

Sustainable Development: Setting the Scene

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The logo for the Council for Scientific and Industrial Research (CSIR) of South Africa. It features the letters 'CSIR' in a bold, blue, sans-serif font. The 'C' is a large, rounded shape, and the 'S' is a vertical bar with a small horizontal bar at the top. The 'I' is a vertical bar with a small horizontal bar at the top, and the 'R' is a vertical bar with a small horizontal bar at the top and a curved bottom.

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Can you tell me which way I ought to go from here?



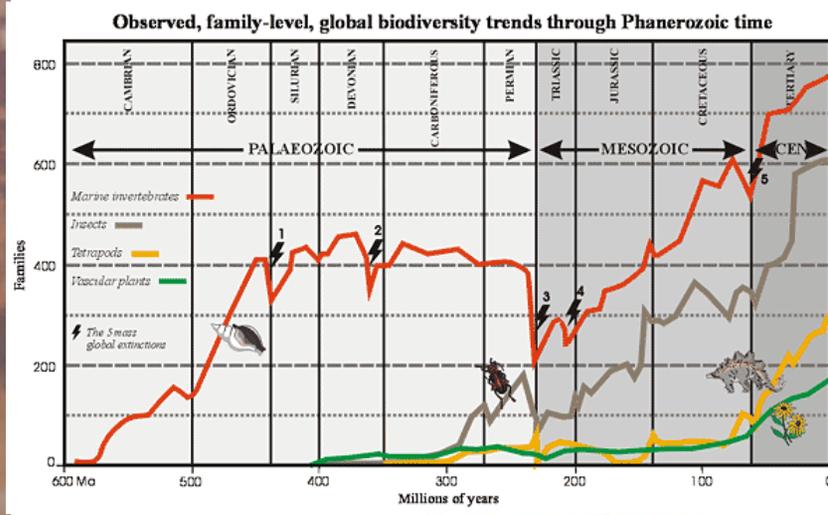
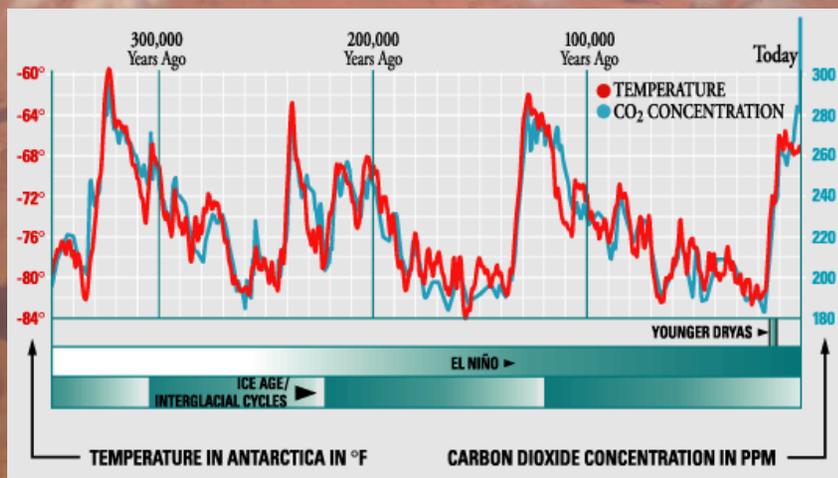
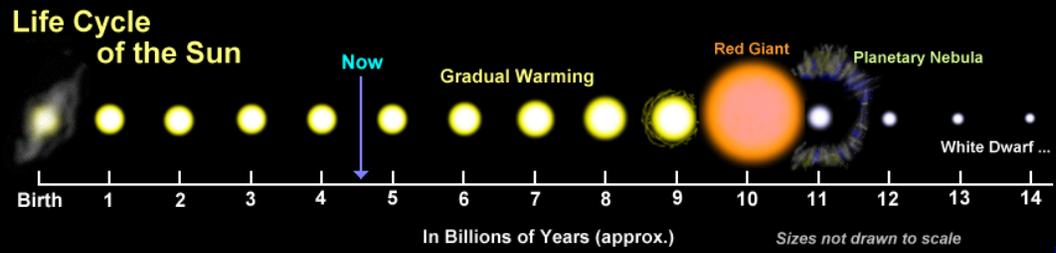
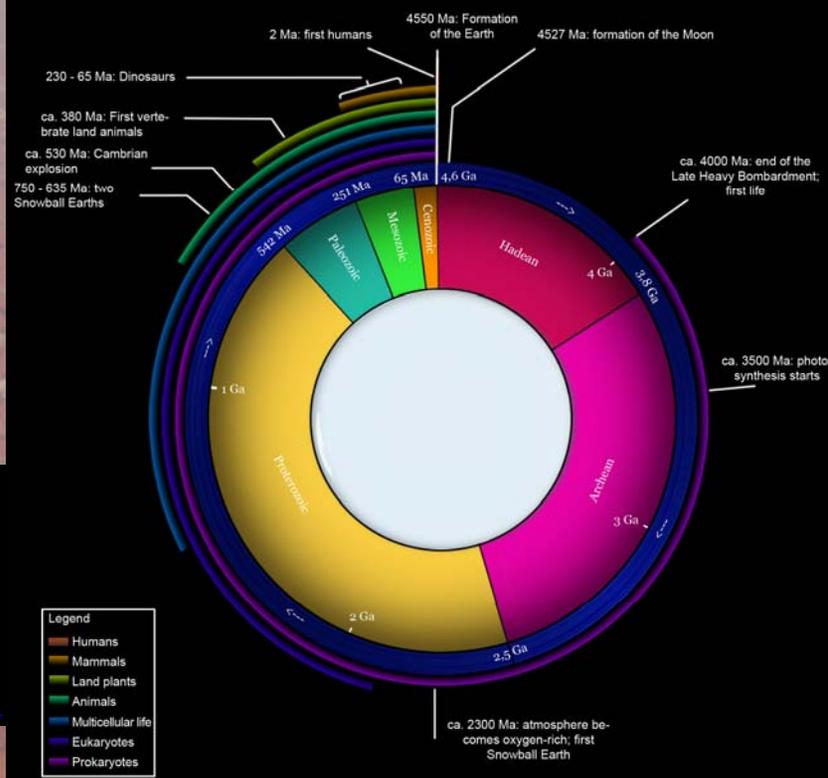
Definitions

