

Question 27 (4 marks)

There are two areas in which energy savings can be made by the use of superconductors. These are:

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- electricity generation and transmission;
- transportation.

Discuss how energy savings can be achieved in each of these two areas.

- In electrical generation + transmission, can use superconductors to save energy by ^{using them in} transmission lines. Power losses associated with power transmission $P_c = I^2R$ if R is effectively zero, so are the losses
- In transportation superconductors can be used in Maglev (magnetic levitation) trains. By avoiding mechanical (wheels) contact with rails, friction is reduced. This increases the efficiency of the train as energy is not being dissipated as heat + noise through the wheels