a brilliant green architect who contributed so much to the field including literally writing the book on design charrettes and more. About a week before she died of cancer I was so moved by her communications with the hundreds of us who were in an e-mail list of her friends and supporters as she battled her disease, that I wrote this and sent it to her. She wrote back a beautiful message thanking me. But it is so true that we can use the forces that seem to be aligned against us as the source of our power. Although I'm not a sailor, I think sailing is a perfect analogy for what we can do. Think about this - you can sail against the current and into the wind and it is those forces acting in the opposite direction of where you want to go that provide the motive force to get you there. But there is a trick to this. You have to have a much bigger mental map to do it. Because only a tiny fraction of the time will you actually be pointed toward your destination. You have to constantly tack back and forth, paying attention to what is happening above and below the waterline and where you have your sails and rudder set. But this is possible to do and it's done all the time. We need to learn to do that in the work we're doing.



I wrote this one in response to a request from my dear friend Carolyn Raffensperger, the Executive Director of the Science and Environmental Health Network (an organization worth knowing about (www.sehn.org)). Carolyn is an amazing woman who is probably the leading authority in North America on the Precautionary Principle among many other things. She wrote to me as her birthday approached this past year to request as a birthday present that I write something to her about becoming an elder. This kind of freaked me out a bit, I must admit, not quite feeling ready to be considered either an elder myself or someone who knew enough about being one to write about it. But this is what emerged.



And this one, is my way of calling you all out into the open and into the work - something I wrote a few years back -

You thought you were invisible, but I saw you. You hoped to escape notice, but I noticed you. You still don't believe that anyone can see you. I saw, and now you must come out in the open and shine that light I saw again. There is so much work to be done and so many good people with whom to do it. And we get to do it together.

And, Remember...

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



And finally, remember, the way to subvert the dominant paradigm is to have more fun than they do and make sure they know it!



Thank you!

www.dcat.net/resources/index.php

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Thank you!