



ECO-SENSE & THE CODE

EXTREME GREEN... AFFORDABLE, BEAUTIFUL, POSSIBLE

Who is Eco-Sense?

Ann & Gord

Baird



☼ What is Eco-sense?

- Normally I say “North America’s 1st legal 2 story loadbearing seismically engineered cob residence (with grid tie PV, SHW, Grey water, Composting no flush toilets, Living roof, Rainwater harvesting, wood gassification, earthen floors, natural plasters & paints... where there is no separation between the home the occupants and the encompassing ecosystem)

☼ My reality today...

- after two years of data collection on wall systems, energy, and building materials...
- and after two weeks of report writing, systems documentation and drawings, carbon calculations, and documenting policy issues...
- and TODAY, after a 6 hour audit by an independant auditor for the **USGBC / CGBC** Cascadia chapter via the International Living Building Institute (ILBI)...

Eco-Sense is a leading edge building enroute for certification to be the greenest building ever rated on the greenest rating system ever created... internationally - The Living Building Challenge



NO REST FOR THE NAIVE



OUR NEW HOME - ABOUT 6 WEEKS OF WALL BUILDING



GLOBE & MAIL



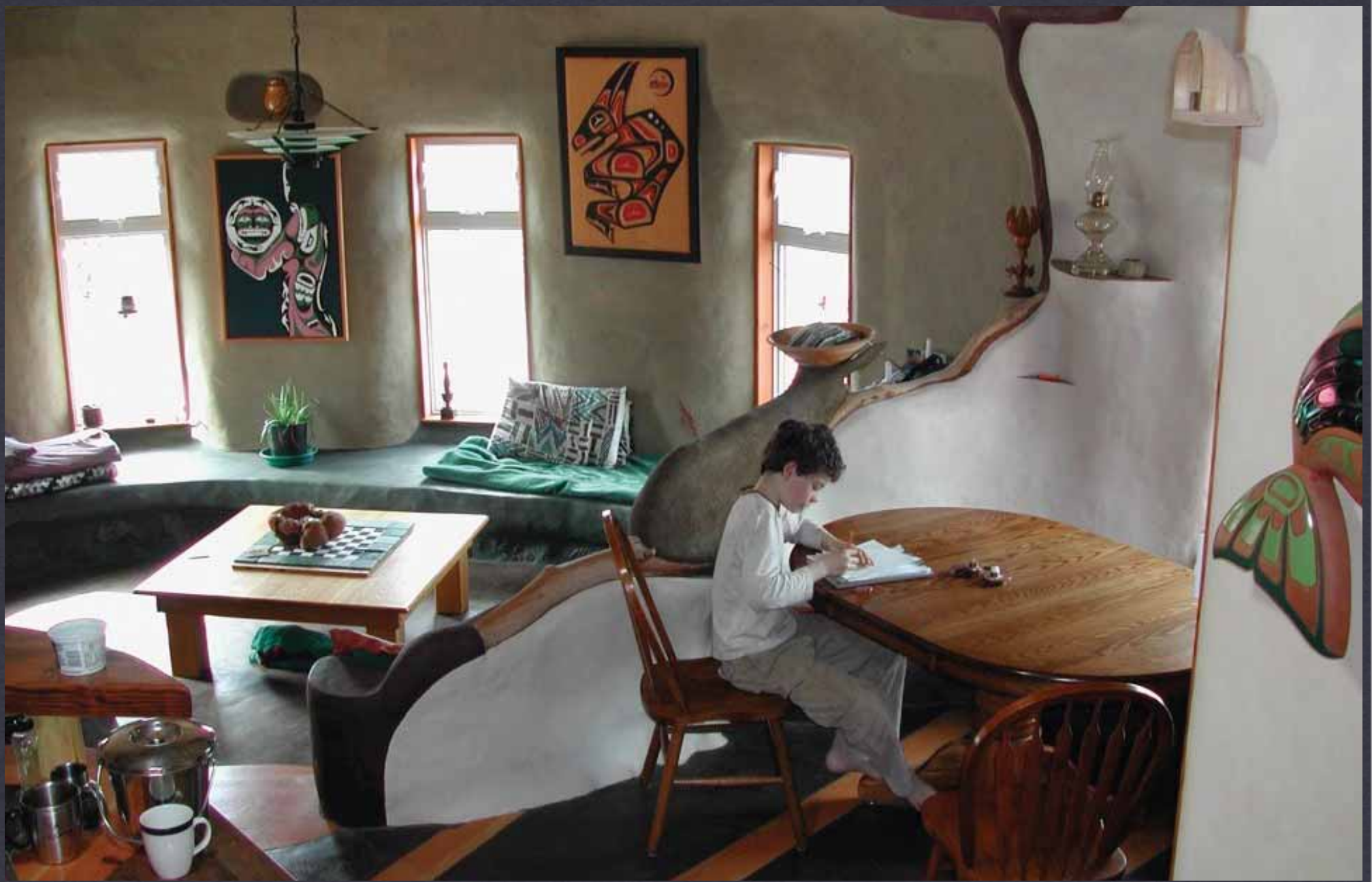
AUGUST 2009....



