

Module 4

Non conventional Energy

Non-conventional energy sources are those that are replenished on a regular basis by natural processes. Solar energy, wind energy, tidal energy, biomass energy, and geothermal energy are examples of renewable energy sources that cannot be readily depleted and can be used repeatedly. Energy derived from non-traditional sources is referred to as non-conventional energy. These sources do not pollute the environment and do not necessitate a significant investment. Renewable resources are those that can be replaced at a rate equal to or greater than the rate at which they are depleted through natural processes.

- **Hydropower**: Even a small amount of water flowing naturally or artificially can be used to generate power. Although there are many types of hydropower, hydroelectric dams and reservoirs are the most common and established. Hydroelectric dams are constructed on rivers with a steady flow of water. The river's natural flow is then used to power turbines that are linked to generators. The generator produces energy while the turbines revolve, which is stored and subsequently transported for consumption.
- **Wind power**: Windmills, also known as wind turbines, are installed in areas with a high and consistent wind flow. Wind farms are areas with a large number of wind turbines for the generation of electricity. Large blades are coupled to a generator in wind turbines. These blades revolve when there is a strong wind, which is subsequently turned to energy. The amount of electricity a wind turbine can generate is proportional to the cube of the wind speed.
- **Solar power**: Solar energy is one of the purest forms of energy, and it has the greatest potential of all the renewable energy sources. Photovoltaic cells, which are solar panels composed of semi conductive materials, are capable of converting light to electricity. A number of panels are positioned in the best possible position so that they receive steady sunshine throughout the day. Solar panels are already being used as a primary source of electricity in some homes and commercially in solar farms with hundreds of thousands of panels.

Solid waste Management

The term solid waste management mainly refers to the complete process of collecting, treating and disposing of solid wastes.

In the waste management process, the wastes are collected from different sources and are disposed of. This process includes collection, transportation, treatment, analysis and disposal of waste

Sources of Solid Wastes

- Solid domestic garbage.
- Solid waste material from various industries.
- Solid agricultural waste.
- Plastics, glass, metals, e-waste, etc.
- Medical waste.
- Construction waste, sewage sludge

Indoor Air Quality

Importance of Indoor Air Quality

“Indoor air quality” refers to the quality of the air in a home, school, office, or other building environment. The potential impact of indoor air quality on human health nationally can be noteworthy for several reasons:

- Americans, on average, spend approximately 90 percent of their time indoors, where the concentrations of some pollutants are often 2 to 5 times higher than typical outdoor concentrations.
- People who are often most susceptible to the adverse effects of pollution (e.g., the very young, older adults, people with cardiovascular or respiratory disease) tend to spend even more time indoors.
- Indoor concentrations of some pollutants have increased in recent decades due to such factors as energy-efficient building construction (when it lacks sufficient mechanical ventilation to ensure adequate air exchange) and increased use of synthetic building materials, furnishings, personal care products, pesticides, and household cleaners.

Other Factors Affecting Indoor Air Quality

Several other factors affect indoor air quality, including the air exchange rate, outdoor climate, weather conditions, and occupant behavior.

The air exchange rate with the outdoors is an important factor in determining indoor air pollutant concentrations. The air exchange rate is affected by the design, construction, and operating parameters of buildings and is ultimately a function of infiltration (air that flows into structures through openings, joints, and cracks in walls, floors, and ceilings and around windows and doors), natural ventilation (air that flows through opened windows and doors), and mechanical ventilation (air that is forced indoors or vented outdoors by ventilation devices, such as fans or air handling systems).

Outdoor climate and weather conditions combined with occupant behavior can also affect indoor air quality. Weather conditions influence whether building occupants keep windows open or closed and whether they operate air conditioners, humidifiers, or heaters, all of which can affect indoor air quality. Certain climatic conditions can increase the potential for indoor moisture and mold growth if not controlled by adequate ventilation or air conditioning.

Rain Harvesting

The rainwater harvesting system is one of the best methods practised and followed to support the **conservation of water**. Today, scarcity of good quality water has become a significant cause of concern. However, rainwater, which is pure and of good quality, can be used for irrigation, washing, cleaning, bathing, cooking and also for other livestock requirements

Advantages of Rainwater Harvesting

The benefits of the rainwater harvesting system are

- Less cost.
- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need for imported water.

- Promotes both water and energy conservation.
- Improves the quality and quantity of groundwater.
- Does not require a filtration system for landscape irrigation.
- This technology is relatively simple, easy to install and operate.

Disadvantages of Rainwater Harvesting

In addition to the great advantages, the rainwater harvesting system has a few disadvantages like unpredictable rainfall, unavailability of the proper storage system, etc.

Listed below are a few more disadvantages of the rainwater harvesting process.

- Regular maintenance is required.
- Requires some technical skills for installation.
- Limited and no rainfall can limit the supply of rainwater.
- If not installed correctly, it may attract mosquitoes and other waterborne diseases.