

SUSTAINABLE DEVELOPMENT AND ENVIRONMENT PROTECTION



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कनिष्ठ व वरिष्ठ महाविद्यालय

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Hazardous effect on environment & living things due to transmission of electricity

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Electrical power transmission is the process of delivering generated electricity to the required destinations over short or long distances. Generated electricity is transmitted to distribution grid located in or near the populated area like village, city or industrial area. This electric transmission process includes transformers which are used to increase voltage levels to make long distance transmission possible.

The electrical power is produced in power plants like hydro-electric power plants, nuclear power plants, biomass power plants, thermal power plants, geothermal power plants, tidal power plants, wind power plants and solar power plants etc. This electricity is transmitted to distribution system to electric grids (sub-stations) and then to society or industry. Thus the electrical power is transmitted from its generation to its end user. Usually power plants are most often located outside of densely populated areas or industrial areas, so the transmission lines must be fairly large.

Power lines or transmission lines, are used to transport electricity from place to place. Usually, this electricity is alternating (ac) current so step-up transformers (which increases voltage by decreasing current) can increase the voltage. This increased voltage allows efficient transmission for 500 kilometers or less. There are 3 types of lines:

1. Overhead lines are very high voltage, between 100 kV and 800 kV, and do the majority of long distance transmission. They must be high voltage in order to minimize power losses to resistance.
2. Underground lines are used to transport power through populated areas, underwater, or pretty much anywhere that overhead lines can't be used. They are less common than overhead lines due to heat-related losses and higher cost.
3. Sub-transmission lines carry lower voltages (26 kV - 69 kV) to distribution stations, and can be overhead or underground.

While the most significant environmental impacts of electricity relate to electricity delivery can also affect the environment and living things in several ways:

1. Transmission and distribution lead to some losses in electricity as it moves from the point of generation to the end-user. These losses are collectively referred to as "line loss." In general, the longer the distance the electricity must travel from generation to consumer, the larger the line loss.
2. Power lines require routine maintenance and operation. Trees and other plants near the wires have to be maintained to keep them from touching the wires. On some power line corridors, herbicides are used to control vegetation.

3. When power lines and their access roads are placed in undeveloped areas, they can disturb forests, wetlands, and other natural areas.
4. Many high-voltage circuit breakers, switches, and other pieces of equipment used in the transmission and distribution system are insulated with sulfur hexafluoride, which is a potent greenhouse gas. This gas can leak into the atmosphere from aging equipment or during maintenance and servicing.
5. The main impact of such lines comes from their visual intrusion, but they also restrict agriculture on bands of land 30-120 m wide and may cause some interference with nearby radio and television reception.
6. It has been postulated that the lines may affect bird behaviour (especially water fowl), perhaps because they sway or hum in the wind; other hypotheses involve the effects of electrical fields.
7. Several studies indicate exposure to the electrical and magnetic fields surrounding power lines may result in cancer, lethargy and loss of sex drive; due to the difficulty of actually measuring the amount of exposure to these fields exact relationships have not been proven.
8. The presence of transmission lines often lowers house prices in neighbouring areas. Because it is expensive to place transmission lines underground (where access for maintenance is also more difficult), this is usually only done in areas of particularly outstanding landscape quality.
9. Stray voltage (neutral to earth voltage) is a small voltage that can be measured between two contact points. When these two points are connected together by an object, such as a person or an animal, a current will flow. The amount of current depends on the voltage and the circuit impedance, which includes the source, contact and body impedances. People and animals respond to the resulting current flow and not to the applied voltage. Because stray voltage is normally related to very low voltage and current, it sometimes is not detectable and therefore not a problem. However, when people start to get shocked, it becomes more of a safety-related issue and if not corrected, has the potential to be a bigger problem. In cities with aging electrical infrastructure have caused serious injury and even death to dogs that were electrified by sidewalk plates.
10. For the past 40 years in the dairy industry, stray voltage has been a serious issue, where cows feel the effects and they result in lower milk production. Dairy cows are extremely sensitive to electricity. Generally, they will start to notice currents flowing through their bodies at levels between 0.001 and 0.002 A and subsequently produce less milk each day, as well as suffer additional health problems, such as mastitis. At higher levels, they may die.
11. Electrical noise (Electrical hum) in electronics, is an unwanted disturbance in an electrical signal. Noise generated by electronic devices varies greatly as it is produced by several different effects. In particular, noise is inherent in physics, and central to thermodynamics. Any conductor with electrical resistance will generate thermal noise inherently. The final elimination of thermal noise in

electronics can only be achieved cryogenically, and even then quantum noise would remain inherent.

12. Unaesthetic location (mal-positioned electrical towers) of power transmission lines or ill-considered pylon location is also a problem. Opposition to the line claim this an inevitable consequence of supplanting public planning by private profit as the prime organizational motive of the electricity industry, and argue that they would do better to generate its own electricity.
13. Exposure to electro-magnetic energy (EME) in which extremely low-frequency non-ionizing radiation (ELF) is a natural component of environmental background radiation, but is also artificially produced by electrical devices. This low-level radiation is associated with electrical installations, transmission lines, home wiring, and electrical appliances such as computers, electric blankets, clocks and radios. Studies suggest it is the oscillating 50 hertz (cycles per second) current, (common to most electrical appliances), perhaps in combination with the background magnetic field of the earth, which produces radiation effects that can cause biochemical changes, interfering with function of genes and stimulating activity in bio-chemicals linked to the growth of cancer. In 1979, doctors at the University of Colorado reported that children exposed to higher than average magnetic fields had a twofold to threefold increased risk of leukaemia (blood cancer). Five subsequent epidemiological studies have reported similar findings, the latest in 1992 by the Swedish Karolinska Institute which studied a population of nearly half a million people living within 300 metres of power lines between 1960 and 1985; whereas a 1992 British government study and one by the Oak Ridge Associated Universities, USA, have concluded that the evidence to link low-level electric and magnetic fields with childhood cancers is too weak and inconsistent. In the USA, death rates as a result of breast cancer were reported in 1994 as 38 percent higher in women exposed to EMFs through job-related activities.

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