40% MORE EFFICIENT THAN AN R2000 HOME



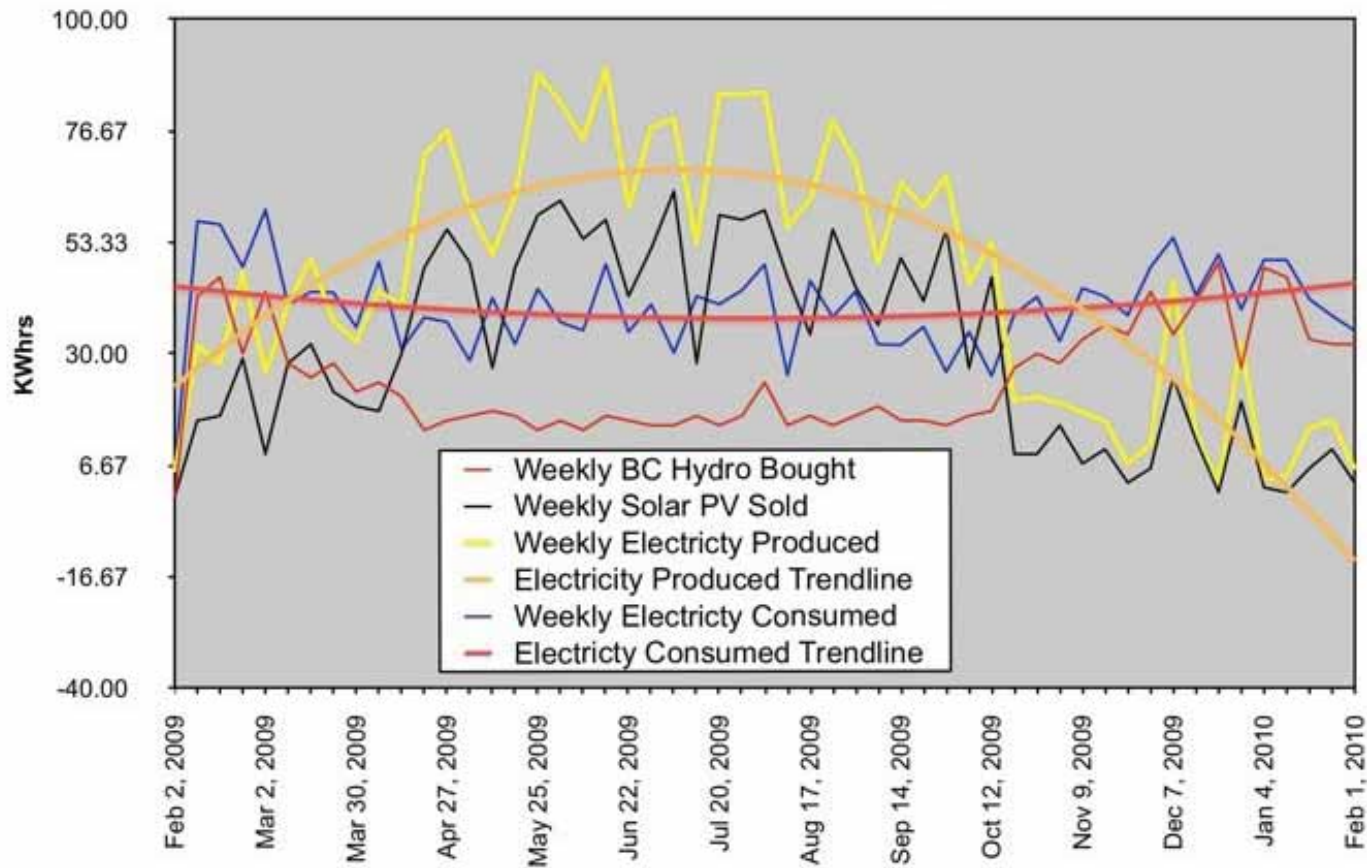
FUNCTIONALITY AND BEAUTY



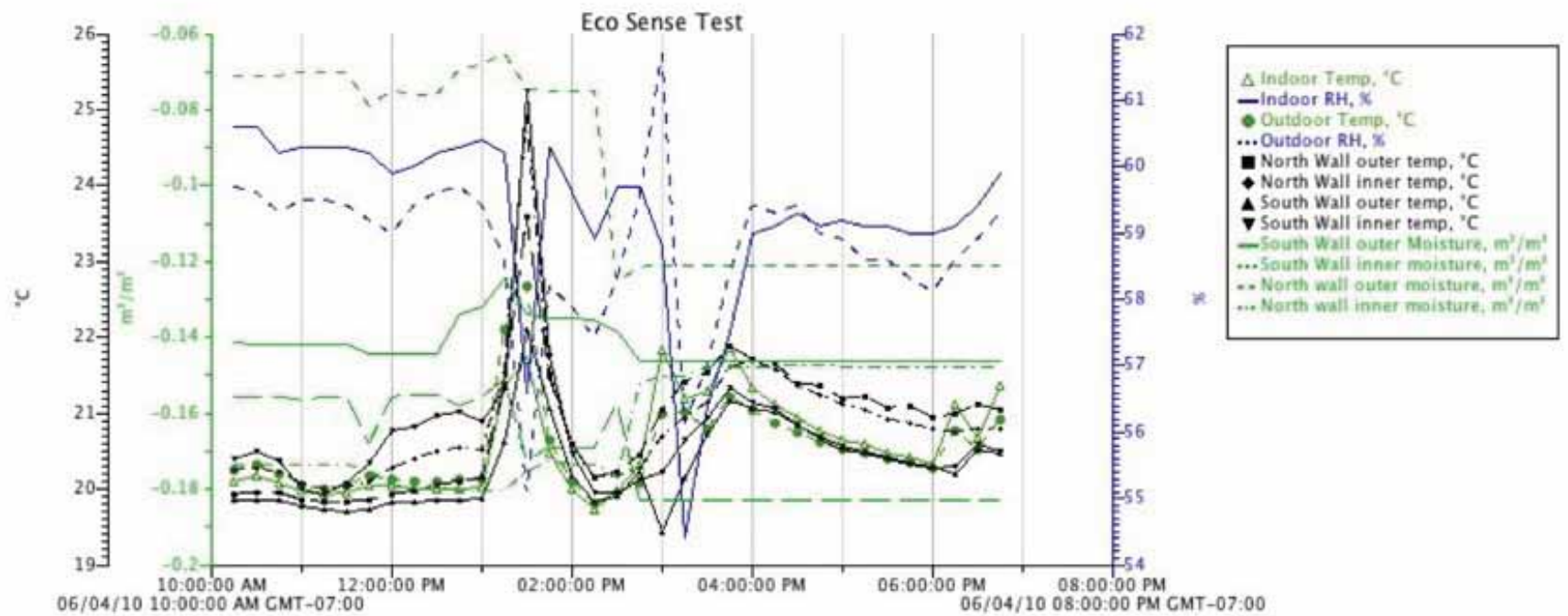
SAFE AND SECURE

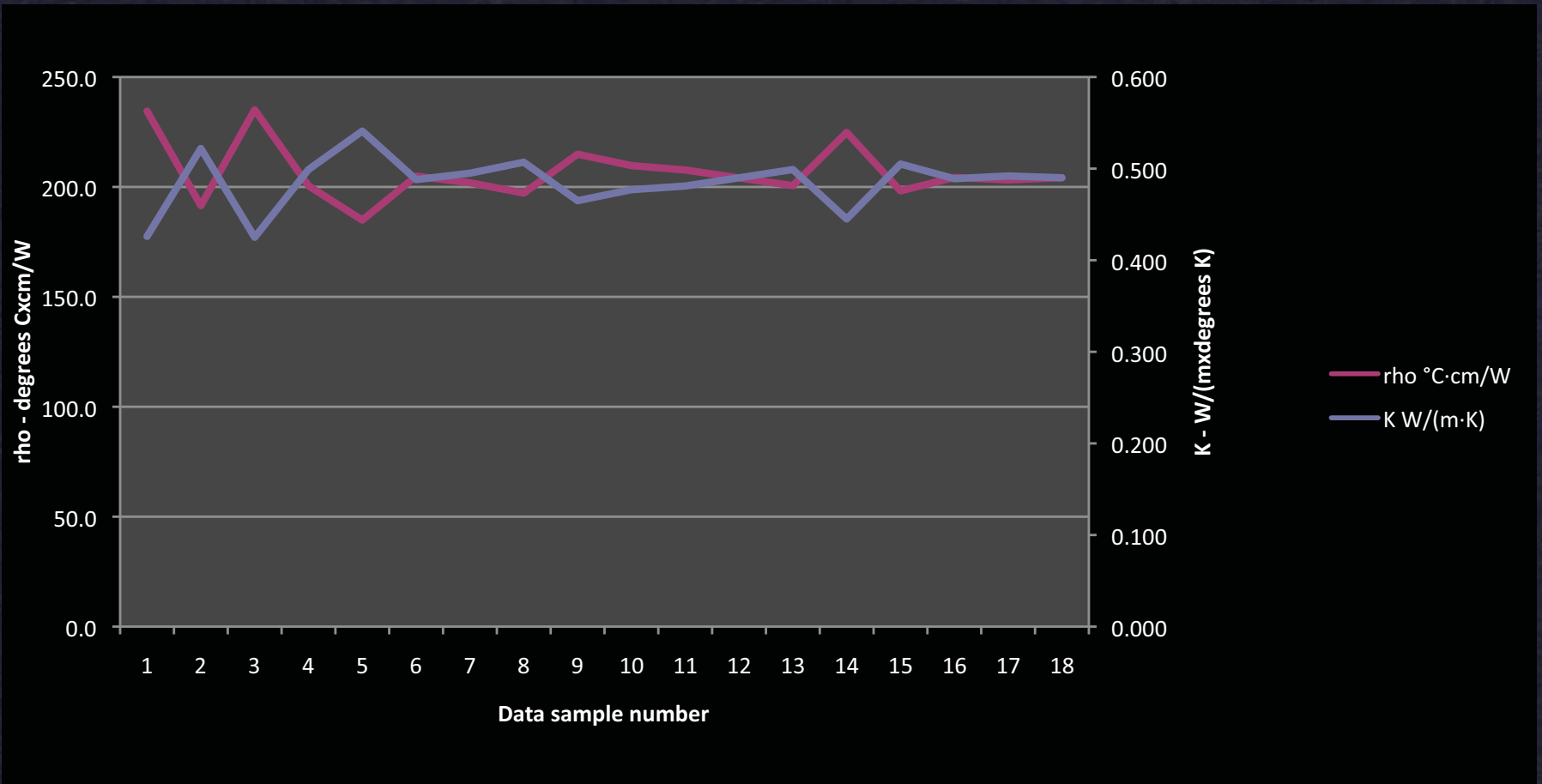


Weekly Electricity Charting



NET ZERO ELECTRICITY -- SUSTAINABLE ENERGY POLICY DEVELOPMENT







PROVIDE HANDS ON TRAINING FOR LOCAL BUILDING OFFICIAL



TEACH

Obviously its possible...

But is it affordable?

Affordability - Cob House Expenses:

2500ft² outside 2150ft² inside

Includes suite for parents – total 5 bedroom, 2 bath, 2 kitchen

<u>Section</u>	<u>Total</u>	<u>Notes</u>	<u>\$/ft2</u>	<u>% of total</u>