- Infrastructure – “the basic physical assets of a country, community, organisation”
- Built Environment – “comprising urban design, land use and the transportation system, and the patterns of human activity within this physical environment”

Hyderabad, India



Sustainability Discourse



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Historical Precedence



Neanderthal 600,000-30,000 years ago

“Man has lost the capacity to foresee and to forestall. He will end by destroying the Earth”.
Albert Schweitzer

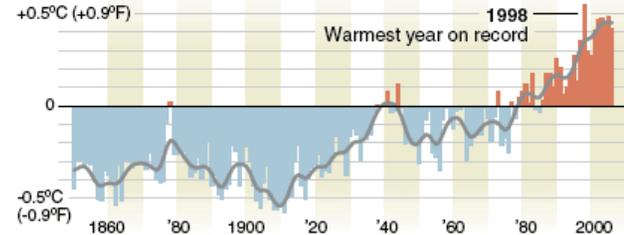
People/Planet Interface

- 6,3 billion people
- 73 million per year
- Equivalent to a new Johannesburg/Pretoria every 6 weeks
- Growing inequalities between rich and poor
- Lack of social cohesion
- Infrastructure collapse
- Ecological collapse
- Social collapse
- Challenge is about adaptation and mitigation

An increasingly warmer planet

A panel of climate scientists is expected to predict an increase in temperatures of 2.5 to 10.4 degrees Fahrenheit by 2100.

