Eco-Design & the Economy

Cell One: Planetary Environment

Cell Two: Open Economic System
  - Biocompatible Material Flows
  - Natural Material Flows

Cell Three: Closed Economic System
  - Non-Biocompatible Material Flows
Design Dimensions

- **Political / Financial**: trade, money / currency, EPR / property / service
- **Energy**: soft energy path
- **Technological**: cradle-to-cradle, eco-industrialism, Carbo Economy, shearing layers, product design
- **Spatial**: urban design / green cities, localization
People/ Work / “Human Capital”

- importance of **Creativity** in postindustrial economics.
- knowledge-based production
- displacing resources from production & circulation.
- education & training: continual learning, learning & doing, self-actualization, community development.
Financial & Property Design

- Internalizing the externalized
- monetary system
- Ownership & stewardship: responsibility & liability design
- EPR, Service Economy
- Ecological Tax Reform / tax shifting
- Intellectual property
End-Use & the Green Economy

1. The Service Economy
   “Hot Showers and Cold Beer”
   Nutrition, Illumination, Entertainment, Access, Shelter, Community, etc.

2. The “Lake Economy”
   Economic Biomimicry, flowing with nature,
   Every output an input, Closed-loop organization, Let nature do the work
The Soft Energy Path

- A **flexible diverse** mix of energy supply
- **Primacy of Renewable** energy sources
- Focus on **End-use**, on Conservation, and on efficiency of use
- Energy matched to the task at hand in both **QUALITY** and **SCALE**
- **Participation-oriented** structure--in both production and consumption
- **People-intensive** development and Job-creation
Historical Trends in Energy Development: from Quantity to Quality

Dematerialization

Decarbonization: wood to coal to liquid fuel to natural gas to renewables & ‘negawatts’

Decentralization
- “distributed generation”
- solar photovoltaics, wind turbines, small hydro, etc.
- fuel cells, flywheel batteries, etc.
Dematerialization & the ESCO model

- Savings as a virtual source of energy
- The Green Economy: creates *Wealth through savings* (or dematerialization)
- Savings as a *source of Investment*

  Challenge of financial design: dealing with first costs
Energy & Spatial Organization

- Energy & the Landscape
  Eco-infrastructure: going with nature
- The Eco-system Model: eco-infill
- Integrating the Divided Economy
  *Every place* a locus of eco-production
  Buildings as *producers* not just *consumers* of energy
The Centrality of the Landscape

“The industrial age replaced the natural processes of the landscape with the global machine...while regenerative design seeks now to replace the machine with landscape.”

...John Tillman Lyle
The Ecological Built-Environment

- Qualitative Development is Place-based
- Eco-efficiency: tied to spatial design
- Need to Integrate structures of Invisibility: “home” & “workplace”
  formal & vernacular landscapes
The Post WW II Waste Economy

Permanent War Economy

The Suburb Economy:
Oil / Autos / Subdivisions
“The greatest misallocation of resources in human history.”
...James Howard Kunstler

The END of SUBURBIA
Oil Depletion and The Collapse of The American Dream

“We're literally stuck up a cul-de-sac in a cement SUV without a fill-up”
- James Howard Kunstler
Key Areas of Green Building

Green Building Certification
--new construction
--retrofit
--neighbourhoods

• Natural Building & eco-community design
Loops in Building

- Extraction of natural resources
- Processing into materials
- Manufacture into components
- Assembly into buildings
- Building use
- Disassembly
- Waste for dumping
- Recycling of materials
- Reprocessing of materials
- Reuse of components
- Relocation of whole building

Domain of the built environment
“Waste” & Building

Deconstruction

Shearing Layers
Manufacturing & the Ecological Service Economy

- Subordination to Mission / end-use / need / quality
- Waste Equals Food
- *Dematerialization* of Production and Higher Resource Efficiency
- Reduction of the Speed of Resource Flow through the Economy
- Appropriate Scale
- Regenerative Work is Created
- New Rules & Closed Loops: LCA and EPR
Cradle-to-Cradle Design of Material Flows
Industrial Ecology & Service

- Ecosystem model: nature-imitating
- Industrial ecostructure: *Reuse-based* Manufacturing
- entails new levels of producer liability
- reduces both the flow of resources and their speed through the economy
- encourages local/regional economies, and
- facilitates high skill levels
Design Considerations in Production

• Craft: money and the economy of labour time in a Quality-oriented economy

• Production and Eco-infrastructure
  – the production of food, energy and water via natural process
Benign Materials & the Carbohydrate Economy

• plant matter as the original source of synthetics & plastics
  – biological revolution & genetic engineering: make possible cheaper & more prolific creation of enzymes.
  – biochemicals: less toxic & degrade more quickly than petrochemicals.
  – detergents, paints, dyes, inks, adhesives, fabrics, building materials, etc.

• zero discharge and industrial clusters
  – complete use of plant materials
  – plantations, biorefineries and green cities