ENVIRONMENTAL STUDIES

LECTURE-12

ENERGY RESOURCES

Growing Energy Needs

Energy consumption of a nation is usually considered as an index of its development, because almost all the development activities are directly or indirectly dependent upon energy. Power generation and energy consumption are crucial to economic development as economy of any nation depends upon availability of energy resources. There are wide disparities in per capita energy use of developed and the developing nations. With increased speed of development in the developing nations energy needs are also increasing.

- The very original form of energy technology probably was the fire, which produced heat and the early man used it for cooking and heating purposes.
- Wind and hydropower has also been used. Invention of steam engineers replaced the burning of wood by coal and coal was further replaced by oil.
- The oil producing has started twisting arms of the developed as well as developing countries by dictating the prices of oil and other petroleum products.
- Energy resources are primarily divided into two categories viz. renewable and non-renewable sources.
- Renewable energy resources must be preferred over the non-renewable resources.
- It is inevitable truth that now there is an urgent need of thinking in terms of alternative sources of energy, which are also termed as non-conventional energy sources which include:
    1. Solar energy needs equipments such as solar heat collectors, solar cells, solar cooker, solar water heater, solar furnace and solar power plants .
    2. Wind energy
    3. Hydropower, Tidal energy, ocean thermal energy, geothermal energy, biomass, biogas, biofuels etc.
- The non-renewable energy sources include coal, petroleum, natural gas, nuclear energy.

Energy Scenario

Energy is a key input in the economic growth and there is a close link between the availability of energy and the future growth of a nation. Power generation and energy consumption are crucial to economic development.

In India, energy is consumed in a variety of forms such as fuel wood; animal waste and agricultural residues are the traditional sources of energy. These non-commercial fuels are gradually getting replaced by commercial fuels i.e. coal, petroleum products, natural gas and electricity.

Out of total energy, commercial fuels account for 60% where as the balance 40% is coming from non-commercial fuels. Of the total commercial energy produced in the form of power or electricity,

- 69% is from coal (thermal power),
- 25% is from hydel power,
- 4% is from diesel and gas,
- 2% is from nuclear power, and
- Less than 1% from non- conventional sources like solar, wind, ocean, biomass, etc.

Petroleum and its products are the other large sources of energy. In a developing country like India, in spite of enhanced energy production, there is still shortage due to increased demand of energy. In spite of the fact that there is a phenomenal increase in power generating capacity, still there is 30% deficit of about 2,000 million units. Policy makers are in the process of formulating an energy policy with the objectives of ensuring adequate energy supply at a minimum cost, achieving self-sufficiency in energy supplies and protecting environment from adverse impact of utilizing energy resources in an injudicious manner. The main features of this policy are

1. Accelerated exploitation of domestic conventional energy resources, viz., oil, coal, hydro and nuclear power;
2. Intensification of exploration to achieve indigenous production of oil and gas;
3. Efficient management of demand of oil and other forms of energy;
4. To formulate efficient methods of energy conservation and management;
5. Optimisation of utilisation of existing capacity in the country
6. Development and exploitation of renewable sources of energy to meet energy requirements of rural communities;
7. Organisation of training for personnel engaged at various levels in the energy sector.
8. Government private partnership to exploit natural energy resources

Renewable Resources

- The resources that can be replenished through rapid natural cycles are known as renewable resource.
- These resources are able to increase their abundance through reproduction and utilization of simple substances.
- Examples of renewable resources are plants (crops and forests),and animals who are being replaced from time to time because they have the power of reproducing and maintain life cycles.
- Some examples of renewable resources though they do not have life cycle but can be recycled are wood and wood-products, pulp products, natural rubber, fibres (e.g. cotton, jute, animal wool, silk and synthetic fibres) and leather.
- In addition to these resources, water and soil are also classified as renewable resources. Solar energy although having a finite life, as a special case, is considered as a renewable resource in as much as solar stocks is inexhaustible on the human scale.

Non-Renewable Resources

The resources that cannot be replenished through natural processes are known as non-renewable resources.

These are available in limited amounts, which cannot be increased. These resources include fossil fuels (petrol, coal etc.), nuclear energy sources (e.g. uranium, thorium, etc). metals (iron, copper, gold, silver, lead, zinc etc.), minerals and salts (carbonates, phosphates, nitrates etc.).

Once a non-renewable resource is consumed, it is gone forever. Then we have to find a substitute for it or do without it.

Non-renewable resources can further be divided into two categories, viz. Recyclable and non-recyclable

Recyclable resources

These are non-renewable resources, which can be collected after they are used and can be recycled. These are mainly the non-energy mineral resources, which occur in the earth's crust (e.g. ores of aluminium, copper, mercury etc.) and deposits of fertilizer nutrients (e.g. phosphate sock and potassium and minerals used in their natural state (asbestos, clay, mica etc.)

Non-recyclable resources

These are non-renewable resources, which cannot be recycled in any way. Examples of these are fossil fuels and nuclear energy sources (e.g. uranium, etc) which provide 90 per cent of our energy requirements.