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Article

Analysis and Case Study of Power Transmission and Distribution

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A B S T R A C T

Power Transmission lines mold a pattern of the distribution and transmission networks which powers the whole country. The complete networks are equanimous of assets consisting; underground cables and overhead lines that connect substations containing switches, transformers, and control equipment. To prevent from propagation to other areas in the protective system are unpredicted faults that occur in the power system. The major task of the protective systems is to identify, then classify and finally determine the location of the faulty line of voltage or current line magnitudes. Adopting the latest hardware technologies can further improve the capabilities of the transmission system whereas software technologies system are required to coordinate with these hardware technologies safely, securely and effectively. The main purpose of this paper is to showcase an analytical review of the approaches in electrical power transmission and distribution systems.

Keywords: Power Transmission and Distribution, Power Generation, Conductors, Sediment, Erosion etc.

Introduction

In the historical, engineers and product inventers go through the tasks involving power: The continuousness of supplied power, recharging batteries, improving the location of sensors, and commerce with rotating or moving joints. Energy is careful as a rudimentary essential for the economic growth of the country. Currently, the transmission lines linked amid generation plants and substations in power mesh, the examination, control, and reduction of transmission and distribution losses in these power networks are of substantial trouble to electrical engineers.[1]

Transmission and Distribution loss refers to a difference between the generated and distributed units.

Generation of Power

Faraday did an outstanding discovery i.e., electrical technology which produced an electric field by changing magnetic flux. Presently, the unthinkable life for today's generation is to live without electricity. It is considered as the most and major tangled engineering operation of human. The production of electric energy includes the consumption of Fossil fuels also by non-conventional energy sources such as wind turbines, solar panels, and other technologies that are used to generate electricity.

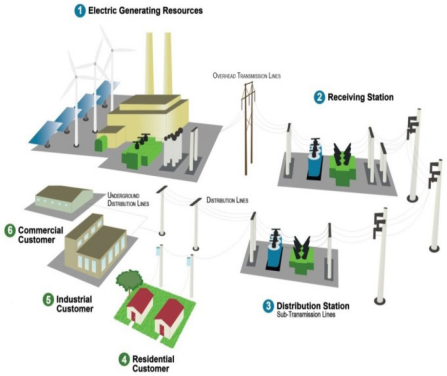

Figure 1.Generation of Electricity

Transmission and Distribution of Power

Electricity is generated and then convey via the distribution and transmission system to commercial, industrial and domestic consumers. The mesh consists of connected power plants, substations, bulk transmission, consumers and distribution lines. During conveyor delivery of electricity along with the transmission and distribution system, there is some occurrence of Power losses.[2] By understanding through it by an example of the transmission and distribution system have posses a losses of 10 percent 100 megawatt-hours (MWh) of electricity produced at the Power plant would deliver only 90 MWh to the consumers, These losses occur due to physical characteristics of the electricity and the transmission and distribution losses in the electrical system are termed as power losses. These losses are caused by.[3] the electrical resistance of the Power lines or Conduction lines.[4] by transfiguring the power between high voltage which is used for long-distance transmission and safe low voltages which are more likely to be used in most industrial and residential homes.

Figure 2.Transmission of electricity

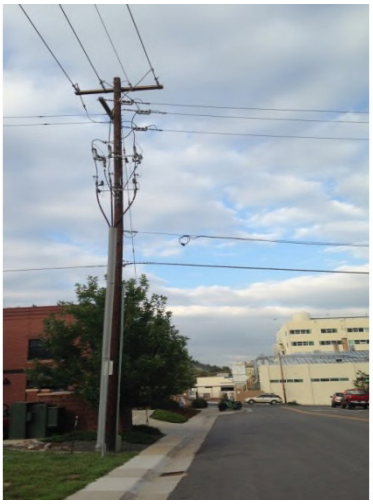

Figure 3.Distribution of Electricity

The total amount of power transmitted a power line is measured or calculated in watts (W), which is analogous to ampere multiplied by volt. These losses also obtained during the conversion of power between high voltages and low voltages through the use of a transformer. By season and time of day, loss factors can vary due to ambient conditions such as wind, rain, and temperature. Generally, in summer it is observed that losses are higher than in the winter.[5]

Conductors

For transmission or distribution of electricity typically aluminum or copper conductors are used. Aluminum is simply preferable because of its lighter weight and lower cost than copper. Aluminum conductors Steel Reinforced (ALSR) - includes steel strands wrapped around aluminum conductors to add strength. This is the major and most commonly used conductor.[6,7]

Figure 4.Aluminum conductor

Potential Environmental Impacts

Climate change risk assessment defines the key risks of bearing up electricity networks as flooding, higher, cooling demand, and heat damage. In response to the climate change act, numerous organization has given several adaption reports over climate change.[8] Power transmission and distribution lines, and linked ingress roads and facilities, may require the construction of corridors crossing aquatic habitats that may disrupt wetlands and watercourses, and necessary the removal of riparian vegetation. Sometimes, sediment and erosion from construction activities and stormwater runoff may increase the turbidity of surface watercourses.[9,10]

Conclusion

This paper has outlined key issues pertinent to the design of power transmission and distribution. The system principles and research problems described here, while influenced by the nuances of power grid control, in particular, are relevant to a wide variety of other critical infrastructure systems in other engineering domains such as automotive, petrochemical, aerospace, manufacturing, and medical device systems.

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