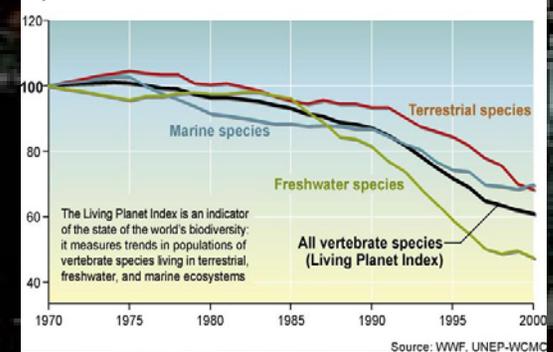
Global temperature anomaly, compared to 1961-1990 mean



SOURCE: University of East Anglia, U.K.

AP

Population Index = 100 in 1970



Cities

CHALLENGES FOR HUMANITY

Two critical discourses of the 1960s:

Ecology



- “Silent Spring” by Rachel Carson, 1963
 - *“Fundamentally, therefore, Miss Carson makes a well reasoned and persuasive case for human beings to learn to appreciate the fact that they are part of the entire living world inhabiting this planet, and that they must understand its conditions of existence and so behave that these conditions are not violated”* (Carson 1963:xiii)
Introduction by Lord Shackleton.
- Anthropecene Epoch

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Two critical discourses of the 1960s: Sociology



- Human Society by Kingsley Davis (1966)
 - Can the anonymity, mobility, impersonality, specialization, and sophistication of the city become the attributes of a stable society, or will the society fall apart?
 - How can devotion to a common system of values and a common set of mores be maintained in a highly literate, scientifically trained, individualistically inclined, and sceptically oriented population?
 - “The answer is not clear”

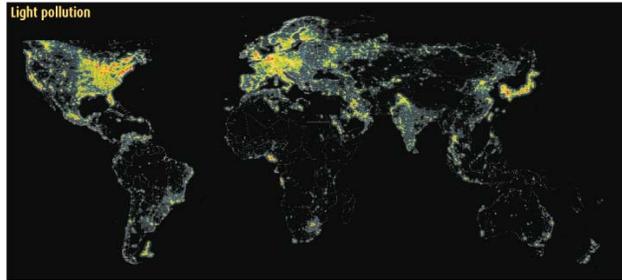
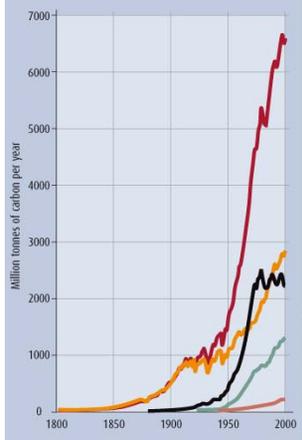
Current Global Ecological Paradigm

THE HUMAN IMPACT ON EARTH

Judging by our effect on ecosystems and the environment, planet Earth and most species on it would be glad to see the back of us

Fossil carbon emissions

● Total ● Petroleum ● Coal ● Natural gas ● Cement production

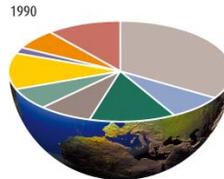


Land use

Before humans



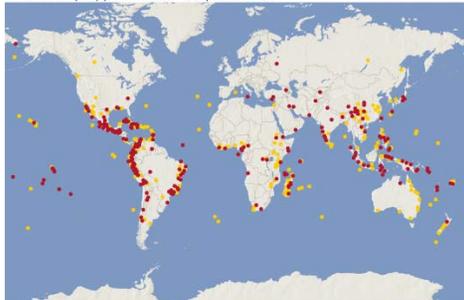
- Cropland/pasture
- Ice and tundra
- Boreal forest
- Temperate woodland/forest
- Grassland/steppe
- Hot desert
- Scrubland
- Savannah
- Tropical woodland/forest



Extinction hotspots

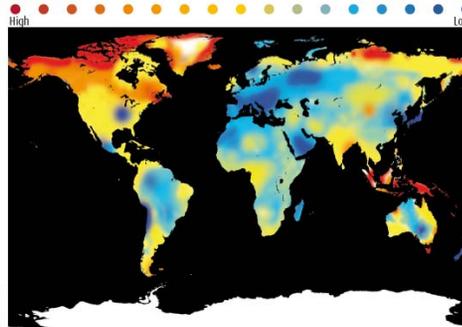
Worldwide, 794 species of mammals, birds, reptiles, amphibians and conifers are threatened with immediate extinction unless there is urgent action to save them. The dots show the locations of their final refuges