Infrastructure	6,572	not including septic system completion	2.63	1.8%
Foundation	7,277		2.91	2.0%
house wiring	19,576	ac and dc	7.83	5.3%
house plumbing	9,011		3.60	2.4%
structure	51,762	includes \$3729 for 42 yards of pumice	20.70	14.0%
finishing	44,584	includes \$14,932 for appliances	17.83	12.0%
living roof	12,994	a bit more to come	5.20	3.5%
Communications	1,464	running wires for phone/internet/ etc	0.59	0.4%
Solar Electrical	45,016	Includes grid intertie	18.01	12.1%
Heating and hot water	34,778	Hydronic heating, tubes, boiler, etc	13.91	9.4%
Water system	11,714	storage tanks, pumps, irrigation, etc	4.69	3.2%
Professional	9,712	Engineer, CAD plans, permits, HPO	3.88	2.6%
Hired Labour	14,575		5.83	3.9%
Our Labour	<u>101,600</u>	20 months	<u>40.64</u>	<u>27.4%</u>
TOTALS	370,635		148.25	100.0%

Our Culture/Society is making
Critical (and increasingly RISKY)
Assumptions

1. of a stable and predictable climate
2. that we have an adequate & affordable supplies of energy, water and food, and other critical resources
3. that the natural systems on Earth are robust enough to withstand whatever Humans may choose to do
4. and that current regulatory systems are adequate and sufficiently integrated to deal with emerging risks.

A few Questions

- Are we paying enough attention to comparative risks... or cumulative harm, recognizing that we are impacting on global and ecological system limits? On regulatory system limits?
- Can our regulatory framework respond to new and emerging risks in comprehensive, timely and appropriate ways?
- Can these frameworks enable positive change... or just respond to negative outcomes?

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.

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.

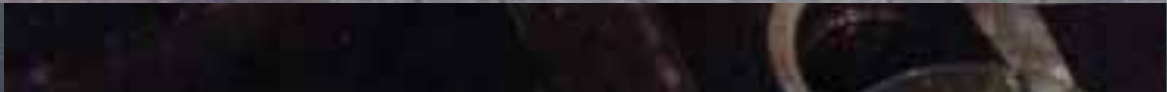


The Current Situation...

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...

