

UNIT: 6 ENVIRONMENT LEGISLATION

6.1 ENVIRONMENT LEGISLATION

Environmental legislation is the collection of laws and regulation pertaining to air quality, water quality endangered wildlife and other environmental factors. Environmental legislation which work together towards a common goal. Environment legislation regulates the interaction between man and the nature to reduce threats to the environment and increase public health.

6.2 WATER (PREVENT AND CONTROL OF POLLUTION) ACT 1974

Water Act 1974 (Prevention & Control of Pollution) Act, 1974 is a comprehensive legislation that regulates agencies responsible for checking on water pollution and ambit of pollution control boards both at the center and states. The Water (Prevention & Control of Pollution) Act, 1974 was adopted by the Indian parliament with the aim of prevention and control of Water Pollution in India. Some of the important sections regulating the prevention of water pollution as per the act are as discussed below.

Functions of Central Board:

1. To advise the Central government on any matter concerning the prevention and control of water pollution.
2. To coordinate the activities of the State Boards and resolve disputes among them.
3. To provide technical assistance and guidance to the State Boards, carry out and sponsor investigations and research relating to problems of water pollution and prevention.
4. To plan and organizes the training of person engaged or to be engaged in programs for the prevention, control or abatement of water pollution.
5. To organize through mass media a comprehensive regarding the prevention and control of water pollution.

6. To collect, compile and publish technical and statistical data relating to water pollution and the measures devised for its effective prevention.

Functions of State Board

1. To plan a comprehensive program for the prevention control.
2. To advise the State Government on any matter concerning the prevention control or abatement of water pollution.
3. To collect and disseminate information relating to water pollution and the prevention, control or abatement thereof.
4. to encourage conduct and participate in investigations and research relating to problems of water pollution and prevention control or abatement of water pollution.

6.3 AIR (PREVENTION AND CONTROL OF POLLUTION) ACT 1981

Air(Prevention and control of pollution) Act 1981 was enacted for prevention control and abatement of air pollution.

Functions of Central Board:

1. To advise the Central Government on any matter concerning the improvement of the quality of air and the prevention, control or abatement of air pollution.
2. To plan and organize a nation-wide programme for the prevention, control or abatement of air pollution.
3. To coordinate the activities of the state boards and resolve disputes among them.
4. To provide technical assistance and guidance to the State Boards, carry on and sponsor investigations and research relating to problems of an pollution.
5. To organize through mass media a comprehensive programs regarding the prevention, control or abatement of air pollution.

Function of State Board:

1. To plan a comprehensive programme for prevention, control or abatement of air pollution and to secure the execution thereof.
2. To advise the State Government on any matter concerning the prevention, control or abatement of air pollution.
3. To collect and disseminate information relating to air pollution.
4. To collaborate with the Central Board in organizing the Training of persons engaged or to be engaged in programmes relating to prevention control.
5. To inspect air pollution control areas at such intervals as it may think necessary, assess the quality of air therein and take steps for prevention, control or abatement of air pollution in such areas.

6.4 ENVIRONMENT (PROTECTION) ACT 1986

This act came into force on November 19, 1986(Birth Anniversary of late prime minister Smt. Indira Gandhi). She took keen interest in the environmental issues of the country. The objective of this act is to protect and improve the quality of environment by Central Government with coordination of State Government.

1. To plan and execute of a nation—wide program for the o, control and Abatement of environmental pollution.
2. To lay down standards for the quality of environment in its various aspects.
3. To lay down standards for emission or discharge of environmental pollutants from various sources whatsoever.
4. To restrict areas in which any industries, operations or processes of class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards.
5. To lay own procedures and safe guards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents.

6. To lay down procedures and safeguards for the handling hazardous substances.
7. To examine such manufacturing processes, materials and substances as are likely to cause environmental pollution.
8. To carry out sponsor investigations and research relating to problems of environmental pollution.
9. To collect and disseminate information in respect of matters relating to environmental pollution.

6.6 ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment is a process of evaluating the likely impacts of a proposed project or development on the environment, taking into account inter-related socio-economic, cultural and human health impacts. According to United Nations Environment Programme.

Environmental Impact Assessment may be defined as a tool used to identify the environmental, social and economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions.

6.7 STAGE OF ENVIRONMENTAL IMPACTS ASSESSMENT(EIA)

1. Screening: To determine which projects or developments require a full or partial impact assessment study.
2. Scoping: To identify which potential impacts are relevant to assess (based on legislative requirements, International conventions, expert knowledge and public involvement), to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity.
3. Assessment and Evaluation of Impacts: To predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives.

