

“BEYOND SUSTAINABILITY: THE SPECTRUM OF ECOLOGICAL DESIGN”
(An overview of approaches, an exploration of some meanings and possible applications)

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INTRODUCTION

There seems to be a growing number of conservation related design ideas out there. This is all to the good! It means that a host of creative environmentally sound development approaches are being actively investigated and promoted. It means that the environmental community is responding to today's challenges and conditions. But with an explosion of new ideas also comes confusion about pivotal terms.

Therefore we would like to, in a very tentative way, explore, examine and hopefully clarify a range of meanings that pertain mostly to the built environment. Many of these meanings shade into each other. Here, however, we would like to stress the signal leap in perspective from sustainability notions (e.g., using limited resources efficiently) to what we believe constitutes a major change: integral ecological design (building with all subsystems contributing to, if not generating, energy). We would like to open an ongoing conversation that focuses on recent approaches to alternative design concepts as a vital new dimension of environmental review and conservation assessment.

We would like to:

- list some old and new approaches to ecological design
- explore their family resemblances and differences
- suggest some possible practical applications of these ideas
- note a paradigm change in the field of conservation -- from the regulation and/or mitigation of inevitably negative environmental impacts to designing all structures as energy enhancing and/or productive and eco-sensitive
- note how the role of alternative design in development in reshaping the built environment complements the traditional conservation emphasis on preservation and protection...
- underscore the distinction between efficiency/sustainability approaches and those that are 'integrally ecological' -- the former hinging on strictly observing limits and maintainability, the latter on healthy growth, creativity and evolution...
- celebrate conservation-minded people as indispensable civic leaders on all levels by tapping into a rising fount of new ecological design/development ideas, wisely and eagerly embracing the best of advanced technology...
- sound the alarm on how utterly crucial clean energy ideas are in the enormously important 2008 American presidential campaign... no matter who wins!

PARADIGM SHIFT

Consider the dark cloud and global dislocations stemming from accelerating out-of-control climate warming as a backdrop to five or six very plausible world scenarios:

1. Crash, widespread societal collapse, violent fragmentations of civic order...
2. Transnational corporate commercial hegemony coupled with habitual mass consumption patterns -- with the planet as an afterthought...
3. Hyper-technology evolution -- being lead by the frenzy of our products and creations; the powered up hyper-environment of the technosphere (genetic, cyber-, nano- space and biotech); arresting alterations that will affect the very nature of our human nature...
4. Planetary enlightenment -- yummm! The millennium of perfect respect for nature, renewed and luminous planetary wide infrastructures and technologies, enlightened collective consciousness and a caring stewardship spanning generations to come...
5. Dramatic realism: the dynamic world of tension that always keeps us off balance and requires choice, a world that always hangs in the balance and a world in which our vision, preoccupations, and practices powerfully accentuate realities... Be careful what you pray for! You can have it any way you want -- and you actually do! We are already creating a variety of utopias, dangerous entropies and oases of salvation as we speak...

What might a sixth "good growth" -- a non-crash, non-degradation, healing scenario -- look like?

Is there such a thing as genuinely good, sometimes avowedly intensive, development that contributes to the overall health of the planet rather than merely multiplies egregiously ugly, wasteful and unsustainable patterns? How might the conscious cultivation of clean energy technologies catalyze mature democracy and planetary awareness -- combining fruitful decentralization with organic integration? How might the range of true individuality and the aspiration to true community converge in surprising ways?

Conservation has been for decades embodied an essentially negative narrative about loss and limits, with accent on catastrophic scenarios, frustration, resignation and despair. Now conservation is developing into a powerful story of hope and possibility, about human creativity and innovation in working with and being inspired by nature. The meaning of conservation is on its way from basically a rear-guard and perpetually losing battle, the all-but-impossible regulation of assumed negative impacts, to conservation as a path of innovation championing a creative, life-affirming vision. A new way of looking at the universe, one that sees it not only as living, but as evolving in the direction of more intense and greater life. The environmental community is becoming a fount of positive ideas and recommendations, pointing the way to healthy and ecologically sound planning and economic development along with essential and important preservation efforts. The shift is from conservation as a self-denying and largely regulatory ethic to conservation as promoting creative and innovative ideas for optimal and truly human growth. The full expression of vibrant energy, rather than limitation to vanishing impact, should be our

standard and banner. The earth should be proud of superlative, well-crafted, harmonious and thoughtful human impact! We need to be kind to all creatures, including ourselves.

Take air travel as an illustration. The effect of conservation should not only not mean the curtailing of global travel and movement but rather its increase instead – for pleasure, business, education, friendship and in-depth visitation... Rather than stringently cutting necessary human contact, circulation, communication and enjoyment in this mode, we need to be vastly inventive concerning new fuels, vehicles and forms of alighting and flight. The answer to current extravagance has to be more than a diet of crippling asceticism. If anything, we need more human interaction and travel, not less.

In their 2000 book, *The Cultural Creatives*, Paul Ray and Ruth Anderson report that the environmental movement has been converging with wider social, cultural and spiritual movements. As Paul Hawken points out in his 2007 book *Blessed Unrest*, the environmental movement is necessarily becoming part of the movement for social and political justice. The earth can't be secure unless all the people on the planet are. Like it or not, poverty, housing, education, corporate malfeasance, political repression, overpopulation, war, the need for all to have the opportunity of productive work, are all deeply environmental issues. No escaping it. As Nordhaus and Shellenberger point out in their 2007 book, *Break Through*, that instead of being a merely litany of complaints, the environmental movement needs a positive vision, one that goes beyond simple sustainability, a vision of positive growth and change to galvanize the body politic.

