

Generators and Turbines

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Generators

- The generator built in class shows that a ***rotating magnet can generate electricity in a coil of wire***
- If you can rotate a huge magnet in an even bigger coil of wire then you can generate a huge amount of electricity!

Turbines

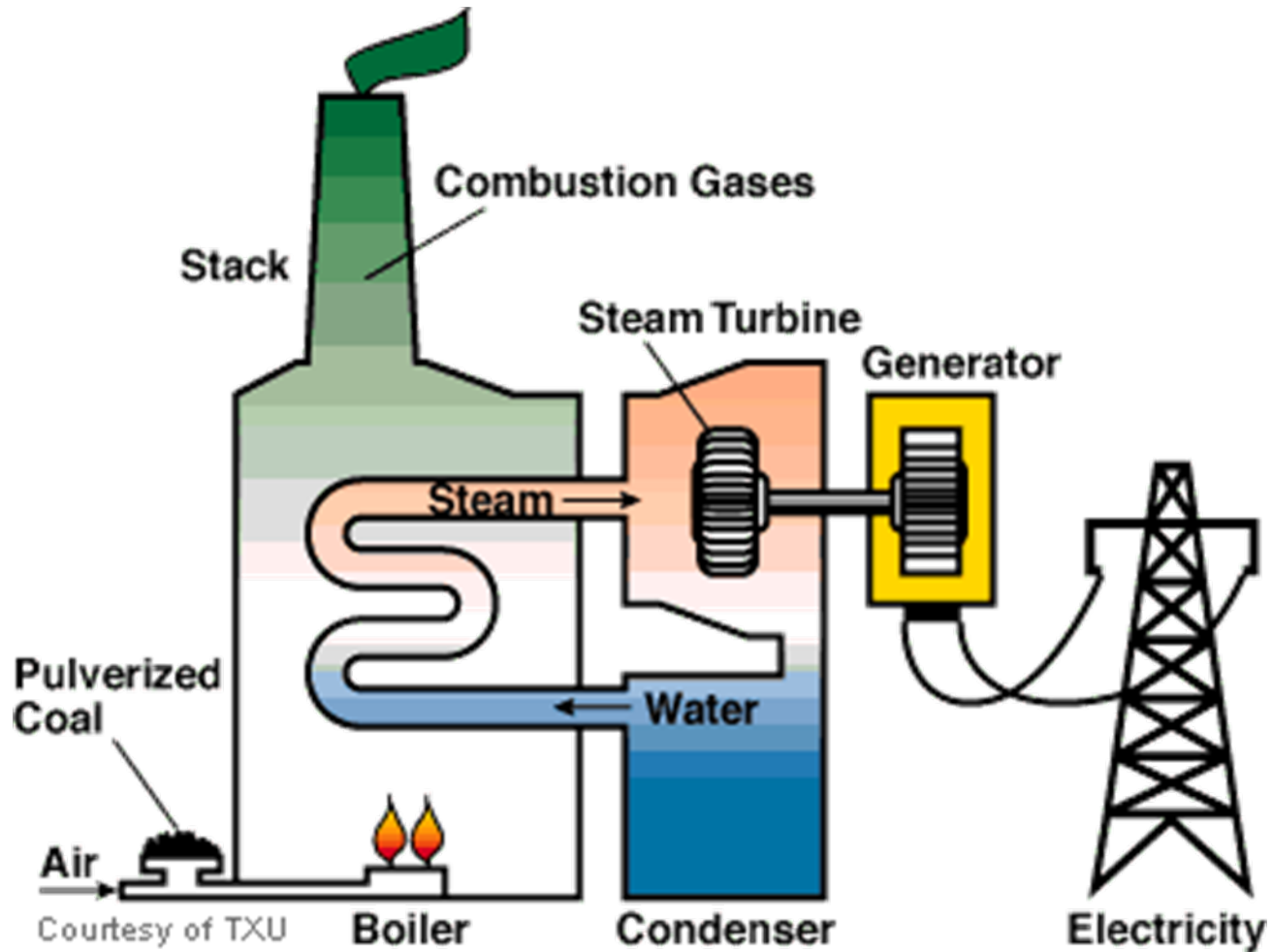
- Turbine
 - Pronounced turr-bin (US) or turr-bine (elsewhere)
- Has blades on one end of a shaft and connects to a generator on the other end of the shaft
- Is a machine that turns with some external power, usually steam or water or wind
 - The steam (or water or wind) pushes on blades to get the whole thing spinning

Coal and electricity

- 92% of the coal used in this country is burned to heat water into steam to turn a turbine
- This converts chemical energy (coal) into heat energy (steam) into mechanical energy (turbine spinning) and finally into electrical energy (via a generator)



Turbine and Generator picture



Generators

- Change mechanical energy into electrical energy (electricity)
- Involve magnets and wire:
 - Magnets have positive and negative ends
 - Negatively charged electrons are attracted to the positively charged end of the magnet
 - Electrons in metals easily move from atom to atom in the metal
 - As magnets move, electrons move, which is electricity

Generators, continued

- Electricity is produced whenever electrons move inside a metal
- This can happen when a magnet moves near a coil of wire, or
- When a coil of wire moves near a stationary magnet
- The electrons don't actually flow like water, but they do move and transfer their negative charge to their neighboring electrons.

Electricity

- The moving magnetic field from the magnet moves electrons in the wire.
- The moving electrons in the wire are the electric current...the “flow” of electricity.
- This electricity can be sent through wires to other locations or stored in batteries (electrical energy changed back to chemical energy since batteries have chemicals inside them)

Links to other info:

- Wind turbine and generator:
- http://www1.eere.energy.gov/windandhydro/wind_animation.html
- Electricity introduction book:
- http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks3/science/electricity_2/electricity.swf
- Electricity game:
<http://www.candystand.com/play/electric-box>