

Power Transmission, Preflight 11.5



A generator produces 1.2 Giga watts of power, which it transmits to a town 7 miles away through power lines with a total resistance 0.01 ohms. How much power is lost in the lines if the energy is transmitted at 120 Volts?

Example

$P = IV$ Power delivered by generator through lines

$I = P/V = 1.2 \times 10^9 \text{ W} / 120 \text{ V} = 10,000,000 \text{ Amps in lines!}$

$P = I^2R$ Power lost in lines

$= 10,000,000^2 (.01) = 1.0 \text{ Giga Watt Lost in Lines!}$

Large current is the problem. Since $P=IV$, use high voltage and low current to deliver power.

If $V = 12,000 \text{ Volts}$, loose $0.0001 \text{ Giga Watts!}$