

# Energy Conservation Through Green Buildings



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# Global warming: Causes and effects

Earth's temperature has risen about 1 degree Fahrenheit in the last century. The past 50 years of warming has been attributed to human activity.

Burning fuels such as coal, natural gas and oil produces greenhouse gases in excessive amounts.

Greenhouse gases are emissions that rise into the atmosphere and trap the sun's energy, keeping heat from escaping.

The United States was responsible for 20 percent of the global greenhouse gases emitted in 1997.

Most of the world's emissions are attributed to the United States' large-scale use of fuels in vehicles and factories.

During the past 100 years global sea levels have risen 4 to 8 inches.

Some predictions for local changes include increasingly hot summers and intense thunderstorms.



Damaging storms, droughts and related weather phenomena cause an increase in economic and health problems. Warmer weather provides breeding grounds for insects such as malaria-carrying mosquitoes.

# Impacts Of Construction on environment

- ✓ Consume nearly 40% of raw materials.
- ✓ Consume 32% of total energy produced.
- ✓ Consume 17% of the fresh water.
- ✓ Consume 25% of global wood harvest.
- ✓ Responsible for Acid Rain.
- ✓ Generates
  - 25-40% of municipal solid waste.
  - 50% of world CFC production.
  - 30% of world CO<sub>2</sub> production.



# What is Green building?

*“ A building designed to conserve resources and reduce negative impacts on the environment – whether it is energy , water , building materials or land.*



# Advantages Of Green Buildings

Green buildings are designed for -

- Efficiently using energy.
- Improving occupant health & productivity.
- Reducing waste, pollution etc.





# Various Energy Saving Concepts

**Exposure to the sun** Consider your homes orientation to the sun to harness energy or to shield it from heat and UV light

**Other Considerations** – Low VOC paints, “green” flooring, energy efficient lighting. Conduct a “blower door” test on your home to determine performance.

**Insulation** Air sealing a home, using a blown insulation and minimizing thermal bridging lowers utility bills. Consider SIPS or ICF’s

**High Efficiency Low E** insulated glass windows reduce energy use and protect your homes interior

**Rain Gardens** Help reduce storm water run off

**Native Landscaping** Requires less maintenance and irrigation

**Conserve Water** with duo-flush toilets, water saving faucets and rain sensors for lawn sprinkling

**High Efficiency Mechanical Systems** reduce your energy bills. Consider a Geothermal Heating System, Always seal your duct work.

**Energy Efficient Appliances** reduce utility costs

**Recycled Deck Materials** utilize sustainable resources and reduce maintenance costs

**Recycled Framing Materials** such as finger jointed studs and an I joist floor system help reduce new lumber use

**Insulated Foundation Walls** Improves the comfort of your home and reduces utility costs. Consider ICF’s.

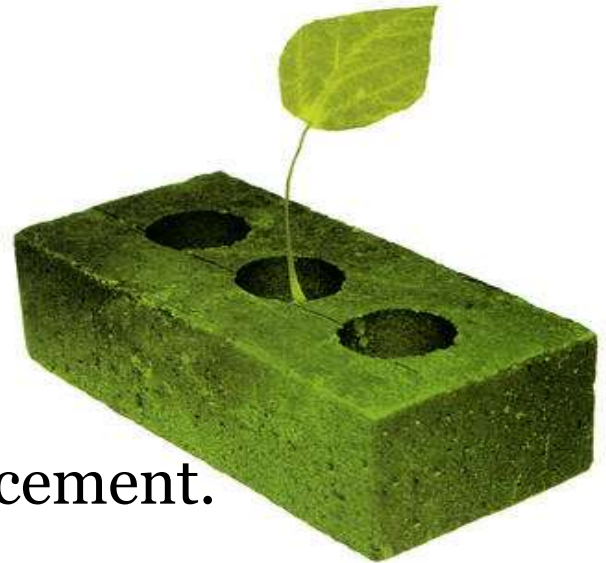
**Insulated Basement Floors** helps eliminate dampness and reduces utility costs



# Fundamental Principles

The fundamental principles should be kept in mind while designing a green building :

- Orientation.
- Energy efficiency.
- Waste and Toxics Reduction.
- Indoor environment quality enhancement.
- Materials and resource efficiency.