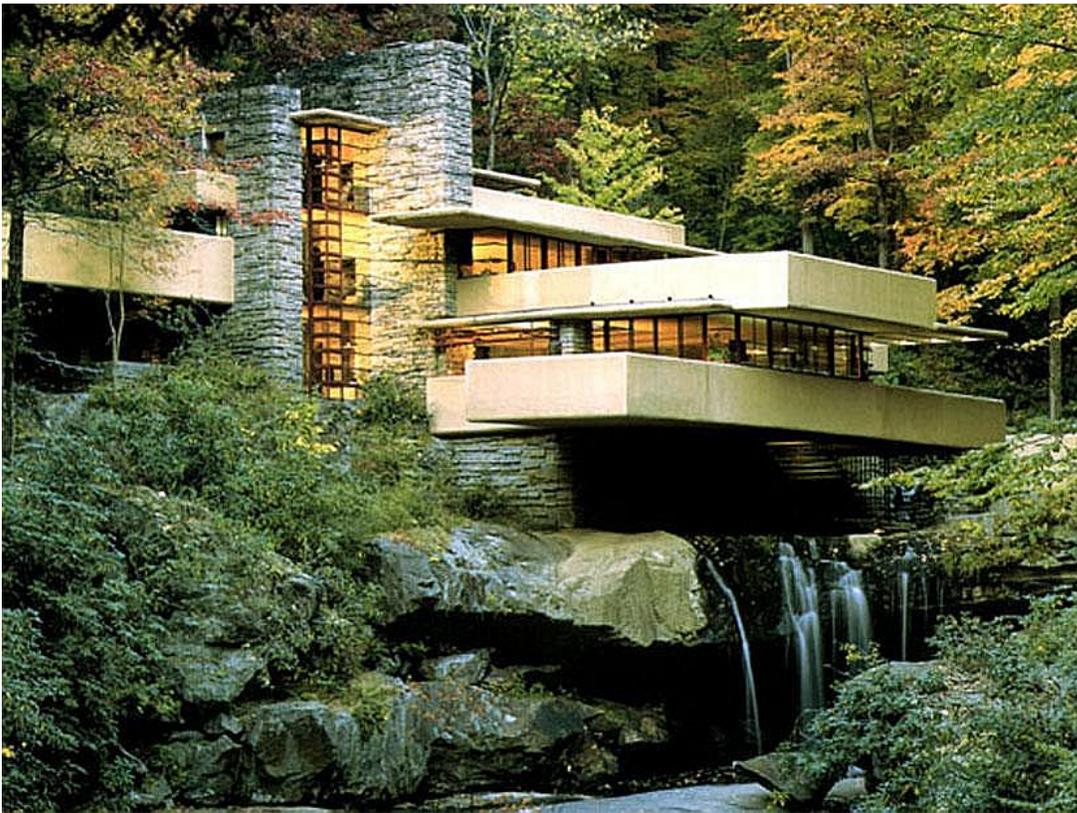
Rather than fight a series of running and losing battles that are all about regulatory compliance, we would suggest that the way to ensure sustainability is to go beyond the sustainability ethos. If we just shoot for a passing grade in our built environment, we will often get failures, often sadly systemic ones. If we shoot for 150%, we will get some interesting results and perhaps some new and exciting directions.

How might some of these new ways of thinking revolutionize the way we approach the built environment?

What are some of the shapes ecological design takes -- principles, approaches, and varied zones of application?

What does the extended family of ecological design look like?

KINDS OF ECOLOGICAL DESIGN



Fallingwater / Frank Lloyd Wright, 1937

(I) “Environmentally Friendly” Design

Quote: “Design with Nature!”

Idea: a diffuse, fuzzy, almost instinctive way – and yet occasionally a style conscious avant-garde way -- of designing with “natural” surroundings in mind, creating a sound or deeply harmonious fit between a structure and its outer environment as a backdrop; designing a building to blend almost seamlessly in with its given, “natural environs”... the responsibility of the structure to ‘fit in’ aesthetically with Nature -- and ideally, with appearances having minimal impact on immediate surroundings...

Possible Applications: We do it all the time; we can’t not do it. Our houses, besides our bodies, are our aboriginal art forms. We invariably and unconsciously mimic nature as we create our habitats and shape our tools... All dwellings and structures are extensions of caves, ledges, and tree canopies... We like to blend in with our surroundings, and elegantly if possible... As creatures, one of Nature’s species, we are inventive and have an innate sense of what harmony looks and feels like... Aesthetic qualities like a sense of space, quietude, fittingness and homogeneity of materials with a given setting... Nature is balance and symmetry, but variation, departure from the norm as well.

We come from nesting instincts and animal feelings of warmth, enjoyment and interest/curiosity, as well as from the desire to make, ingeniously build and construct... We have camouflage and protective motivations, but we also enjoy the intricacy and simplicity of good design... Nature is rife with such examples. We appreciate deeper resonances... Biomimicry is the beginning of style... We enjoy doing things well, creating things that simultaneously blend in and stand out... It is natural to create. And such human capacities make untenable any absolute division between the natural and the artificial... Our building metaphors start with Nature. Nature and humankind evolve in tandem. We get a kick when we ‘design with nature.’ For all our daring and adventures, we know this. It’s not a matter of designing with nature or not – but of how well.

Reference: *Design With Nature* by Ian L. McHarg – the classic



(II) “Conservation Efficiency”

Quote: “Replace that energy hog refrigerator!”

Idea: harkening to inevitable constraints and limits...doing more with less, economy of means... conservation as limitation, cost-efficiency, low usage and impact, lower consumption of mass-produced goods, etc. ... Such goals are consistent with the aim of “sustainability”— not ‘using up’ inherently limited or scarce natural resources faster than our ability to replace or replenish them...

