

Sustainable Construction and Resources utilization and efficiencies

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COURSE LECTURES

- **Lecture 1: Introduction to *sustainable Construction***
- **Lecture 2: Life Cycle of Structure**
- **Lecture 3: Reducing cost in construction**

Lecture 1 - Introduction to *sustainable* *Construction*

INTRODUCTION

- Green building refers to both a structure and the application of process that are environmentally **friendly** and **resource efficient** throughout a building's life cycle ***from planning*** to design, construction, operation, maintenance, renovation, and **demolition**



- **Sustainable Construction is development that meets the needs of the present without compromising the ability of future generations to meet their own need**

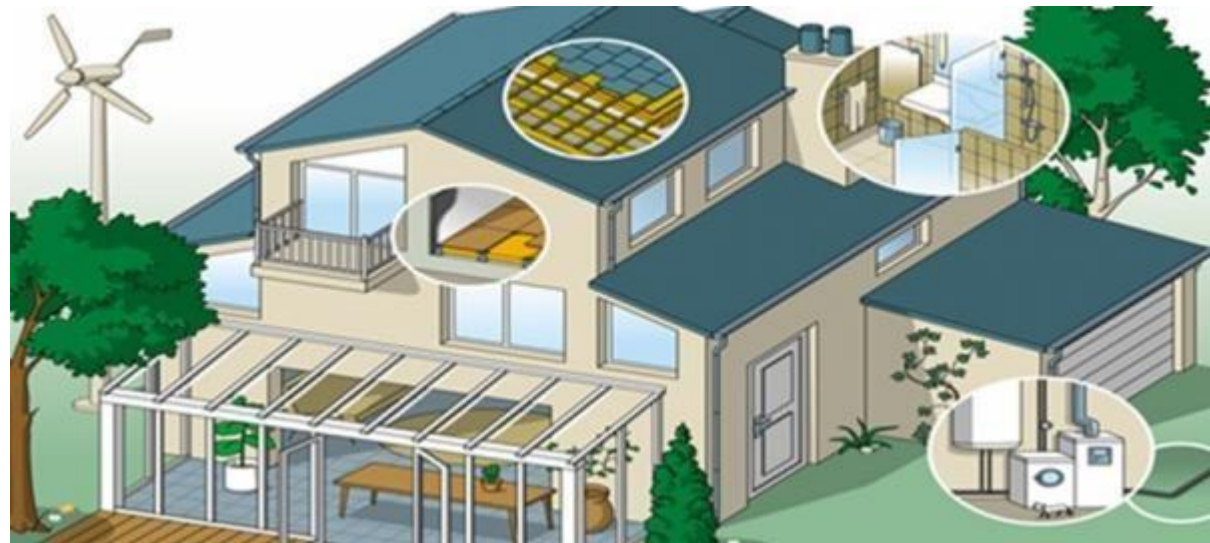
The **five** sustainable design and Construction aims defined here to:

1. **Reduce overall energy** use and maximize potential for renewable energy supply and use.
2. **Minimize waste** and **maximize re-use** and recycling both during construction and after occupation
3. **conserve water resources**, enhance water quality, incorporate water sensitive design and minimize vulnerability to flooding
4. **Minimize polluting** emissions to water, air and soil and minimize noise and light pollution.
5. **Maximize use of materials** from sustainable sources

Current views include

- Aiming for efficient construction;
- Re-using existing built assets;
- Minimizing energy use;
- Designing buildings to minimize waste;

- Avoiding air, water and ground **pollution**;
- Preserving and enhancing biodiversity; 11096, H, 27500
- Conserving water resources;
- Respecting people and their local environment