4. Reporting the Environmental Impact Statement, Including an environmental management plan(EMP) and a non-technical summary for the general audience.
5. Review of the Environmental Impact Statement(EIS), Based on the terms of reference and public participation.
6. Decision Making.
7. Monitoring, Compliance, Enforcement and Environmental Auditing.

6.8 ENERGY CONSERVATION ACT 2001

This act empowers the Central Government and in some instances, State Governments to

1. Specify energy consumption standards for notified equipment and appliances.
2. Direct mandatory display of label on notified equipment.
3. Prohibit manufacture, sale, purchase and import of notified equipments and appliances not conforming to energy consumption standards.
4. Notify energy intensive industries, other establishments and buildings as designated consumers.
5. Establish and prescribed energy consumption norms and standards for designated consumers.
6. Get energy audit of the building conducted by an accredited energy in this specified manner and intervals of time.

State Governments may:

1. Amend the energy conservation building codes prepared by the government to suit regional and local climatic conditions.
2. Direct every owner or occupier of a new commercial building or complex being a designated consumer to comply with the provisions of energy conservation building codes.

6.9 ENERGY CONSERVATION (AMENDMENT) ACT 2010

The Energy Conservation Act was amended in the year 2010 and the main amendments of the Act are given below:

1. The Central Government may issue the energy savings certificate to designated consumer whose energy consumption is less than the prescribed norms and standards in accordance with procedure as may be prescribed.
2. The designated consumer whose energy consumption is more than the prescribed norms and standards shall be entitled to purchase the energy savings certificate to comply with prescribed norms and standards.
3. The Central Government may , in consultation with the bureau, prescribe the value of per metric tonne of oil equivalent of energy consumed.

EXERCISES

VERY SHORT ANSWER TYPE QUESTIONS:

1. Define Environment legislation.
2. Define WATER (PREVENT AND CONTROL OF POLLUTION) ACT 1974.

SHORT ANSWER TYPE QUESTIONS:

1. Write function of State Board with reference to WATER (PREVENT AND CONTROL OF POLLUTION) ACT 1974
2. Define Air pollution.

LONG ANSWER TYPE QUESTION

1. Explain the Air Pollution Act 1984 .

Unit : 7

IMPACT ON ENERGY USAGE ON ENVIRONMENT

7.1 ENERGY MANAGEMENT

Energy is an integral part of today's modern life. It is the blood of our day to day life. But it is not free. It comes at a monetary price and more than that it come at the cost of environment. Therefore, the concept of Management has become important.

Among the practices that arise from the above definition are as follow:

1. Eliminate Waste: Ensure that energy is used at the highest possible efficiency.
2. Maximize Efficiency: Utilize the most appropriate technology to meet organizational needs.
3. Optimize Supply: Purchase or Supply Energy at the lowest possible cost.

7.2 ENERGY CONSERVATION

Energy can be conserved by reducing wastages and losses, improving efficiency by technological up gradation and improved operations and maintenance Energy conservation may be defined as the efforts made to reduce the consumption of energy by using less of energy service.

7.3 ENERGY EFFICIENCY

Energy efficiency means using less energy to provide the same service. E.g. a compact fluorescent bulb is more efficient than a traditional incandescent bulb as it uses much less electrical energy to produce the same amount of light.

Sometimes, increase in energy efficiency costs high, but this high cost will be paid back in the form of reduced cost of energy within a short period of time. The scope of techniques required and the savings depend on the situation and location.

7.4 SOURCES OF ENERGY

Sources of energy may be classified into two categories:

1. Conventional sources of energy.
2. Nonconventional sources of energy.
 1. Conventional sources of energy: These sources of energy are also called non-renewable sources of energy. These sources of energy are in limited quantity and will be exhausted over time. These include coal, oil, natural gas, nuclear power etc.
 2. Non-conventional Sources of Energy: Beside conventional sources of energy, there are nonconventional sources of energy also. These are also called renewable sources of energy. These include bio-energy, solar energy, wind energy.

7.5 The difference between conventional and non-conventional sources of energy are presented below in points:

1. Conventional sources of energy, as the name suggests, are those sources which are widely used all around the world since ages. On the contrary, non-conventional sources of energy are described as

the energy sources whose evolution has been done in the recent past and has gained popularity since then.

2. As the conventional sources of energy are limited in nature, and their formation takes millions of years, they can be exhausted one day. Conversely, non-conventional sources of energy are the sources that are in abundance in the environment and are easily renewable, so they are inexhaustible.
3. Conventional sources of energy pollute the environment on a large scale through the smoke and hazardous waste emitted from the power plants. However, the energy produced from running water does not pollute the environment. On the other hand, non-conventional sources of energy are environment-friendly, so they do not harm the nature, by polluting it.
4. The energy produced from conventional sources are highly used for industrial and commercial purposes. As against, the energy generated out of non-conventional sources are used for domestic purposes.
5. Conventional sources of energy are costly because they are scarce but their uses are unlimited. In contrast, non-conventional sources of energy are less expensive, because of their enormous presence in nature.