The Rear View Mirror



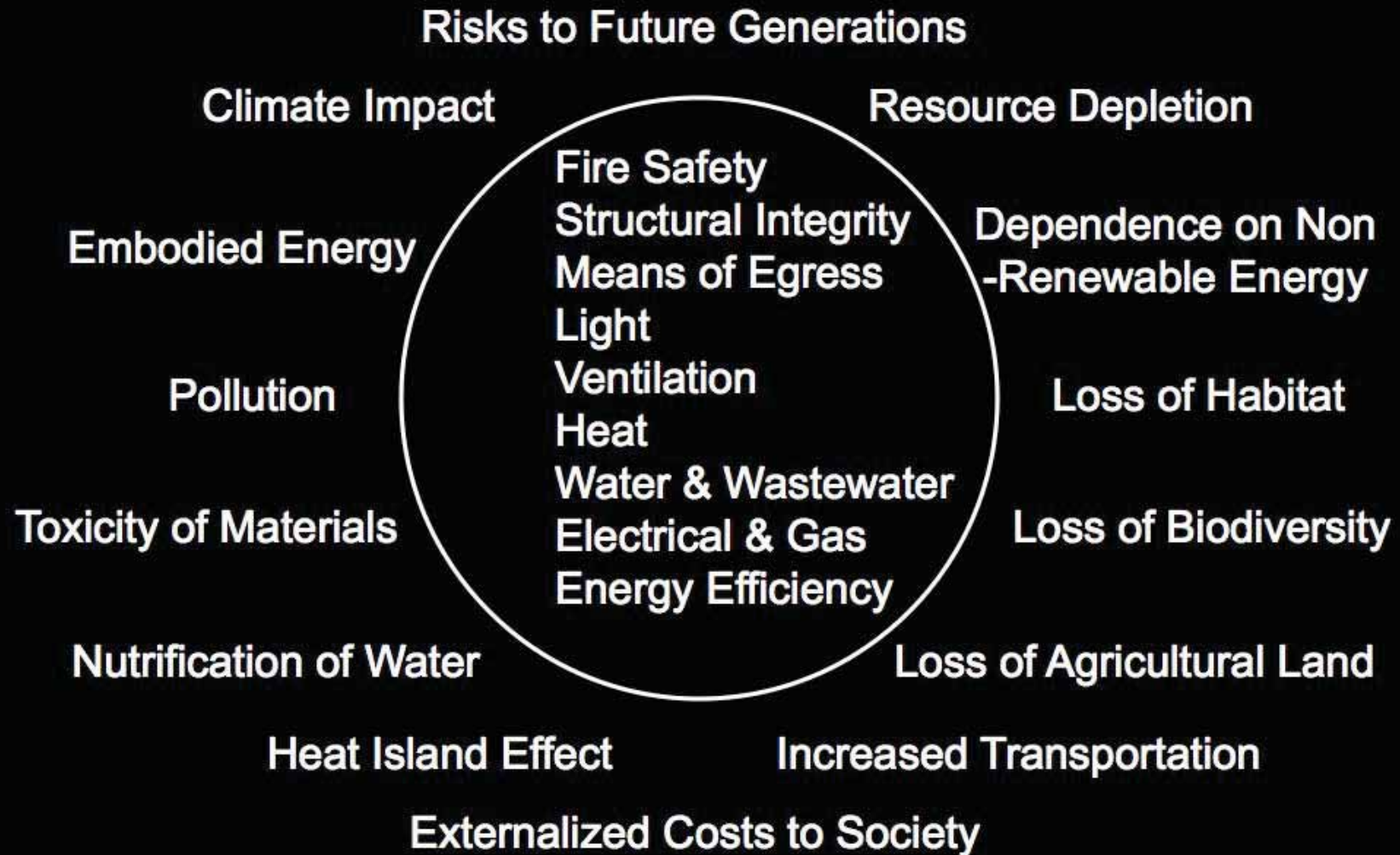


Risk - Through the Microscope of Codes...



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

Risk - The Bigger Picture...



A Regulatory System

A good first principle would be a kind of Hippocratic corollary — *that buildings first do no harm* (balanced over their whole lifecycle).

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

The ultimate goal would be a system designed to enable positive outcomes as well as preventing negative ones.