● Protected or partly protected areas ● Unprotected areas



Future extinction risk

In some areas, mammals are safe for now but are considered extremely sensitive to future human impact



- “Measuring sustainable development – Nation by nation”, Ecological Economics, In Press, 2007
 - Only 1 out of 93 met two specified minimum consumption requirements without exceeding biosphere capacity
 - Between 1975 and 2003 only 33 countries decreased foot prints: HIC increase ratio from 1.9 to 3.7

SA Backlog

- Housing backlog 2.2 million units
- 14.5% of households live in informal dwellings
- 20% of households do not use electricity for lighting
- 12% of households have no access to piped water
- 53% of households have no piped water inside the dwelling
- 45% of households have no access to flush toilets connected to sewerage
- 44% of households do not use electricity for cooking

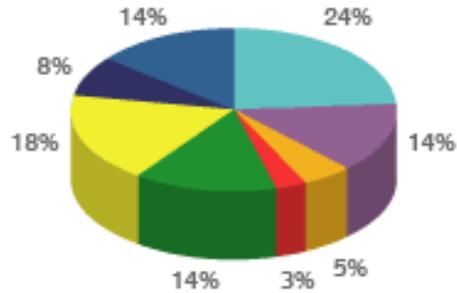
Construction Performance: Materials

- \$4,2 trillion plus industry
- Employs over 100 million
- 10% global GDP
- Resource consumption
 - 50% all resources globally
 - 45% of energy generated + 5% during construction
 - 40% of water used globally
 - 60% of prime agricultural land lost to farming
 - 70% of global timber products
- Over-budget, over-time
- Little added-value
- Little process or technological innovation

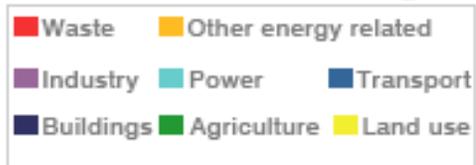


Emissions by Sector

GLOBAL EMISSIONS BY SECTOR

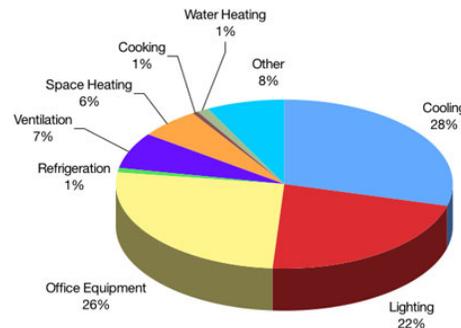
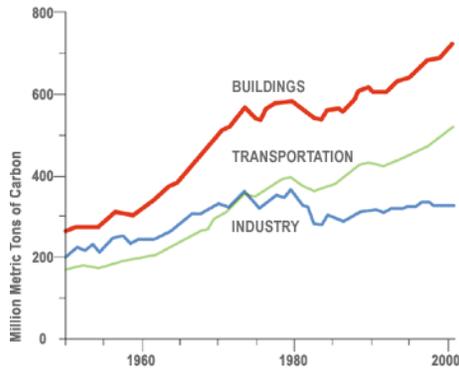
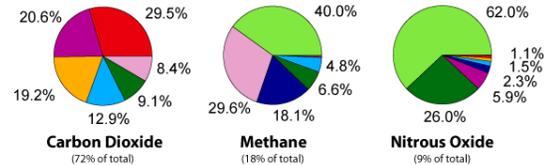
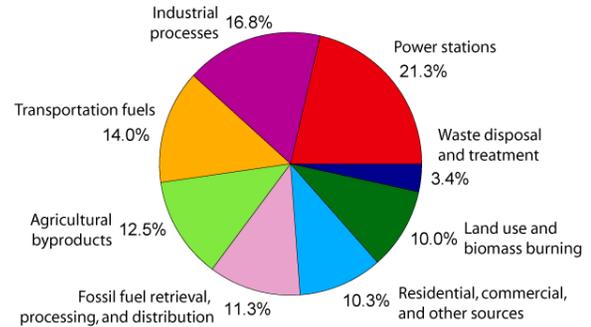


