SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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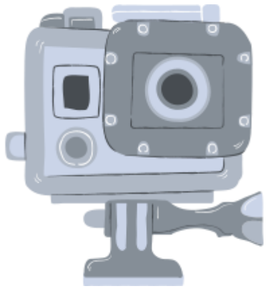
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EEE308/ SMART GRID

III YEAR / VI SEMESTER

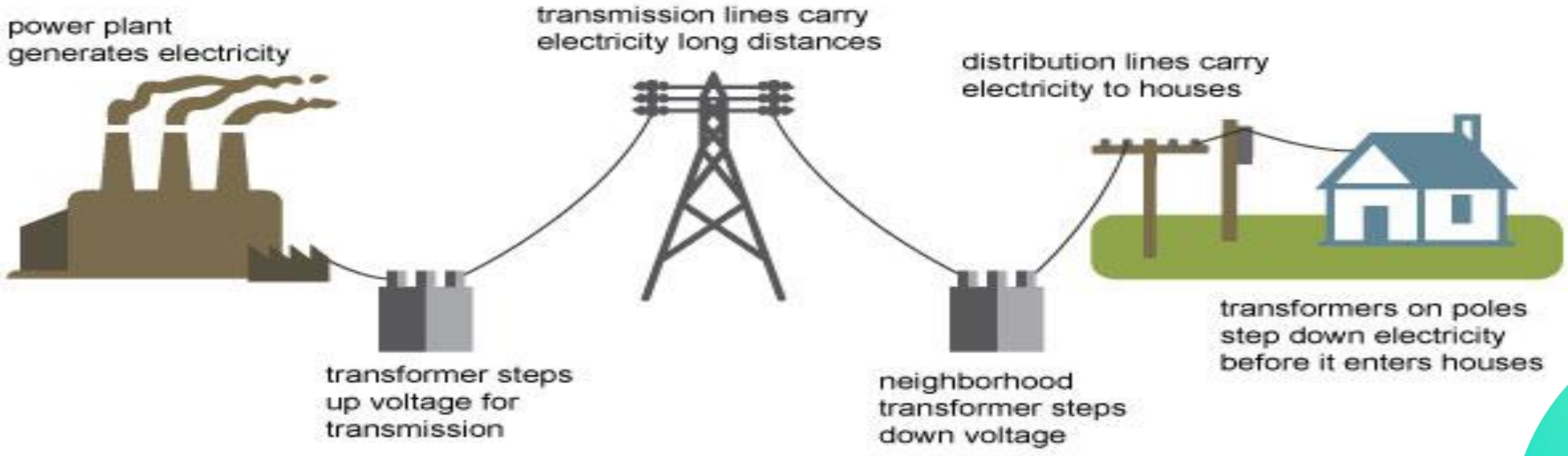
Unit 1 –OVERVIEW OF SMART GRID

Topic 1: EVOLUTION ELECTRIC GRID



ELECTRIC GRID:

- The electric grid is a network of power lines, substations, and transformers that delivers electricity from power plants to consumers



ELECTRIC GRID:

- When you plug in your phone or charge an electric vehicle (EV), your are accessing electricity from **the grid**.
- The grid is the network of wires and electrical systems that transport energy from the production source to your home

Evolution of Electric Grid
"Phase 1-Early Development

- The major highlights of the early evolution of electric grid during its first phase are given below –
- The early development of Electric Grids took place between 1880s and 1930s.
- The concept of electric power and its supply system began with the invention of electric light bulb by Thomas Edison and the development of DC power system in the years of 1880s.

Phase1 – Early Development

- In 1882, Thomas Edison established the first power plant in New York City for supply DC power to homes and business for lighting.
- After that Nikola Tesla and George Westinghouse introduced the concept of alternating current (AC) power in the year of 1891. They also shown the technical benefits of AC power for transmission over long distances as compared to DC power.
- In the period of 1900s to 1930s, a rapid expansion of electric grid occurred with the establishment of large AC power plants and long-distance transmission lines.

Phase II – Mid 20th Century

- During the period 1940s to 1950s, the utility companies expanded their electric grid infrastructure for widespread electrification and meet the energy demand.
- In 1950s, the concept of electricity generation from nuclear energy was introduced. This gave a new path for electricity generation at a large scale.

Phase II – Mid 20th Century

- New electric grid technologies like high-voltage power transmission were developed in the period of 1960s to 1970s.
- In the years of 1970s, the oil crisis and environmental concerns came into picture. Because of all these issues, the energy sector has shifted towards new and diversified energy resources to ensure sustainability.

Phase III – Late 20th Century

- During the period of 1980s to 1990s, the deregulation of electric power industry resulted into the commencement of new and independent utility companies and a competitive electricity market was created.
- In 1990s, several types of renewable energy resources like solar, wind, etc. was introduced to meet the increasing demand and fulfil the environmental policies.

Phase III – Late 20th Century

- After that the period of 1990s to 2000s was come up with the advancement of digit technology and internet which significantly affected the operations of electric grid.
- In this period, utility companies started implementing digital control systems to manage and operate their electric grids and improve the reliability of the supply system.

Phase IV – The Age of Modern Electric Grid

- This period is considered from 2010s to present.
- During 2010s, the concept of smart grid came into existence and the digital communication technologies and automation systems are integrated with the electric grids.
- During this period, the integration of renewable energy resources is further expanded to meet the increasing demand of electricity and create a sustainable way of producing electricity.

Phase IV – The Age of Modern Electric Grid

- With the advancement in digital technology in the electric grid, the focus on grid security is increased at both cyber and physical layers. Also, self-healing and grid resilience was developed during the period of 2010s to 2020s.
- In 2020s, the **IoT (Internet of Things)** and **AI (Artificial Intelligence)** are integrated with the electric grid for further enhancement of the grid and for real-time monitoring of system and data.

Phase IV – The Age of Modern Electric Grid

- In this phase, another major focus in the electric grid is on the reduced carbon and greenhouse gas emission to create a sustainable and environment friendly energy system.
- The electric grid that we see today has evolved from its simplest form to today’s a large interconnected network of power supply systems. This complete evolution has taken place in different phases. In each phase of evolution, the electric grid has undergone through some technological

Conclusion

- The electric grid that we see today has evolved from its simplest form to today's a large interconnected network of power supply systems. This complete evolution has taken place in different phases.
- In each phase of evolution, the electric grid has undergone through some technological advancements and other improvements.
- All these transformations were needed and made to meet the increasing demand of electricity and create a sustainable energy system.


Thank
You!