7.6 ROLE OF NON-CONVENTIONAL/RENEWABLE ENERGY SOURCES IN ENVIRONMENT PROTECTION

Renewable technologies are considered as clean sources of energy and optimal use of these resources minimize environmental impacts, produce minimum secondary wastes and are sustainable based on current and future economic and social societal needs. Sun is the source of all energies. The primary forms of solar energy are heat and

light. Sunlight and heat are transformed and absorbed by the environment in a multitude of ways. Some of these transformations result in renewable energy flows such as biomass and wind energy. Renewable energy technologies provide an excellent opportunity for mitigation of greenhouse gas emission and reducing global warming through substituting conventional energy sources. In this article a review has been done on scope of CO₂ mitigation through solar cooker, water heater, dryer, biofuel, improved cook stoves and by hydrogen.

7.7 SOLAR ENERGY

Solar energy is radiant light and heat from the Sun that is harnessed using a range of ever-evolving technologies such as solar heating, photo voltaic, solar thermal energy, solar architecture, molten salt power plants and artificial photosynthesis.

It is an important source of renewable energy and its technologies are broadly characterized as either passive solar or active solar depending on how they capture and distribute solar energy or convert it into solar power. Active solar techniques include the use of photovoltaic systems, concentrated solar power and solar water heating to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light-dispersing properties, and designing spaces that naturally circulate air.

Application of Solar Energy

1. Domestic lighting.
2. Street lighting.
3. Village electrification
4. Water pumping.

5. Railway signals.

7.8 ADVANTAGES AND DISADVANTAGES OF SOLAR ENERGY

Advantage: The following are the advantages of solar energy

1. Renewable Energy Source.
2. Reduce Electricity Bills.
3. Diverse Applications.
4. Low Maintenance Costs.
5. Technology Development.

Disadvantage: The following are the disadvantage of solar energy

1. Fairly high cost.
2. Weather Dependent.
3. Expensive Energy Storage.
4. Requirement of large space.

7.9 WIND ENERGY

Wind energy is a form of solar energy. Wind energy (or wind power) describes the process by which wind is used to generate electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. A generator can convert mechanical power into electricity.

Wind turbines convert the kinetic energy in the wind into mechanical power. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity to power homes, businesses, schools, and the like.

Advantages of Wind Power

1. Wind power is cost-effective. ...
2. Wind creates jobs. ...
3. Wind enables U.S. industry growth and U.S. competitiveness. ...
4. It's a clean fuel source. ...
5. Wind is a domestic source of energy. ...
6. It's sustainable. ...
7. Wind turbines can be built on existing farms or ranches.

Disadvantages of Wind Energy

1. The Wind Fluctuates. Wind energy has a similar drawback to solar energy in that it is not constant. ...
2. Wind Turbines Are Expensive. Although costs are reducing, wind turbines are still very expensive. ...
3. Wind Turbines Pose a Threat to Wildlife. ...
4. Wind Turbines Are Noisy. ...
5. Wind Turbines Create Visual Pollution.

7.10 BIO-ENERGY

“Bioenergy” is use of any organic material, such as forest thinning, residues, agricultural waste or urban wood waste, to generate heating, cooling and/or electricity. Many independent power producers across the United States and Canada produce electricity for the grid using

bioenergy.

Examples of biofuels include ethanol (often made from corn in the United States and sugarcane in Brazil), biodiesel (from vegetable oils and liquid animal fats), green diesel (derived from algae and other plant sources) and biogas (methane derived from animal manure and other digested organic material).

Advantages And Disadvantages Of Bioenergy

Although the burning or conversion of biomass does not fully relieve pollution of the atmosphere, it does have several major benefits. In many regions, biomass is more reliable than solar or wind energy. This is because the energy in plants is captured and stored, while in solar and wind energy this must be done by manufactured technology. Another advantage of bioenergy is that it can be produced using organic waste material that might otherwise be discarded; this saves the environmental and economic costs of their disposal. Used in mass quantities, bioenergy could boost the economy of any nation that must now import fossil fuels. If crops grown for their biomass increase the biomass of growing plants on the planet, this would reduce the amount of carbon dioxide in the atmosphere. Perhaps the most significant advantage of bioenergy is that it is a potentially renewable natural resource that would help supply energy needs indefinitely.