Conservation efficiency mainly focuses on the appliance environment: light bulbs etc. Use less energy, be frugal, tighten your belt, consume less, recycle and/or consume wisely; household and appliance energy efficiency: lower adequacies, substitutions and draw; household energy audits and monitoring... Monitor your computer usage and recycling... turn down that thermostat, put on that cardigan sweater, eat locally, shop less, purge your stuff, be abstemious, restrict your effect/footprint...

In terms of the built environment generally: the properly maintained and efficient functioning of all parts of a home, business or industrial facility – from lighting and insulation to heating and cooling, use energy star appliances, materials and ratings; purchase of hybrid cars, low-emission, high gas mileage vehicles, etc.

Possible Application: consistent use of domestic and commercial energy star features and appliances... application of LEED (Leadership in Energy and Environmental Design) criteria in building construction generally...

References: innumerable websites online under “green building”...



(III) Personal Ecological Design

Quotes: “In the beginner’s mind there are many possibilities, but in the expert’s there are few.” (Shunryu Suzuki) “Look at the almond tree in your front yard.” (Thich Nhat Hanh)

Personal Ecological Design: of course there is no such thing! We are spiritual kindergarteners learning vital things each day, watching the infinite unfold in startling moments of blessedness and understanding... We find ourselves on a steep learning curve that is frustratingly flat and bewildering – even retrograde -- at times. If we are alive, we are constantly gestating, flashing merely our ticket of admission at birth...

We shape ourselves as we walk a slow and determined, persistent, supremely low-tech and attitudinal path, intimate to the core, carrying and modifying worldview realizations and correspondingly subtle yet comprehensive behavioral changes... Because we don't know, we require deep and ongoing personal grounding and spiritual practice. We subsist in the midst of that strange mandala of complementary and polar opposites, e.g., the paradoxical connections between ultra low-tech and ultra high-tech, the terribly simple and the enormously complex, raw individuality and authentically being in community, the center that is close at hand and as it lies beyond the farthest horizon... As we discover the cosmos living on all scales, we learn to treat things and creatures with the reverence they deserve. All is sacred... Architecture, eating, personal gear, the whole realm of 'home economics' (Wendell Berry), work, play and enjoyment, all manner of relationships -- all forms of holy energy... We learn to manifest the truths of ecological awareness in our own lives... discovering how each particular thing can become a vehicle of transcendence... realizing that one is limited yet playing – consciously or not - an “infinite game” (James Carse) on behalf of all life... No choice, but amazing choices!

Some kindred dimensions and meanings:

- Materiality: nothing is utterly inert, passive, useless, absolutely other; personal taste, talents, preferences and style as the true stuff of life; all artifacts tending toward art; houses, for example, as art works, expressive shrines always evolving... dwelling being first of all a phenomenon of consciousness... we live by eco-location, pulses, soundings that tell us who, what and where we are... the environment as guru (Br. David Steindl-Rast)
- Spirituality: personal, meditative/contemplative/religious understanding; the practice of awareness and the growing circle of compassion
- Social/Political: Paul Hawken – the environmental movement converging with an ongoing revolution in social justice and human rights; new possibilities for more authentic and integral community; a growing movement for planetary justice and universal human rights – population, food, work, dignity, forging truly human corporations as part of genuine biological stewardship...
- Cultural: inspired by and working in partnership with other cultures, indigenous, contemporary, and yet to be born, and species on a planetary plane (see D. Haraway, *Companion Species Manifesto*)
- Personal rhythms, habits and attitudes: hygiene, clothing, eating/food, buying/consumption, entertainment/recreation, reverence for shelter, rest/recharging, work/employment, maintenance/repair, the whole range of intimate gear and sense of required space...

Possible Applications: consciously attending to gear, attitudes, habits, and consumption patterns: a meditative “middle way” between self-denial and mindless self-indulgence... all manner of creative personal decisions can find root here, from gardening to type of home improvement to the profile of financial investments...

Gear, gizmos, tools, clothing, cars, and style!... possibilities of a new and highly desirable aesthetic... the fen shui of things: discriminating between and among gleam, glitz and glamour, and a different kind of radiance... religiously and creatively experimenting with the ethic of non-violence... Suppose there were ultimately no distinction between the spiritual and the material, what then?

What am I doing in my life and household? What should be taking place in my life, what should be unfolding in my spirit? Isn't it wonderful that we can't predict the next step in our personal revolution? – which is at the same time the next step in the revolution/evolution of our immediate personal environment!

Here's where it becomes intensely interesting, as the daily becomes increasingly the site and locus of spiritual practice.

There really can be no specific recommendations in this realm of the personal! Repeat, there can be no prescriptions, no recommendations in the realm of the personal. The personal X, the silent personal decision is fundamentally all a matter of experimentation and discovery known only to oneself... Your immediate challenge is not mine, my immediate challenge is not yours. And that's wonderful! How precise, how exact! Only keen and intimate awareness, unattached openness, a moment to moment mindfulness, an unstinting creativity, resolute honesty or silent prayerfulness (call it what you want) reveals what constitutes the imperative of our next step. Only a quiet peaceful and loving attentiveness helps us to see what should come next in our lives... What we call aesthetics or ethics are but surface manifestations of our hunger for harmony, unity and joy... Why should the greatest adventure of life be thought of as dull and dutiful? Why have we made it so? Why is it embarrassing to realize that we learn truly vital things, essential things, every day? Religion is the art of continually finding "the one thing necessary"... And, by extension, asking what is the contribution only you can make? In every moment. Circumstances are both secret and utterly plain. What is the understanding that unlocks what we can give? How can we realize our participation in an intrinsic and overflowing abundance?