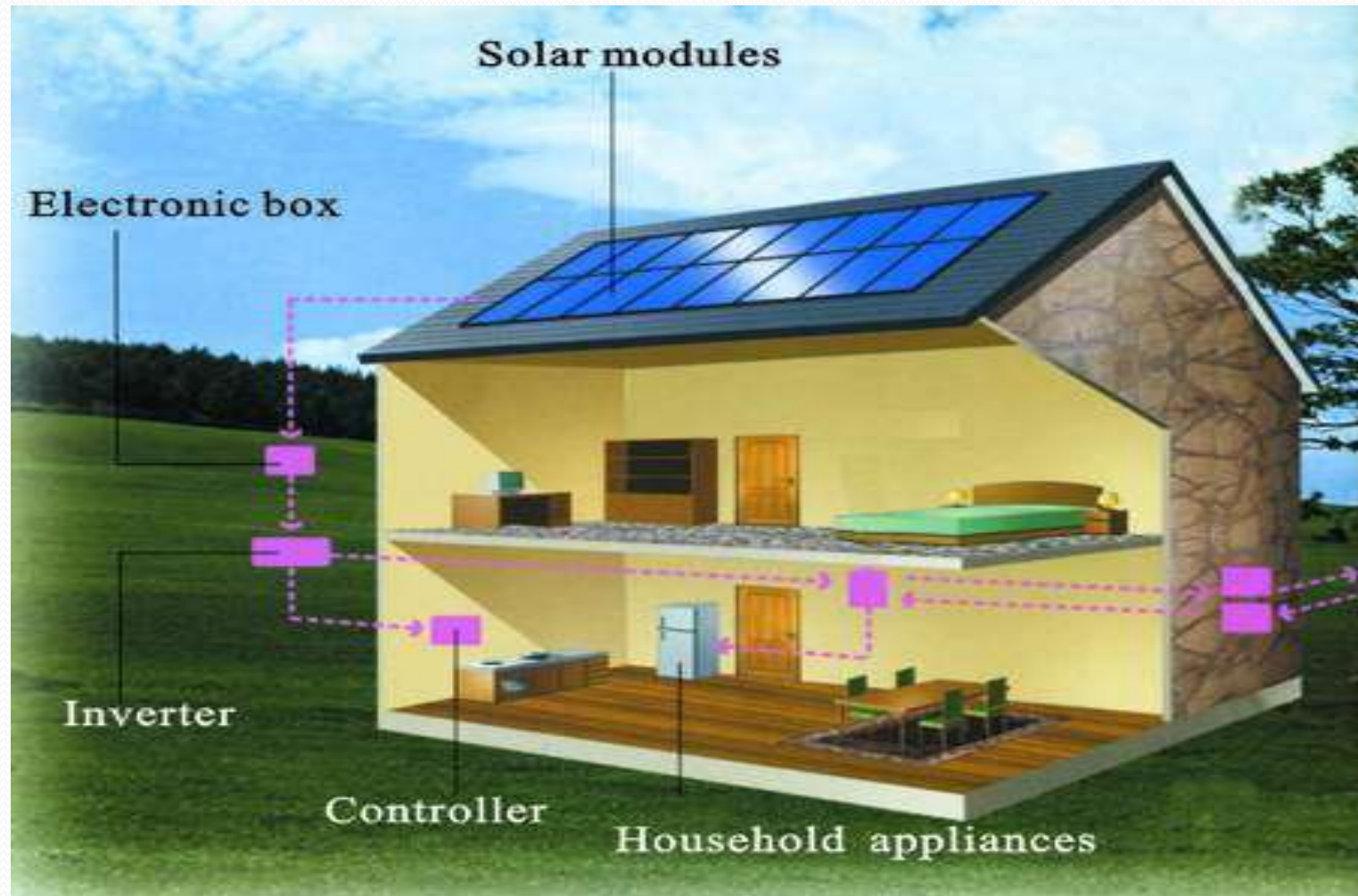
# Orientation Of A Building

- Maximum daylight.
- Poly carbonated sheets.
- Glass frames with nanotechnology .





# Solar Electricity Generation



# Solar Energy Utilization

It can be used for –

- Lighting
- Cooling
- Heating
- Drying
- Cooking
- Sensors in washrooms
- Electronic Gadgets

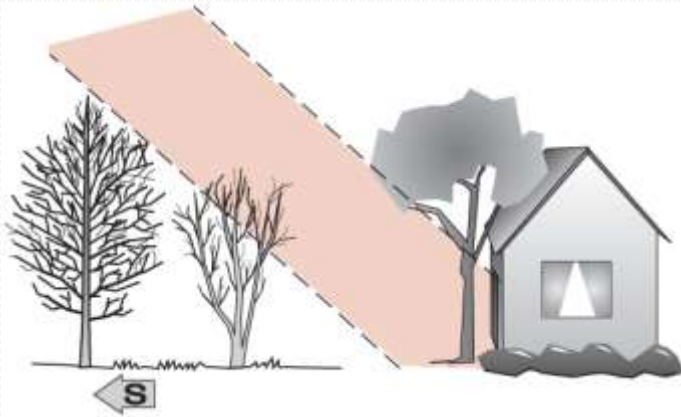


# Rain Gardens

- Planted Depression .
- Reduces Rain Run off.
- Prevents Soil Erosion .
- Prevents Pollution .



