

Newbie – Current, Voltage, Resistance, Power and Transformer theory

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I'm self-teaching myself electronics and the only place to ask questions is in this forum so please excuse me if this has been asked a million time already but after reading several books, I still have questions on these topics. No real values, just theory in this question.

I'm just starting the section on AC and the book is explaining why we (homes and industry) use AC instead of DC and the use of transformers. Now, the books says the reason we use AC is to minimize power loss. That homes and industry need a lot of current and if we were using DC we'd need to push a huge amount of current through the transmission lines and the higher the current the more we'd lose in heat loss. OK fine. But now let's see what happens in AC. Rather than pushing a huge amount of current we have a very high voltage say 200,000 to 600,000 volts and a low amount of amps (current). But how can we have this HUGE amount of "pressure" (the typical explanation of what voltage is) and hardly any current ? I've been reading that voltage and current are proportional – the more voltage the more current. Ahh... but this isn't the case really since current is a variable value. It depends on the amount of resistance. So getting back to the transmission lines, if we have HIGH voltage and LOW current then resistance MUST be high. $E = I * R$ that is, if I is low R must be high to get a high value of E. And resistance is what cause heat which causes power loss. So how can we have low current + low resistance = high voltage ?

In summary, if we have very high voltage and low current we must have very high resistance which would eliminate just about all the current so loss would be almost 100%.

TIA

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