Growth as outer expansion morphs into the path of inner development...

References: Wendell Berry, *Home Economics; Sex, Economy, Freedom & Community*
Thich Nhat Hanh, *The Miracle of Mindfulness; Peace Is Every Step*
Jon Kabat-Zinn, *Wherever You Go, There You Are*
Matthew Fox, *Original Blessing*



(IV) “Conservation Development”

Quote: “rural by design” (Randall Arendt)

Idea: basic idea: configuring the built environment around a natural feature, like a field, pond or stand of trees; taking a systematic inventory of environmentally significant sites or resources and/or community valued features; community surveys or audits as an integral part of town comprehensive plans and town conservation inventories: a town goes on record articulating its values and priorities in the matter of what is worth preserving and where and how growth is to be encouraged, all the while taking natural and community valued assets into account as the first step in the planning process... If something is lost to development, then townspeople should know what was at stake. Likewise, if something is gained! If town perceptions and perspectives are explicitly recognized in the early part of the planning process, then residential and/or commercial growth can be configured around precious natural resources and culturally and/or recreationally defined values and qualities...

Possible Applications

How to use a town comprehensive plan in a review...

1. Note what the town has explicitly gone on record about, specifically enumerated goals and priorities, indicating what and how it wants to grow, what it wants to encourage as a part of its vision of a healthy future, and what it wishes to discourage as undermining that consensually agreed on vision...

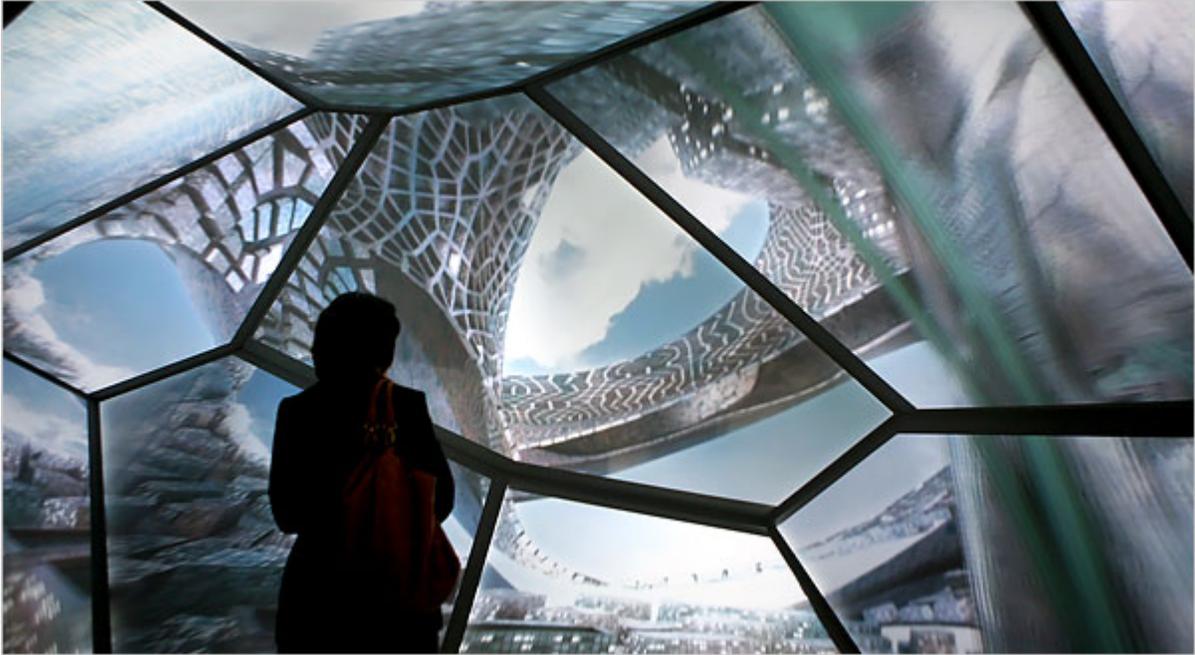
How to use a town conservation inventory in a review...

1. Do an inventory beforehand and have one on hand as a reference tool and/or mapping that clearly shows places, areas, resources, and especially community valued features that your town has listed (e.g. in relation to currently undeveloped spaces or recorded plots of land) and as applied to the area surrounding a given proposal... Know what's there!
2. Be very explicit as to why and how a given piece of land (or other natural or community feature) is environmentally significant, i.e., spell out the specific criteria or parameters which list valuable aspects (e.g., lot such and such or area such and such as containing an important aquifer or viewscape or species of plant life)
3. Based on such explicit criteria, graphically show in a review why the town should try to either (a) preserve such a piece of land because of its noted outstanding qualities, or (b) if it is to be developed, show, whatever the commercial or residential development happens to be, why it should and how it can take those community valued features into account, e.g., by building around a given pond or stream or stand of trees. By having this dialogue and conservation assessment early on, this helps guide the planning process in noting clearly what should be taken into account beforehand and then consciously configuring the built structures around said environmentally desired features... This creates a win-win situation for both the community and for the builder/owner/developer. With a little forethought and flexibility, environmental worth and commercial worth can be congruent.

References: Randall Arendt, *Growing Greener* – an invaluable handbook on the distinct phases involved in conservation development
Scott Millar, *The Rhode Island Conservation Development Manual* (A Ten-Step Process for Planning and Design of Creative Development Projects) – graphically illustrated and user friendly



A huge mural painting of what Gaviotans have already accomplished and their vision for the future. Note airship in the background.



(V) “Integral Ecological Design” (or “Eco-Design” or “Eco-Effective Design”)

Quotes: “waste equals food” (William McDonough)...