Total emissions in 2000: 42 GtCO₂e



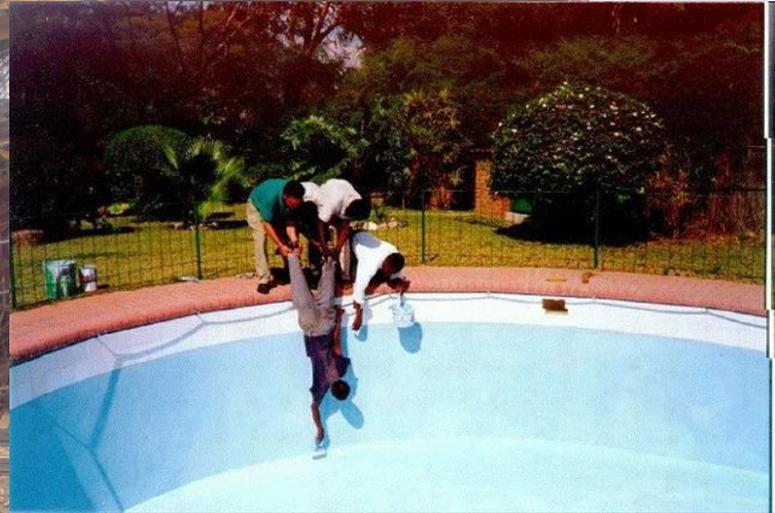
SOURCE: Stern Review

Annual Greenhouse Gas Emissions by Sector



Construction Performance: Governance

Poor OHS record
High rates of corruption



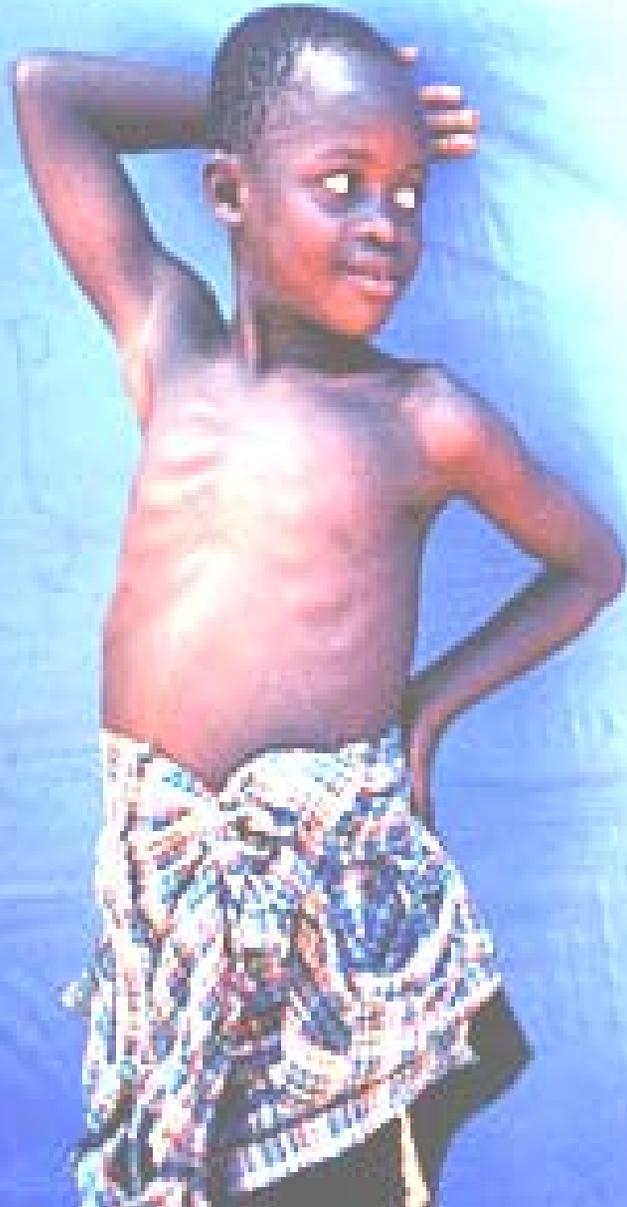
'Our Common Future'

