Electrical Power Generation - Principles

Electricity generation requires rotation within the generator. Regardless of method used, this is the common principle. Generators currently fall into the following categories:

- Environmental source causes rotation of blades - water (e.g. dams) and wind (windmills).
- Combustion of fuel turns turbine blades - gas and oil-fired turbines, or reciprocating engines.
- Steam turns turbine blades
    - Combustion of fuel in boiler heats water converting it to steam - coal, gas, oil, municipal waste, refuse-derived fuel, biomass (for 111 K figure showing process with equipment; 74 K figure showing process in simplified terms - graphics courtesy NSP)
    - Nuclear process directly heats water converting it to steam - boiling water reactor (BWR)
- Nuclear process heats water in a separate loop which, in turn, heats water in a separate boiler converting it to steam - pressurized water reactor (PWR), gas cooled reactor (GCR) (for 103K figure showing process with equipment; 74 K figure showing process in simplified terms- graphics courtesy NSP)
- Solar energy is passively collected (and concentrated); this heat energy converts water in a boiler to steam. In other cases, photovoltaic cells directly convert the solar energy to electrical energy.
- Chemical reaction creates heat which, in turn, is used to boil water producing steam - fuel cell

Processes that are currently unproven for commercial purposes include fusion.

Electricite de France has produced an excellent imagemap that leads to information about the various types of energy sources, as well as a discussion about transmission systems and electric cars. The map or the text links below will take you to the EdF site.

Nuclear - **Wind** - **Tidal Power** - **Hydro** - **Thermal (Coal/Gas)** - **Transmission** - **Electric Car** **(Imagemap Copyright © 1999 EdF)**