“take more out than you put in” (McDonough McGregor)

Idea: Ecological design does not merely reshuffle materials or re-circulate flows, it moves energy up to a new, emergent level. Something new is born, a new gestalt is created... Ecological design recycles for sure, but it also generates interactions on a new level – to take one dramatic example, the way in which the internet has spawned and shaped the ‘virtual’ space of the web... Eco-design recapitulates and summarizes but also creates new possibilities...

Concept: the goal of a renewed and living architecture is to have every facet of the built environment non-toxic and energy-productive ...

- A. all structures as living: i.e. composed of systems or sub-systems, all of which have distinct metabolic or conversion functions (rather than being merely inert objects or just statically occupying space; or, that merely consume, decay, and/or generate what is interpreted as trash)
- B. all structures of the built environment as inherently productive and energy generating... not only self-sustaining but enhancing, contributory to the community as a positive asset...

- C. all built structures as intrinsically synergetic, strongly or weakly – i.e., harboring potentially symbiotic relationships, e.g., between and among commercial businesses and complex industrial facilities...
- D. all structures as cognitive, i.e., capable of ‘learning’ (S. Brand), and potentially transformational as well as evolving in time...

Some random characterizations:

the parable of the cherry tree
 fecund, prolific, producing an abundance
 simple and easy strategies of self-replenishment (as well as generating complex partnerships and caring stewardships)
 serving multiple functions – sustaining life on many levels...
 waste=food...
 a house/dwelling/home as a net energy-producer...
 providing paths to slowness and simplicity in today’s milieu of technological speed, complexity and hyper-development...
 replenishment, refreshment and enjoyment as revolutionary qualities in today’s atmosphere...
 principles of non-toxicity... considering product life-cycles... ‘cycling-up’ rather than ‘down-cycling’(making into less useful products)...
 promoting human health and regenerative landscapes and interiors...
 becoming inherently organic in all senses and on all fronts, all systems being assessed as potentially living tissue and having multiple and effective functions...
 all products and structures designed as net community assets...
 from the ecological perspective, there is no “inner” and “outer” – there is just the circulation of energy and enjoyment through healthy -- or else degraded or seriously consumptive -- structures and activities...
 note: a misnomer to talk about the ‘internal’ features of a building since a building is in an almost literal sense an organism which depends on a continual intake and outflow of molecular and macro-feeds, fuels, use and activity, and other ‘metabolic’ functions...
 a building may have an IQ – not just in the sense of an increasingly “smart” environment of sensors and automatic response patterns – but display other ‘intelligences’ also in the sense of expanding and contracting and evolving in form over time as needs and purposes change...
 a house may even have a spirit in the sense of being warm, welcoming, resilient, nourishing, providing tranquil sacred space and an energizing atmosphere...
 as consciousness grows, we may see our dwelling envelopes differently...

Possible Applications

Develop evaluative criteria that spell out each major function of proposed structures, and then see the systems or sub-systems that embody those functions, and then finally show how energy-generating materials and processes – currently available and constantly being researched – can be substituted for energy-deficient or merely energy-consumptive designs...

Recast all conservation assessment in municipal reviews to include, and in fact highlight, this emphasis on the environmentally productive and creative alternative building designs that are both possible and desirable...

Every conservation review as hinging on four elements: applying town goals and priorities for a given parcel, area, feature or quality, or type of connectivity (CP); the town conservation inventory of valued features (CI); the ecological design criteria that affects appropriate environmental siting, conservation development (CD), and the internal ecological design features of the built structures themselves, integral ecological design (IED)... All these applied together might constitute a set of conservation eco-design assessment recommendations (CEDAR)...

Recommendations should not only harken to preservation possibilities but to the superior building materials, processes and designs now being developed and pioneered and that mean so much in terms of building for the future. Building patterns need to go beyond the ethos of sustainability, just maintaining or running in place. Literal replacement is an impossibility anyway – nothing is perfectly replicated or merely maintained in life! Either continue to evolve or inevitably decay! If we don't aim for the ecologically superior – which assumes sustainability on all fronts as a matter of course – then we will have default patterns which will fail even the minimal and important criteria of sustainability. Our focus should be bringing buildings and structures to the next level. Ecological design restructures the substructural environment to permit the emergence of new qualities and capacities...

Analyze/inventory major/appropriate functions... intake of food and/or fuel, traffic, reasonable quietude, refreshment, enjoyment/activity, protection from the elements, power or energy generation, space for working and sharing activities, waste elimination or conversion, etc.... Then spell out the various major structural systems and sub-systems ...

AN EXERCISE: list some building functions reframed as life-functions or metabolic activities... (or! do the opposite and list some metabolic activities as building components or structures...)

- e.g. heating and cooling as “perspiration”
- building envelope as “skin”
- appliance networks as “tissues”
- water intake as “vital fluids”
- waste elimination
- communication
- food, fun, enjoyment, work, rest, inspiring, traffic/busyness, etc.
- protection, safety...

