Instytut Paliw i Energii Odnawialnej

IPiEO

EC BREC

Sustainable Urban Energy Concepts

dr Magdalena Rogulska

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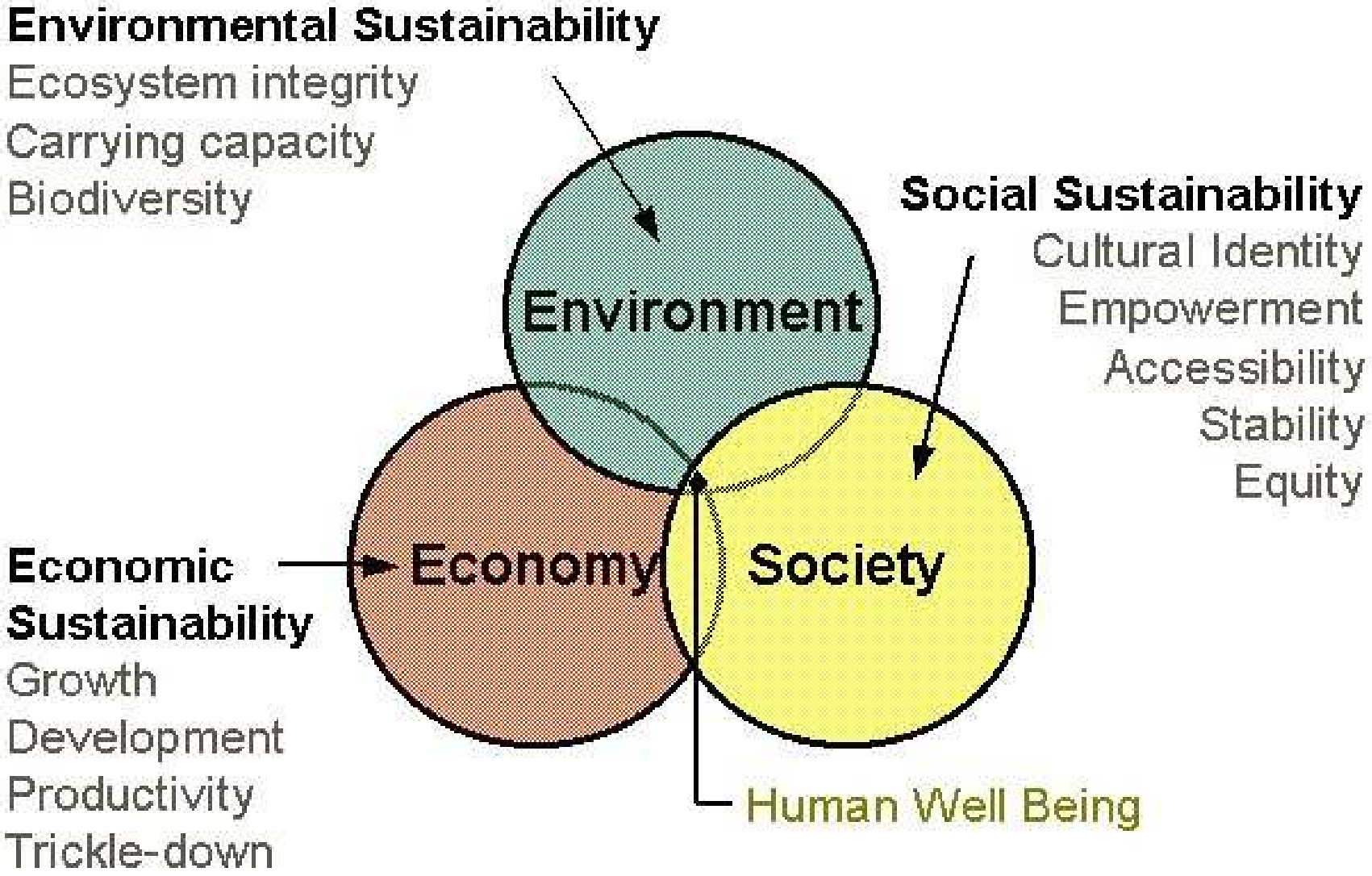
Definitions

- **Sustainable development** is development which meets the needs of the present without compromising the ability of future generation to meet their own needs."
- This definition has been formulated by the World Commission on Environment and Development (WCED), led by the norwegian prime minister Gro Harlem Brundtland, in 1987
- "Treat the Earth well. It was not given to you by your parents. It was loaned to you by your children." --- Kenyan Proverb


Environmental Sustainability
Ecosystem integrity
Carrying capacity
Biodiversity
Social Sustainability
Cultural Identity
Empowerment
Accessibility
Stability
Equity
Environment
Economy
Society
Economic Sustainability
Growth
Development
Productivity
Trickle-down
Human Well Being