7.11HYDROPOWER

Hydropower is energy in moving water

Hydropower was one of the first sources of energy used for electricity generation and is the largest single renewable energy source for electricity generation in the United States.

Hydropower plants capture the energy of falling water to generate electricity. A turbine converts the kinetic energy of falling water into mechanical energy. Then a generator converts the mechanical energy from the turbine into electrical energy.

This fast flowing water turns the turbines, and the generator system converts this kinetic energy into electrical energy. An example of a hydroelectric power dam, is the Kielder Water reservoir, located in Northumberland, operated by RWE Npower and is the largest system in England.

Advantages of Hydroelectric Energy

- 1 Renewable: Hydroelectric energy is renewable. ...
- 2 Green: Generating electricity with hydro energy is not polluting itself.
- 3 Reliable: Hydroelectricity is very reliable energy. ...
- 4 Flexible: As previously mentioned, adjusting water flow and output of electricity is easy. ...
- 5 Safe.

Disadvantage of Hydroelectric Energy

1. Causes Environmental Damage. Due to the interruptions in the natural flow of water, there are many identified results that can affect the environment. ...
2. Cost of Building is Expensive. ...
3. May Cause Droughts. ...
4. Floods in Lower Areas. ...
5. Shortage of Water Supply.

7.12 GREENHOUSE EFFECT

The greenhouse effect is the problem caused by increased quantities

of gases such as carbon dioxide in the air. These gases trap the heat from the sun, and cause a gradual rise in the temperature of the Earth's atmosphere.

Greenhouse gases and global warming

Carbon dioxide (CO₂) and other greenhouse gases act like a blanket, absorbing IR radiation and preventing it from escaping into outer space. The net effect is the gradual heating of Earth's atmosphere and surface, a process known as global warming.

The following is a list of 8 steps you can take to reduce greenhouse gas emissions:

1. Reduce, Reuse, Recycle. ...
2. Use Less Heat and Air Conditioning. ...
3. Replace Your Light Bulbs. ...
4. Drive Less and Drive Smart. ...
5. Buy Energy-Efficient Products. ...
6. Use Less Hot Water. ...
7. Use the "Off" Switch. ...
8. Plant a Tree.

7.13 OZONE LAYER

The ozone layer or ozone shield is a region of Earth's stratosphere that absorbs most of the Sun's ultraviolet radiation. It contains high concentration of ozone (O₃) in relation to other parts of the atmosphere, although still small in relation to other gases in the stratosphere. The ozone layer contains less than 10 parts per million of

ozone, while the average ozone concentration in Earth's atmosphere as a whole is about 0.3 parts per million. The ozone layer is mainly found in the lower portion of the stratosphere, from approximately 15 to 35 kilometers (9.3 to 21.7 mi) above Earth, although its thickness varies seasonally and geographically. The ozone layer was discovered in 1913 by the French physicists Charles Fabry and Henri Buisson. Measurements of the sun showed that the radiation sent out from its surface and reaching the ground on Earth is usually consistent with the spectrum of a black body with a temperature in the range of 5,500–6,000 K (5,227 to 5,727 °C), except that there was no radiation below a wavelength of about 310 nm at the ultraviolet end of the spectrum. It was deduced that the missing radiation was being absorbed by something in the atmosphere. Eventually the spectrum of the missing radiation was matched to only one known chemical, ozone.[2] Its properties were explored in detail by the British meteorologist G. M. B. Dobson, who developed a simple spectrophotometer that could be used to measure stratospheric ozone from the ground. Between 1928 and 1958, Dobson established a worldwide network of ozone monitoring stations, which continue to operate to this day. The "Dobson unit", a convenient measure of the amount of ozone overhead, is named in his honor.

7.14 DEPLETION OF OZONE LAYER

Ozone depletion, gradual thinning of Earth's ozone layer in the upper atmosphere caused by the release of chemical compounds containing gaseous chlorine or bromine from industry and other human activities. The thinning is most pronounced in the polar regions, especially over Antarctica.

7.15 EFFECT ON OZONE LAYER DEPLETION

The serious effects of ozone layer depletion are as follow:

1. Damage to Human Health.
2. Damage to Animal.
3. Impact on Certain Materials.
4. Devastation to Environment.
5. Threat to marine Life.

EXERCISES

VERY SHORT ANSWER TYPE QUESTIONS:

1. Define energy conservation.
2. Define conventional and non-conventional energy.

SHORT ANSWER TYPE QUESTIONS:

1. Write the effects on Ozone layer.
2. Explain the concept of Global Warming.

LONG ANSWER TYPE QUESTION

1. Explain Energy Management in detail.
2. Explain Wind Energy in detail
3. Explain Hydropower in detail.