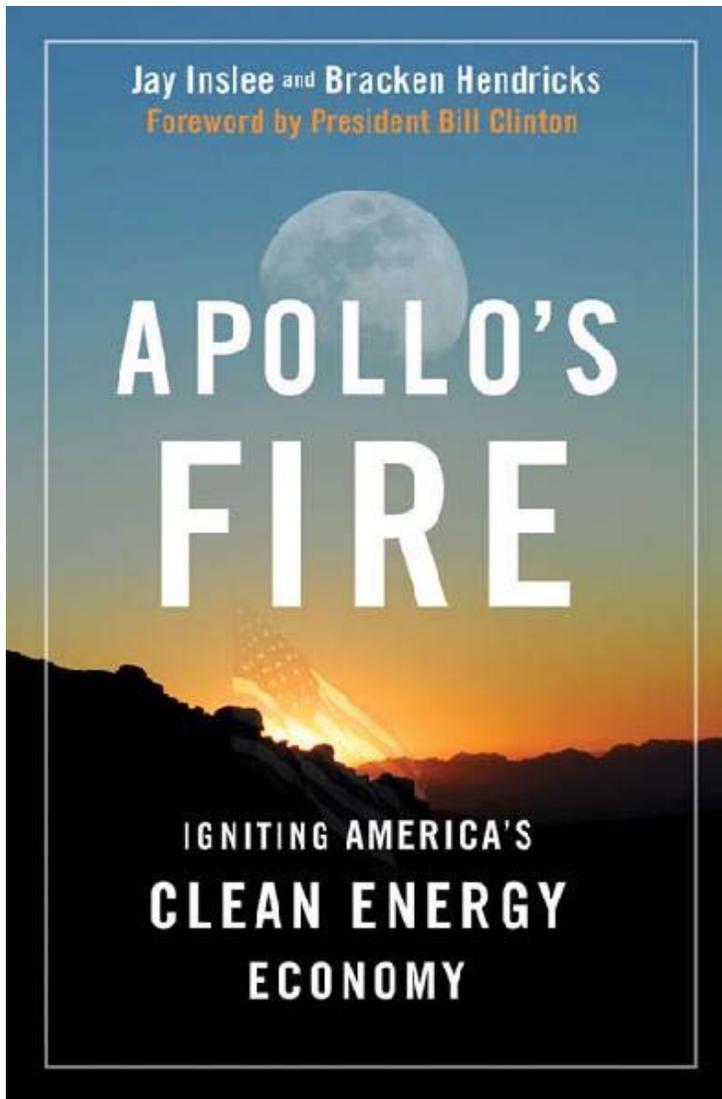
ANOTHER EXERCISE:

Elaborate such functions and evaluate types of eco- effectiveness in a work sheet (see final worksheet page):

Eco-Design Principles... Bldg. Functions... Criteria... Checklists... Process... Agency...

References: McDonough and Braungart, *Cradle to Cradle*
McD & B, “The Extravagant Gesture: Nature, Design and the Transformation of Human Industry”
Nancy Jack Todd and John Todd, *From Eco-Cities to Living Machines*
Janine Benyus, *Biomimicry: Innovation Inspired by Nature*
Fred Stitt (ed.), *Ecological Design Handbook*
Robert Gibson et al., *Sustainability Assessment: Criteria, Processes, etc.*
Charles Kibert (ed.), *Reshaping the Built Environment: Ecology, Ethics, and Economics*

Stewart Brand, *How Buildings Learn*
Christopher Alexander, *A Pattern Language*



(VI) Eco-Sensitive Globally Optimal Organic Development

Quote: “what polar bears, unborn children, and CEO’s can agree on”

Idea: Ecological design in all its variety and dimensions generates new fields of economic activity: from advanced technological research to infrastructural renewal to retrofitting houses, businesses and post-industrial fabricating facilities... atmosphere/climate calming and landscape regeneration are part and parcel of this new gestalt for our planet... the elimination of ghettos, swollen mega-urban agglomerations, toxic dumps and dumping... a new confluence of art, technology, commerce and spirit...

Idea: Ecological design is globally appropriate design: it spawns a plenitude of results embodying a few elegant principles... It “internalizes” or folds in the right workings of the environment – taking cues from nature’s elegant patterns but not slavishly imitating

them – and represents an immense diversity of shelter/dwelling styles apropos to different circumstances... from “disasters to celebration” as the hexayurt promo puts it. Respect for the earth’s fecundity and limits, human creativity, thoughtfulness and capacity for enjoyment...

Optimal and Organic Growth – a new and richly articulated bio-cover for the earth, a proliferation of design styles accommodating hermitages and large and vibrant human aggregations... patterns taking all factors – spatial, temporal, technological, human, biological – all environments – into account: a growing design sensitivity which is constantly learning, examining and encouraging models of integral eco-effective design that in turn addresses a host of relevant interfaces and concerns... constraints conceived as points of appropriate, beautiful and multi-beneficial generation ... new forms of auditing as the ‘top-line’ becomes more appealing than a bottom line that hides a multitude of sins (and costs!)... More organic structures mimic life’s intricate patterns more closely, sustainably, and effectively.

Small is good; large is good; low-density can be good; high density can be good. An eco-sensitive building ethic is not single valued or regimented in the least. On the contrary, it means departing from standard grids, pseudo-menus and oppressive monoliths. It means building with individuality (non-dividedness) and heart (reverential consideration), a new aesthetic that encompasses forms as diverse as a “hexayurt,” a 22nd century village, and the space travel vehicle of the 23rd century. They will all not only be sustainable, treating all resources with respect, but they will be crystals and nuclei of multidimensional growth, and probably tapping into energies that we can now only dimly imagine. We will smile as we remember the days of suburban tracts and the idea that one size or mould of permanence could fit all. Good integration and good differentiation go together. The multiplicity of forms possible on all scales will surprise us. The richness of simplicity will inspire us. Ensoulment will become a constant process as evolving design becomes more sensitive, intelligent and feelingful...