# Role of Landscaping



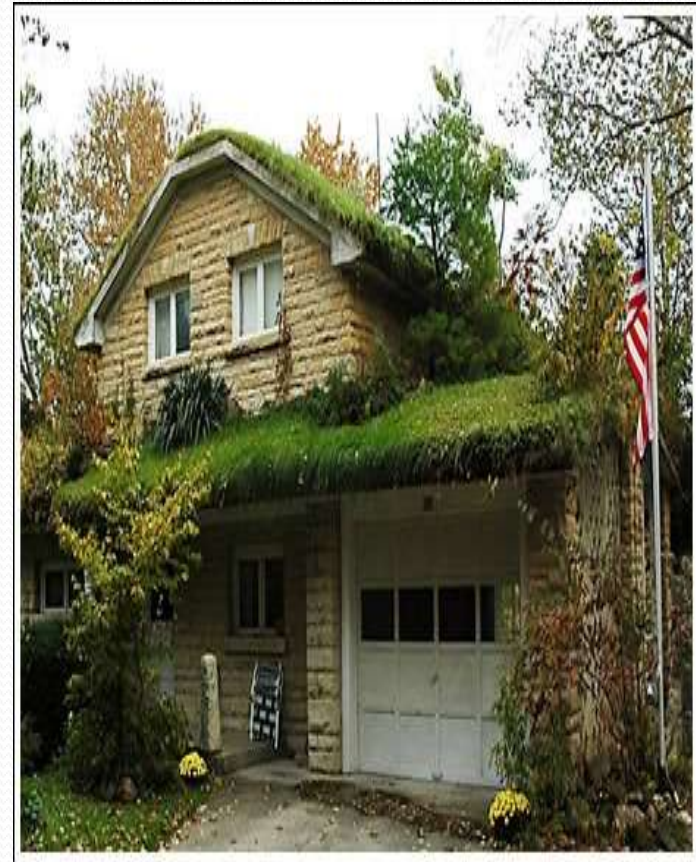
## Deciduous trees

Helps in maintaining temperature inside building by keeping greener in summers and falling leaves in winters hence allowing sun glare to enter the building in winters but not in summers.

e.g. Amaltas, champa etc.

# Green Roofs

*Green roof is a roof of a building that is partially or completely covered with vegetation.*



# Green roofs are used to:

- Grow flowers and fruits.
- Reduce heating and cooling.
- Reduce storm water run off.
- Filter pollutants.
- Sound Insulation.



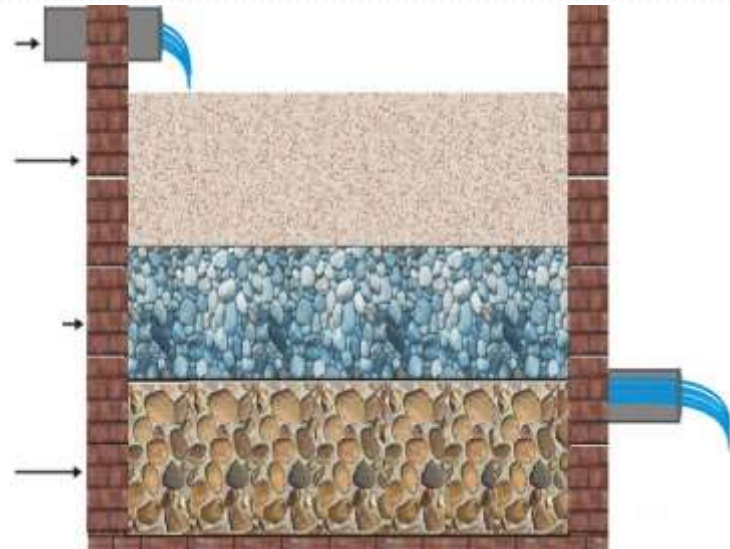
# Rain Water Harvesting System

The water is conserved by harvesting and storing the rainwater. The water harvested may be used in two ways:

- 1) Direct use
- 2) Ground water recharge.