- Gro Harlem Brundtland Report 1987
- "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs"



'Earthrise', Apollo 8,
Dec 24, 1968

5 Key Concepts



- **Needs:**
 - Essential needs of the world's poor. Could also include Maslow's needs
- **Limitations**
 - Imposed by the state of technology and social organisation on the environment's ability
- **Responsibility**
 - The environment is held as a proxy for social equity between generations
- **Transformation**
 - Sustainability is pro-development providing that it "involves a progressive transformation of economy and society"
- **Ecological Capital**
 - Impact of development on the quality of natural elements must be accounted for



Throughout history engineering has driven the advance of civilisation

Applying the rules of reason, the findings of science, the aesthetics of art, and the spark of creative imagination, engineers will continue the tradition of forging a better future

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Required delivery paradigm

- Smart
- Efficient
- Effective
- High-performance
- Sustainable
- Knowledge-based & technology-driven
- Skilled



Introduction and Background

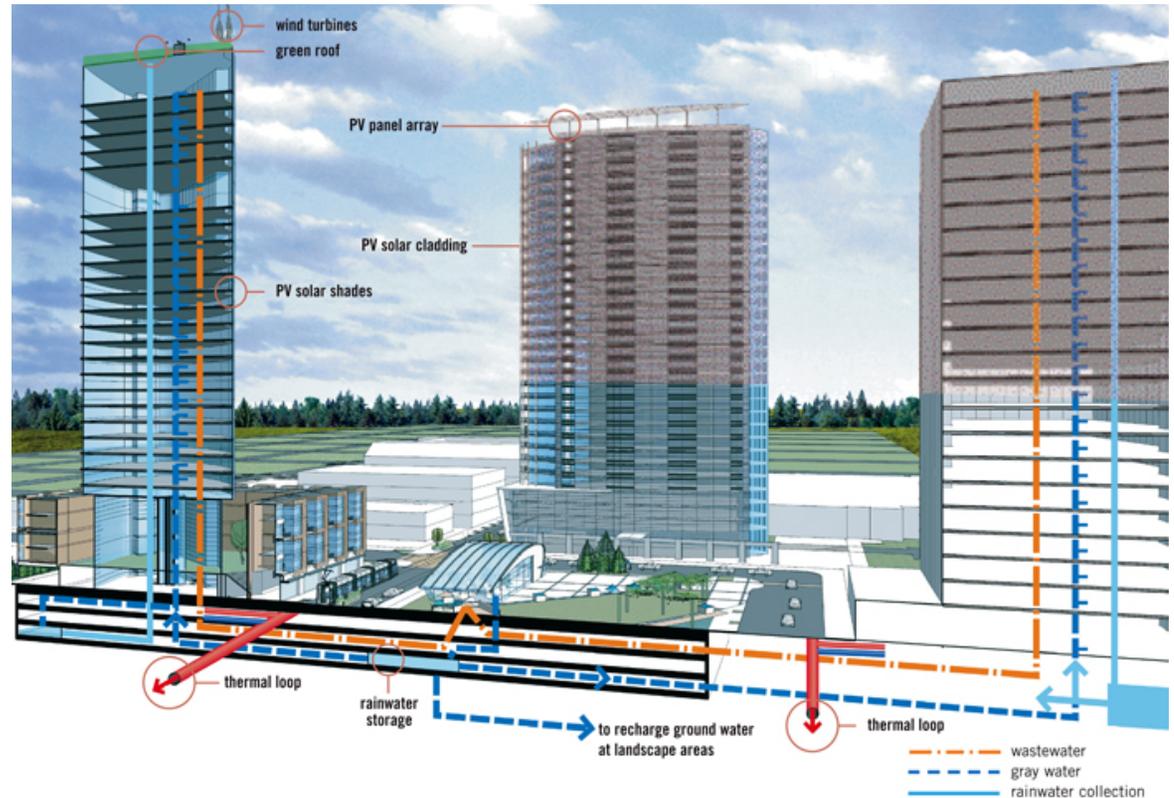


- *“First, our approach to infrastructure must focus not just on economic growth or human growth, it must also focus on smart growth. That is growth that is economically sound, environmentally friendly, socially acceptable, locally desirable and most important, growth that makes a real difference in the lives of poor people” Wolfowitz, World Bank 2006.*