It has been said that, just as the 20th century was the era of physics, the 21st century will be known as the “neo-biological” era because of the increasing significance of biological guiding metaphors and conceptions and startling advances in biotechnology, engineering and cultivations. Many technologies will employ biotic strategies, like John Todd’s purification of wastewater using micro and plant organisms. Janine Benyus gives powerful examples of new approaches to all manner of problems using natural systems and creatures as inspirations, e.g., in the realm of fabric-materials of super-spidey strength. Nanotechnology will open up new fields of manufacturing, pharmaceuticals and medicine in the interpenetration of molecular structures and micro-organism operating and

healing agents and immunity coalitions. New and composite and “designer” materials will also interpenetrate with cyber and digital technologies to produce further strengths and resiliencies on all scales... Robert Frenay’s recent book *Pulse: The Coming Age of Systems and Machines Inspired by Living Things* recounts some of these new and coming developments in relation to the larger networks we will participate and be active in... Advances in little miracles open up wider realms...

The real challenge is for some advanced form of technology to make the kind of energy breakthrough that nuclear plants once promised, and that nuclear fusion once hyped. Solar panels (photovoltaics) for passive electricity generation are becoming more efficient and less expensive, and hydrogen and hybrids more popular. Work on the ingenuity front is moving fast, given the volatile implications of what Tom Friedman of the New York Times calls “petro-politics.” (How much did you pay for gas this morning!) We still don’t know exactly what technology will enable us to tap into natural/renewal abundances in a way that will solve our collective energy needs. Maybe solar packs on our backs. Maybe some kind of flywheel in a vacuum for each house that will enable us to see centralized generators and grids as antiques of the past.

There is the research programme and the consistent, comprehensive energy policy that can be called, The “Eight Fronts Strategy.” Arbitrarily and heuristically say the number 8. That is, the eight major techno-fronts we need to explore in a massive way to achieve a genuine energy breakthrough (maybe 16 or 32 today, what with hybridizations, cross-breeding and third and fourth generation technologies)... -- The fundamental imperative of intense and dedicated experimentation in advanced technological research i (e.g.... fission, fusion, biochemical, enzymatic and nano-scale organisms and bio-manufacturing, hydrogen, and, most important in any heuristic algebra: “X” –the as of yet unthought of fuel source or power that can be distributed in an off the grid fashion, and of course our old-new friends, the renewables like solar, wind, water and biomass)...

Clearly we need a national and visionary campaign to save the planet – in addition to the enormous commercial benefits that accrue from the export of clean energy technologies... the “eight fronts” as a political incentive, operating heuristic, and new economic hypothesis... for example, the Apollo Alliance that links green/clean advanced technologies and industries with blue-collar infrastructural construction/renewal and nationwide retrofitting... We need daringly proactive, abundant thinking. We don’t need the habit of debt and burden that goes with deficit/deficiency thinking... We need campaign platforms that give voice to comprehensive and positive visions (Nordhaus and Shellenberger)...

The vital benefits of a clean energy economy will include a major new source of jobs, no need to pursue resource wars, finally tamping down out of control global warming. Related to this will be the possibility, the prospect of a national public service renewal, an identity-giving sense of global mission as well as the rebirth of our economy in the post-industrial age... Getting the global dilemmas generated by energy question may usher in the kind of work, service and stewardship – and adventure – that human and bio-rights advocates are calling for... the post-work era may indeed flower into the era of service... much real human imbued work to be done! Poverty and retirement are two diseases of non-meaningful work being the norm. Imagine the sustenance, play and sacred service being a given for each being on the planet... The fear that undergirds overpopulation will have no foothold...

It has been said by one of the great philosophers of the 20th century that the real gift of the modern scientific era was the invention of invention itself, the discovery of discovery. We constantly need to remind ourselves that the cultivation of innovative thinking is more important than the success of any one particular technology, or style, we develop... Unless we give the space our imagination needs, we cut off our future... Our educational culture should not resemble a grid...

Reflections on healthy growth, from paleontologist-priest and evolutionary visionary Pierre Teilhard de Chardin to gifted Jungian psychologist James Hillman, suggest that we now need to appreciate growth not just as horizontal, comfortable or aggressive spatial expansion, but primarily as inner development in a dual sense, particularly the realm of consciousness. Truer communities will come into alignment as part of the growing and increasingly self-aware energy field... Through planetary lenses the truly local will echo the truly global and vice-versa... The notion of place defined by grid and grid intersection will be supplanted by the organic meadow... Nothing is intrinsically unholy. Cross-fertilization Is Us...

How many angels, celestial beings, can you fit on the head of a pin may not turn out to be such a frivolous theological question!

“Luminous Growth” -- Christopher Alexander... We need a vision of resplendent human evolution that will be echoed in a luminous landscape and dwellings that are truly alive and responsive... We need to think about leaving earth the way not as the last desperate act of an overpopulated, damaged and smothered planet, but as a grateful young person leaves his or her thoughtful parents... fledging and looking out onto the Cosmos... But unless we realize our nest is already sacred, the journey will always be imperialistic, violent and incomplete... When we realize our sufficiency in the context of a divine-like love, we can truly be curious and grow...

Without that sense of encompassing and compassionate love we are always insufficient, and no external device, ploy or strategy will save or complete us... Conservation is conscience, moral apprehension itself. It is not a set of externally imposed upon rules but the fact of non-otherness – self-realization on a cosmic scale – waiting to dawn us into awakens... The way St. Francis or the Buddha look at a flower constitutes the best set of blueprints for growth... We need to be tender revolutionaries... If we can gently and gingerly observe one cycle of our breath, we can tackle infinite complexities with grace. If we diss ourselves, the world becomes dirty.

PRACTICE EXERCISE, WINNING QUIZ GAME QUESTION,
HOMEWORK ASSIGNMENT NUMBER ONE:

Question: What three issues worry most Americans? And correlative question: What set of notions in the environmental/conservation repertoire addresses all three?

The necessity of an urgent national/global campaign to address: jobs/economy, resource wars and security, accelerated climate change (aka global warming)...