**Direct use**



**Ground Water  
Recharge**

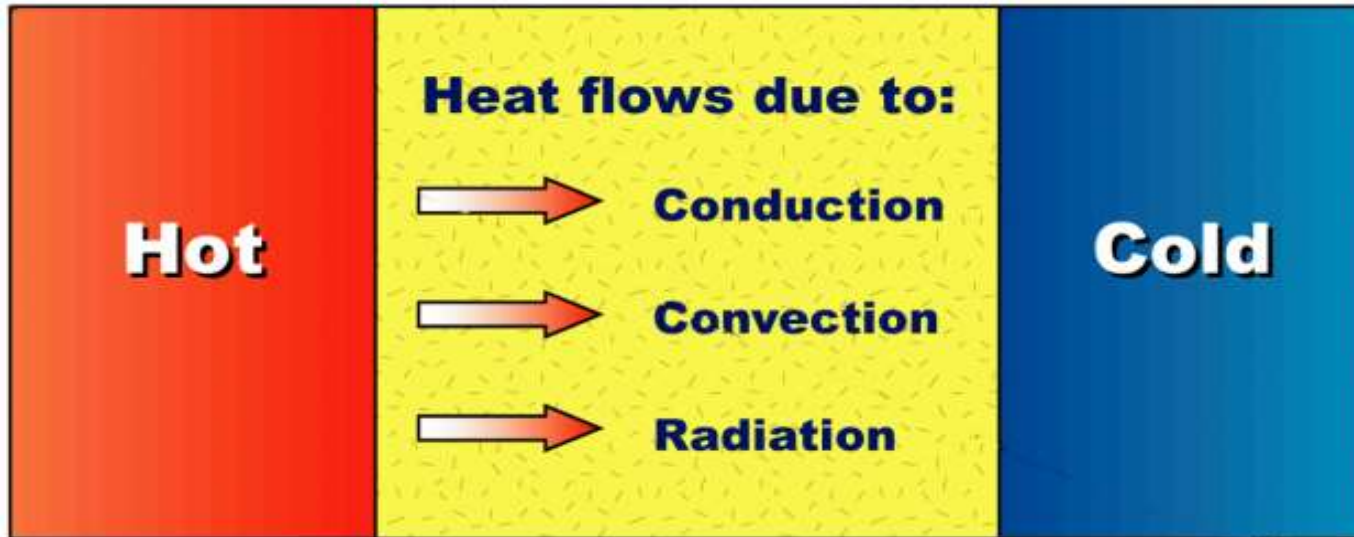
# Roof Top Or Pole Mounted Wind Turbine

- Cuts electricity bills.....
- Performance depends upon type of the turbine and location.





# Insulation Of Exterior Walls



- Prevents heat transfer.
- Reduces movement of sound waves and dust.
- The house is quieter and cleaner.

# Solid Waste Reduction

4-R Principle Should be Adopted for reducing solid waste –

- ✓ *Reduce*
- ✓ *Recycle*
- ✓ *Reuse*
- ✓ *Recover*



# Low VOC Paints

It helps to -

- Lower ozone pollution.
- Fewer smog-forming emissions.
- Reduced incidents of eye and respiratory irritation.
- Better air quality.



# Benefits Of Green Buildings

- Enhance and protect biodiversity and ecosystems.
- Improve air and water quality.
- Reduce waste streams.
- Conserve and restore natural resources .
- Reduce operating costs



# Green Building Materials

Green building materials should meet the following criteria:

- Natural, plentiful or renewable
- Resource efficient manufacturing process
- Locally available
- Reusable or recyclable.
- Durable
- Low-VOC assembly
- Moisture resistant
- Healthfully maintained

# Different Agencies involved in certifying green buildings :

- **USGBC** – United States Green Building Council.
- **GBCI** – Green Building Certification Institute.
- **TERI** – The Energy Resource Institute.
- **LEED** – Leadership in Energy & Environmental Design.



# Environmentally sustainable construction

The rating system addresses these major areas :

- Sustainable sites
- Water efficiency
- Energy and atmosphere
- Materials and resources
- Indoor environmental quality



Lewis and Clark State Office Building  
Jefferson City, Missouri



A tall, futuristic skyscraper with a green, diamond-patterned facade, set against a city skyline. The building has a distinctive, rounded, and somewhat conical shape. The facade is composed of a grid of white lines forming diamond shapes, with green foliage or panels filling the spaces. The building is surrounded by other city buildings, including a prominent, tall, rectangular skyscraper to the right. The sky is a clear, light blue.

**Some Certified Green Buildings  
of  
India:**





**NEG Micon Building, Chennai  
( Gold Rating)**



**Suzlon One Earth, Pune  
(LEED – Platinum Rating)**



**L & T EDRC I, Chennai  
(Silver Rating )**



**Wipro Technologies, Gurgaon  
(Platinum rating)**



**1st LEED CERTIFIED BUILDING OF INDIA  
GODREJ**



# START THINKING GREEN

*“Follow GREEN shastra before  
VASTU shastra”*



# Any Questions ???





*Thank You!*