Ecological Design: Replace what's Displaced



The building as tree, and city as forest

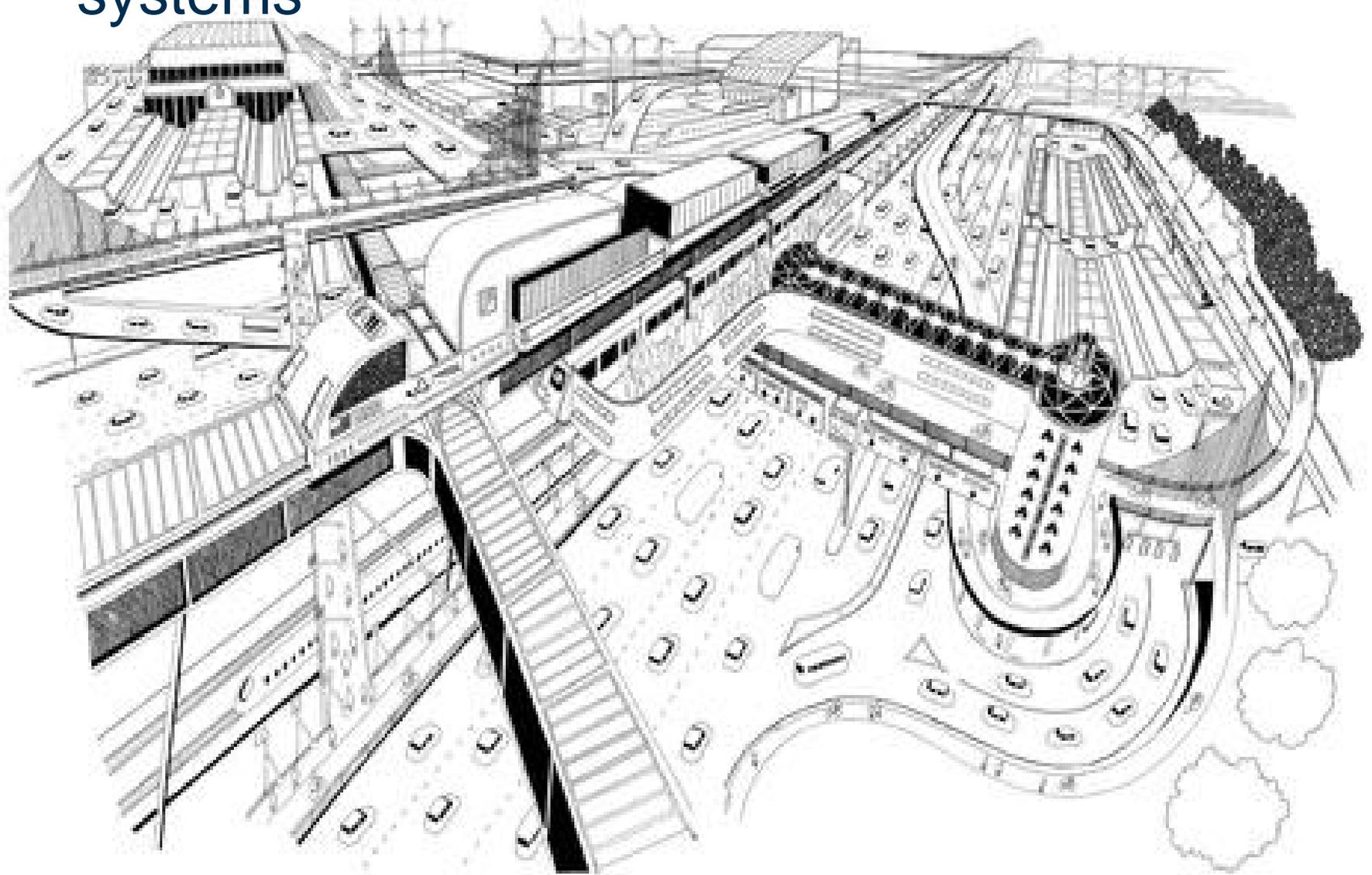


10. Green Buildings to Green Neighborhoods



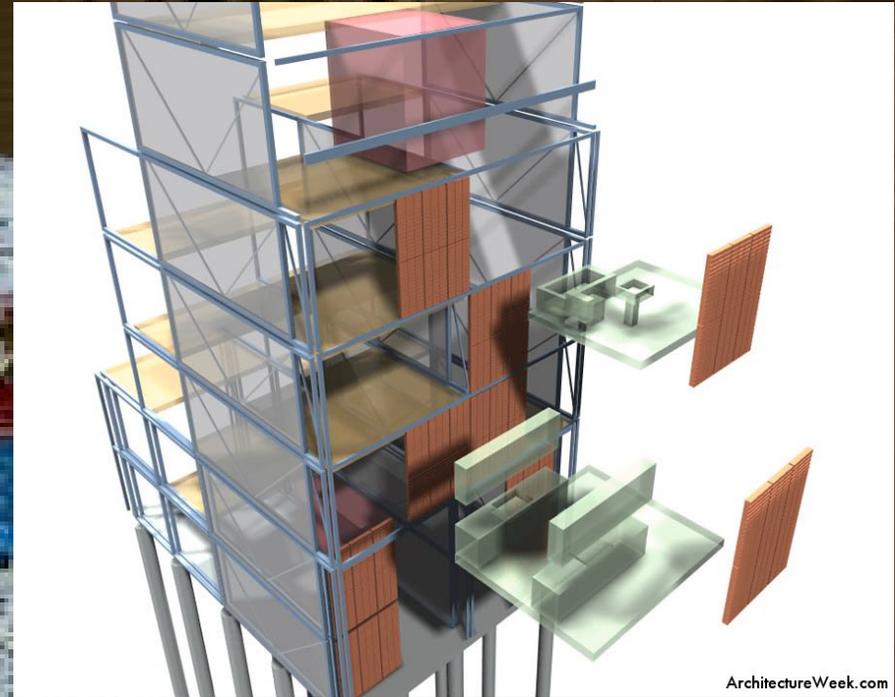
3D Rendering of Catalyst Project

Engineering integrated transportation systems



Yona Friedman 'Open Infra-structural Approach'

- Fix service positions
- Industrialised manufactured modular components



Sustainable Infrastructure: Definition

- A process of change in which the:
 - Exploitation of resources;
 - Direction of investments;
 - Orientation of technological development; and
 - Institutional changeare all in harmony and enhance both current and future potential to meet human needs and aspirations



Summarise

- Design serves its constituents: good design extends to respecting what is notable and honourable about the past, present and future, in a manner that is restorative and transformative
- Infrastructure is back on the developmental agenda: to be sustainable it must contribute to:
 - Poverty alleviation
 - Community upliftment
 - Social cohesion
 - Quality job creation
 - Healthy, safe and uplifting working environments
 - Distributing the costs and benefits equitably
 - Skills development and transfer
- Ed Mazria “We are the problem, and we are the solution” West Coast Green, San Francisco, Sept 28, 2007

Masdar: Norman Foster (2008)

Conclusion

- 21st C, post-Modern epoch, is a turning point for humanity.
 - Old environmental management theories and practices have no ongoing value
- Sustainability seeks balance between people/planet
- Development must improve quality of life
 - 'Do least harm' not good enough

“That depends a great deal on where you want to get to”

“I come to give you life, and that you may have it more abundantly” John 10:10

Siamak Hariri: Baha’I temple, Santiago

29-May-07 10:01

Thank You