Objectives for sustainable buildings

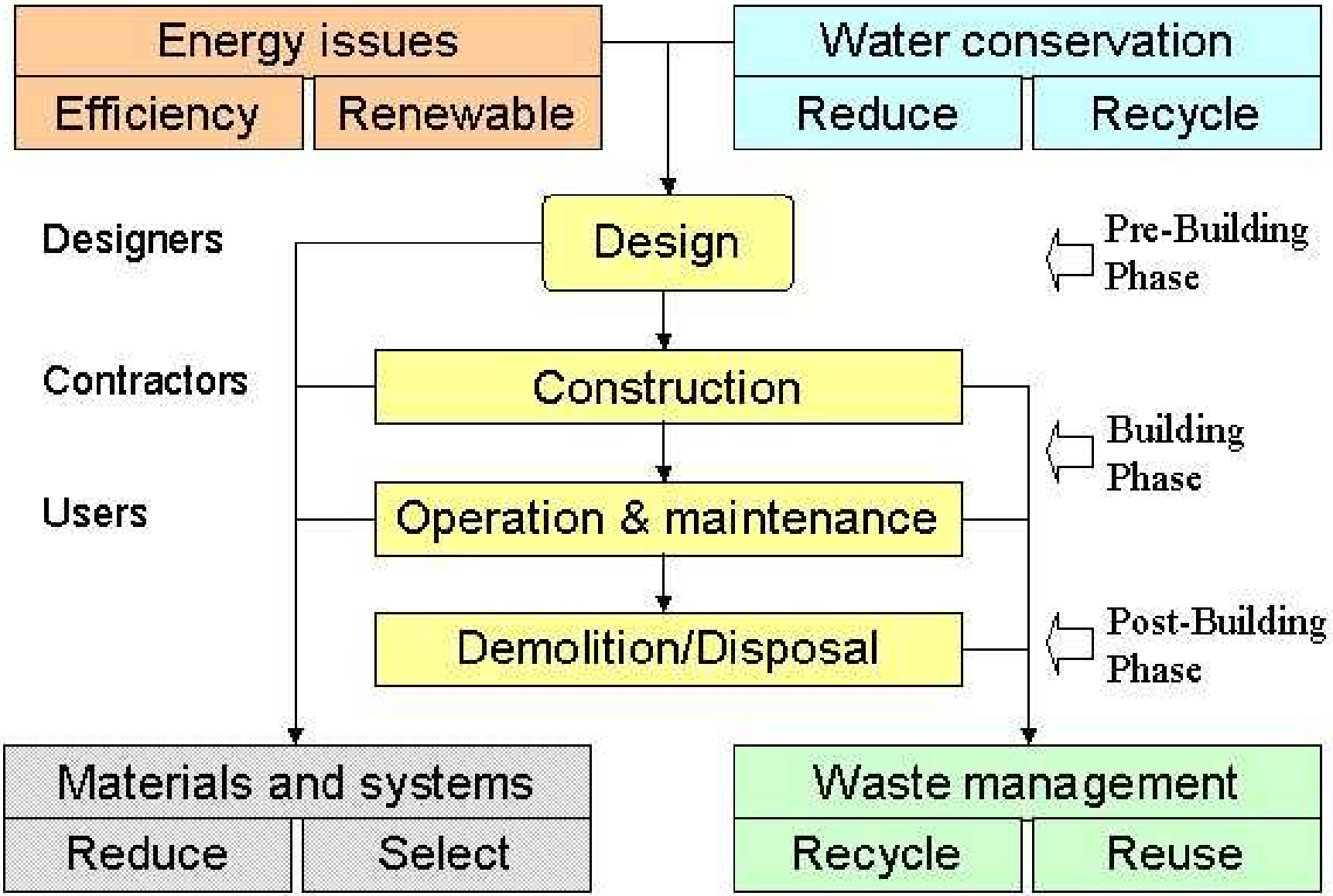
- Resource Efficiency
- Energy Efficiency (including Greenhouse Gas Emissions Reduction)
- Pollution Prevention (including Indoor Air Quality and Noise Abatement)
- Harmonisation with Environment (including Environmental Assessment)
- Integrated and Systemic Approaches (including Environmental Management System)

Sustainable transport

- Integrating land-use, transport and environmental planning is important to *minimise the need for travel* and to *promote efficient and effective mode of transport*, including walking.
- There are four principal ways to influence transport system efficiency and energy consumption:
- urban and land-use planning;
- modal mix (cars, trucks, rail, air, etc.);
- behavioural and operational aspects (occupancy of vehicles, driver behaviour, system characteristics); and
- vehicle efficiency and fuel choice.

Sustainable City

- The main advantage of a sustainable city is that it provides a living environment that that **does not degrade the natural environment** as well as does not achieve its **current progress by the expense of future generations** In addition to these, it also offers:
- More effective economy, **less external/social costs.**
- **Increased quality of life.** (E.g. improved human health, nicer natural & built environment, less stress in traffic jams, less commuting/more free time, more cooperative community etc.)
- **Positive feedback loops may start.** (E.g. cleaner environment => improved human health => increased productivity => more tax money for the environment)
- More **efficient transportation** and compact land use patterns.
- Minimal urban sprawl that **does not eat up green spaces**, trigger more traffic, **or demand new and expensive infrastructural developments**.
- **Social progress.** (E.g. stronger civil society, improved aesthetic value of the natural/built environment, better health => more funds available for social welfare, more eco-taxes => less employment taxes => more jobs => less poverty & conflicts etc.)
- **Less air polution/solid waste/sewage/noise.**


Energy issues
Efficiency
Renewable
Water conservation
Reduce
Recycle
Designers
Design
Pre-Building Phase
Contractors
Construction
Building Phase
Users
Operation & maintenance
Demolition/Disposal
Post-Building Phase
Materials and systems
Reduce
Select
Waste management
Recycle
Reuse

Energy Efficiency

- The benefits from the energy-efficient siting and design of buildings are economic (saving money), social and ecological (reducing resource exploitation and emissions).
- Computer energy simulations can be used to assess energy conservation measures early and throughout the design process. The design team collaborates early in conceptual design to generate many alternative concepts for building form, envelope and landscaping, focusing on minimizing peak energy loads, demand and consumption. Computer energy simulation is used to assess their effectiveness in energy conservation, and their construction costs.
- Simulations are used to refine designs and ensure that energy-conservation and capital cost goals are met; and to demonstrate compliance with regulatory requirements.

Waste Management Strategies

- Waste prevention
- Recyclying construction and demolition materials
- Architectural reuse (include adaptive reuse, conservative disassembly, and reusing salvaged materials)
- Design for material recovery (durability, disassembly, adaptive reuse)

"Waste - a resource in the wrong place"

an old Chinese proverb