Electricity and the Grid
SPH4C

Recall that the power delivered to a circuit or consumed by a load is: P =

or P =

or P =

Electrical power travels from a power plant to your house via the

_____.

The power plant contains a _____

electrical _____.

What spins the generator could be _____

power, but is more commonly a

_____,

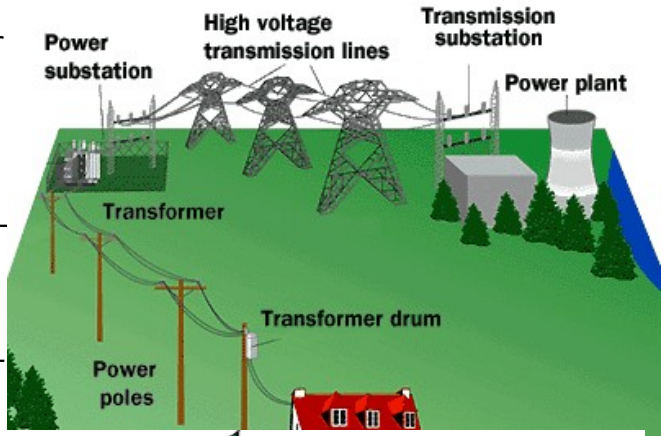
powered by steam from the

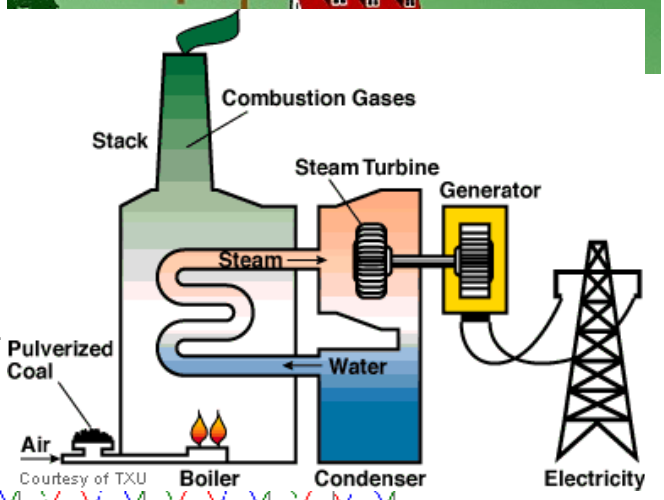
_____

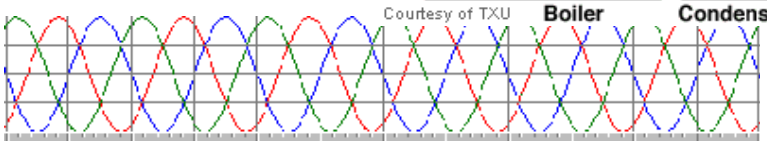
or from a _____.

(or _____).

Remember that generators produce _____ power.

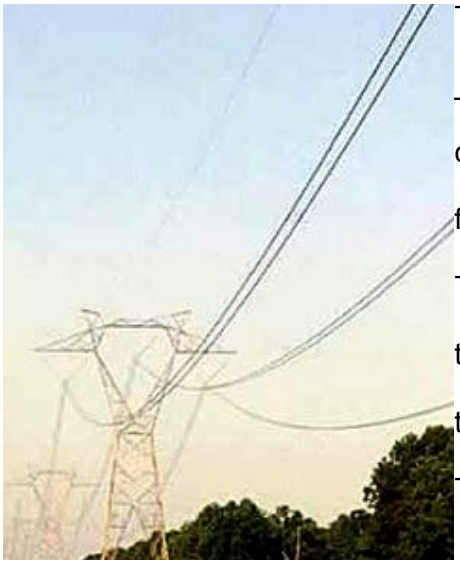






Power plants actually produce _____ (offset by 120°) of AC power simultaneously, so that at any given moment, one the three phases is near its peak, producing relatively _____ power for _____.

A power plant therefore has four wires coming out of it, the three phases and a _____ _____ for electrons common to all three (in some circuits the _____ itself may be used as ground).



The wires leave the generator and enter the electrical _____ where the generated voltages are converted to higher voltages (by _____) for _____.

The high-voltage transmission lines are supported by large steel towers. (The wires at the top are _____ and are placed there primarily to _____).

The long-distance transmission lines often carry _____. Why?

Recall $P = VI$. So the current drawn by the substation is _____.

Also, $P = I^2R$, so the loss of power along the line (the **line loss**) is:

Note that line loss is least for _____.

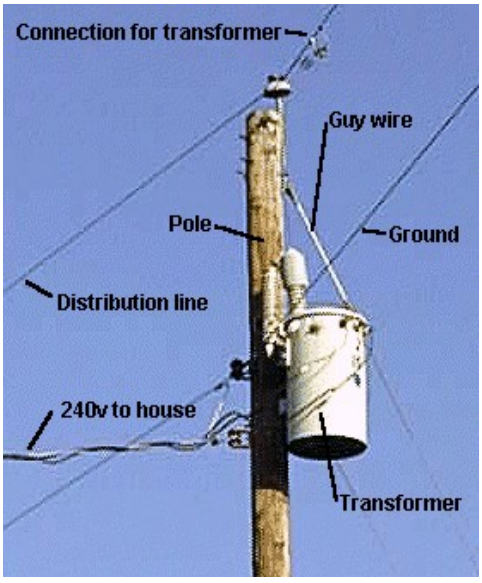
(And that line loss is increased when the _____, i.e. you have your lowest efficiency _____.)

For power to be useful in the home, the voltage has to be _____ again (to less than 10 kV) at local substations and split for distribution.

You may also see local _____, regulating the voltage along the lines.

Taps _____ (your house only needs one).

And local transformers step the voltage down to what is required to _____ (in North America, commonly _____).



Note that some household devices do require _____ current.

Alternating current can be converted to direct current using _____.