The Answer and an Application of Collective Survival Proportions!! -- Whoever becomes our next president, we need a citizens' movement that embraces national/planetary mission, we need ACTION! -- advanced clean technologies initiatives oriented nationally... We need to be ACTING = having an Advanced Clean Technologies Initiatives National Goal... You get the idea -- a set of initiatives on the order of the Manhattan Project, the post-WW II Marshall Plan, the magnitude of a new Apollo Space Program that will here on earth regenerate our stumbling economy and revive our public spirit and identity as proud Americans on a transnational/planetary mission. Massively renew our economy with new jobs, businesses and industries; make resource wars unnecessary; and finally begin to address out of control global warming with the seriousness it deserves. The only way for that to happen is for everyone to be inspired and benefited by the planetary work ahead. Two pulls: gravity and grace.

- References: Alex Steffen (ed.), *Worldchanging*
Zelov and Cousins, *Design Outlaws on the Ecological Frontier*
Inslee and Hendricks, *Apollo's Fire*
Teilhard de Chardin, *The Future of Man*
David Korten, *The Great Turning*
James Martin, *The Meaning of the Twenty-first Century*
Tom Friedman, "The Power of Green"
Bob Herbert, "What's the Big Idea?"

Ecological Design: A Draft Sketch of a Work Sheet for Further Deliberation and Discussion

THE ONE ESSENTIAL QUESTION: HOW WILL THE DESIGN OF THIS STRUCTURE, IN ITS SITING, OVERALL CONSTRUCTION, AND IN ITS PARTS AND FUNCTIONS, NOT ONLY NOT HAVE NEGATIVE IMPACTS ON ITS IMMEDIATE AND LONG RANGE ENVIRONMENTS BUT RATHER WILL AID, ENHANCE, AND/OR CONTRIBUTE TO ENERGY GENERATION AND THUS BE A NET ASSET FOR ITS SURROUNDING COMMUNITIES?

Meta-Criteria /Human Values.... Eco-Design Principles.... Building Functions....

Assessment Format/Criteria.... Checklists.... Process.... Agency....

Some candidates for meta-criteria qualities:

Adequacy, competence, efficiency, sustainability, creativity/productivity, exploration/adventure/unanticipated delight, community-enhancing, elegance in design as the fitting combinations of simplicity and complexity – the serving of many ends in a highly economic manner, beauty and radiance in the organic, friendly, diverse, compassionate relations with other species and genera, distributive, egalitarian and democratic, rich and resilient nodes and networks, the power of limits and healthy membranes, creative asymmetries and healthy tension, subtle and benign complementarities

Some Eco-Design Principles (not in any special order or priority):

The primacy of the generation, flow and conversion of life energy

Good energy “reflects” in a double sense: it radiates or conducts, and it ‘turns in’ upon itself as a potential for greater creativity

An apparent contradiction of the Second Law of Thermodynamics: take out of a system more than you put into it

Bio-Logic has to do with the design catalyzing and permitting of uncharted and unprecedented emergence in new realms and powerful fields

Genuine beauty is productive

Every structure should be seen as a natural and evolving community asset, not simply a consumption sink

Buildings are cognitive and learn over time... Some buildings and arrangement of buildings have steep learning curves... Some buildings might be called “enlightened” in the way they provide for future generations...

Quiescence and rest are qualities just as essential to the generation of energy as tension and voltage differentials

Things properly aligned have greater power than things which are not; multiplied alignments create a stronger energy field

Miniaturization is only one transformational tactic and pathway to the future

There is such a thing as non-point holistic effect

Source, nature and transport of materials, as well as construction processes to be monitored and evaluated for their contributions to superior overall effect
While efficiency and sustainability certifications apply, special consideration should be given to innovative growth procedures and contexts.

All functions translated into metabolic equivalents or activities (e.g., the building envelope as skin, providing protection, perspiration, sensitivity or receptivity to outside contact, pressure and conditions, etc.)

No toxicities: The built environment should not only be non-polluting, not toxic, but should serve to purify our atmospheres, inside our building envelopes and as a global climate totality

Potential and/or actual food production

No waste

Organic composting, replenishment, or conversion of all flows, systems, functions into multi-purpose and positive energy contributions...

Building Functions:

Breaking the building components and structures into systems and subsystems susceptible to organic analysis

Assessment Format/Criteria:

(A) Site Assessment: Some Guiding Documents

town (regional/state/national/global) comprehensive plan
town (regional/state/national/global)conservation inventory
town (regional/state/national/global) conservation development (zoning ordinance or policy rationale)

(B) Building Assessment: Application of ecological design principles, practices and models

Building assessment criteria summation:

How does a particular building subsystem or function conserve energy?

How does it generate or enhance usable energy?

How does it promote the immediate and long range resiliency or character of its environs?

LEED components, incentives, points, bonus points

SEEDS – indispensable sustainable eco-effective design strategies

ADAM – alternative design approaches models

(C) Comprehensive Conservation Assessment, Review, or Advisory Opinion

CODA, comprehensive organic design assessment, or

CEDAR, conservation/comprehensive eco-design assessment recommendations

Checklists:

inventory every relevant major system or unique subsystem

determine questionable items or items needing specific certification

*** Special consideration for particularly innovative items, for novel and especially more effective designs!!!

Process:

Municipal review (conservation assessment as part of the master plan review or the conceptual dialogue/requirements prior to any master plan)

Routine application of legislative ordinance and/or code regulations

Discussions and dialogue between town representatives/advocates and owner/builder/developers

Responsible Agent or Agency:

Owner/builder/developer

Outside consultant, certifier

Conservation Commission

Town Planning Board

State Dept. of Environmental Management designate or team

