

Energy Efficiency In The Transmission And Distribution Of Electric Energy

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Electricity is the most common form of energy used in industry, commercial companies and houses. More efficient and active use of electrical energy is required due to the rapid consumption of natural resources, increase in the environmental pollution and high energy prices. Although the fossil fuel resources and reserves of Turkey are low compared to the other Middle East countries, in Turkey the percentage of the electric energy generated by fossil fuels are 75%, whereas 25% is generated by renewable energies. As a result this makes Turkey a country that is energy dependent and imports energy. Because of all these reasons, especially in electric energy, Turkey should improve and pay attention to its level of energy efficiency.

It would be a missing approach to say that energy efficiency is only valid in the generation phase; because there are some energy losses in the transmission and distribution phases as well. Electric transformers, used in the transmission and distribution phases of electric energy, are static electrical machines. They transform electrical power from one circuit to another by either increasing or decreasing the amplitude of voltage and current, but they don't change the frequency. Since transformers are in the inactive electrical machine class, their losses are expected to be minimum and efficiencies to be maximum.

With this study the circumstances are determined, under which the transformers will have minimum losses and maximum efficiencies, by analyzing the simulation results and studies. To model transformers a software program called MATLAB is used. By using this model the changes in efficiency and the reactions of transformers for different circumstances are observed. As a result of this efficiency increase, the electric energy necessary for thousands of houses or tens of factories can be saved. This study is concluded by discussing the applicability of this algorithm in Turkey.

Keywords: Energy Efficiency, Electric Energy, Distribution, Transmission, Transformers