Barriers... homeowner's role

- Perception that the Inspector is the adversary...
- Lack of willingness of builder/homeowner to understand intent of the code...
- Understanding the role/job of the inspector... their job is protect future owners... **not the future... Their obligations are set by the regulations, narrow definitions, job descriptions, and their role to protect the district they represent -- they have no mandate to protect the environment, nor future generations. BUT This doesn't make them bad!**
-

Barriers...The Regulatory system

- Protect from immediate dangers to the occupants... not long term dangers caused from the built environment...
 - eg. water systems, climate change, toxic chemicals
- Risk Management Policy of the district - Risk adverse <====> Flexible
- CSA - certification process... controlled by industry -- impairs certification of new competing technologies. (Eg. Solar Hot Water).
- Code is based on prior failures, thus by its nature does not recognize new systems readily...
- Because code is reactionary... it sets minimum standards... it is not the “Best Practice” or Ideal Solution
- Lack of education/interest on alternative building systems on behalf of the inspectors

Where to start: BC Building & Safety Policy Branch

- Equivalencies are out! Functions and objectives are in.
- Alternate solutions are not required to be written by an engineer... they should be judged on the merit of the solution
- Prescriptive requirements will be phased out in replacement of meeting the intent of the code.
- Much of the code in the past has been greatly swayed by industry lobby... if a material is incorporated it assures sales.
- Mandate of the BC BS Policy branch comes from Government... They are interested in having their mandate expanded to encompass environmental responsibility... they just need to have Government tell them so.

Other Players in Barriers

- Home Warranty Suppliers...
- BC Hydro administration of net metering program
- BC Assessment Authority - evaluation of SE systems, Thickness of the walls,
- District initiatives:
 - The Net Zero Zone
 - Flush Toilet Ready

How did Eco-Sense do it?

- Began to read the code... **learned the language**
- **Listened** to the inspectors... and **asked** what they needed
- Demonstrated **intelligent problem solving** thus gaining the confidence of the inspector
- Wrote well documented **Alternative Solutions**:
 - Combination Solar Hot Water
 - Waterless no-flush composting toilets
 - Hydraulic Fixture units for grey water system
- Created **buy-in** of the inspector through incorporating ideas of the inspector
- Gave credit where it was due
- Chose our battles
- Chose a well respected engineer - had the engineer and inspector become engaged in initial communications before the start of the project.

What Inspectors should be encouraged to do

- Have a **dedicated inspector** for the duration of the project.
- **Listen** & realize that someone is building GREEN not because they are flakey... **but** because **they care** about the safety of their family, the environment and future generations
 - Eg. Composting toilet - Not because the homeowner has an fascination with shit... Maybe they care about groundwater, fertilizer... or aversion to present municipal disposal systems
- **Vision**... look beyond the microscope... what makes sense in the big picture
- **Networking** - as most building officials often are not trained or experienced in the innovative designs, technologies, materials or systems they are asked to review and approve...

... link up with other officials that have experience in the method/system being proposed. Regional specialists!
- Nothing is **BLACK** and **WHITE**

Resources

- ASRi - Alternative Solutions Resource initiative
 - Soon to be found at ASRI.ca
- DCAT - Development Centre for Appropriate Technology
 - David Eisenberg - Victoria, October 26 2010
 - more details by email gord@eco-sense.ca
- IgCC - International Green Construction Code
- Technical & Trade chairs at Camosun College

www.eco-sense.ca

- **Policy Papers - Barriers, Solutions, Research:** www.ecosenseliving.wordpress.com
- **Research**
- **Living Building Challenge:** First completed and registered Living Building project.
- **Tours:** (private, professional groups, school, and public)
- **Consulting:**
 - system design and integration
 - project planning, networking with others, and costing
 - Assist individuals at all levels of their building process to enable them to build mostly themselves.
 - Writing alternative solutions
- **Building:** foundations, wall building, living roofs, water systems, earthen finishing, framing, custom cabinetry, hydronic heating, etc.
- **Teaching and Education:** workshops and courses (watch website for details); lots of media attention.
- **Policy and code work:** community volunteer work; assist individuals writing alternative solution to meet the function and statements of the BCBC
- **Presentations:** virtual Eco-Sense tours, solar PV, system integration, etc