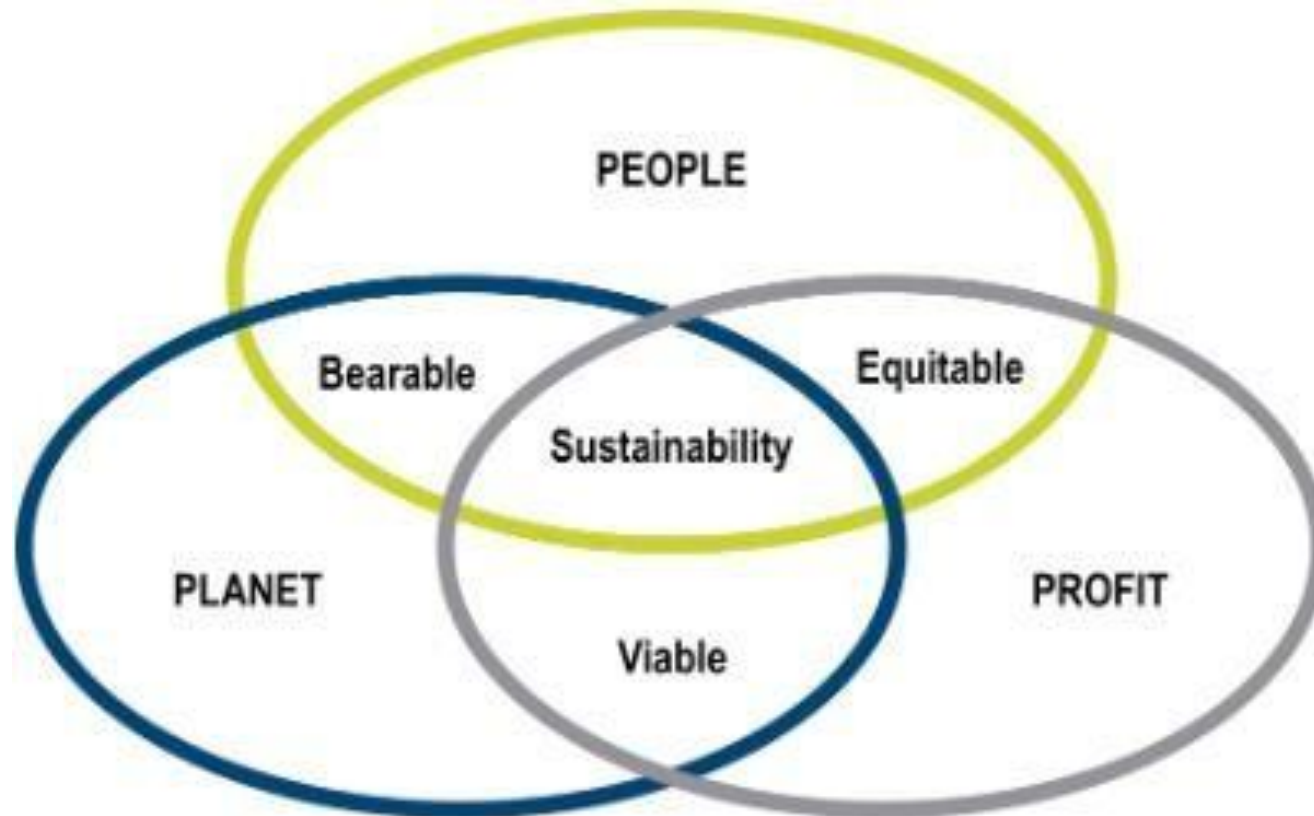


Sustainable construction is:

- Designing,
 - Renovating or
 - converting a building in compliance with environmental rules and energy-saving methods
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- In particular it is to ***promote environmentally friendly materials*** and the companies that use them. And therefore greatly contribute to the wellbeing and "sustainability" of buildings;



- Increased efforts need to be made to ***reduce CO2 emissions***.



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- Is concrete a sustainable material?
 - Is Bricks sustainable material?
 - Is timber sustainable material?
 - is steel environmentally sustainable materials?

- **Steel** is a uniquely **sustainable material** because once it is made it can be used, as **steel**, for ever.
- **Steel** is infinitely recycled, so the investment in making **steel** is never wasted and can be capitalized on by future generations.
- This is truly **sustainable**.
- **Steel** is truly recyclable and is *truly*



- To reduce the Embodied Energy it is important to use a good design not only in the structure but also in the management and utilization of materials.
- Timber frame construction can benefit this situation because:
- Timber is a renewable resource
- Timber has low embodied energy
- Timber has good thermal properties
- Timber has high strength to weight ratio

Life Cycle of Structures

- The whole life cycle of an asset over its life from **Inception** to **disposal**
- Life cycle costing (LCC) is defined as the present value of the total cost of an asset over its ***operating life*** including...
 - **Operating costs** including, maintenance, repair and
 - replacement, security,
 - insurance;
 - cost or benefit of the eventual **disposal** of the asset at
 - the end of its life.

Reducing Cost in Construction

Costs In Construction Projects

- » Direct Costs
- » Indirect Costs
- »Overheads
- »Profits
- »Contingencies....

Reducing Cost in Construction

Plan for a low cost Project Management during....

- Inception
- Planning
- Procurement
- Construction
- Testing and Commissioning
- Handover
- Phase-out...

Reducing Wastage

- Waste can be defined as any losses produced by activities that generate direct or indirect costs but do not add any value to the product from the point of view of the client.
- Therefore **Minimizing wastage** (minimize labor and material cost indirectly) => minimize expense => cost effective building