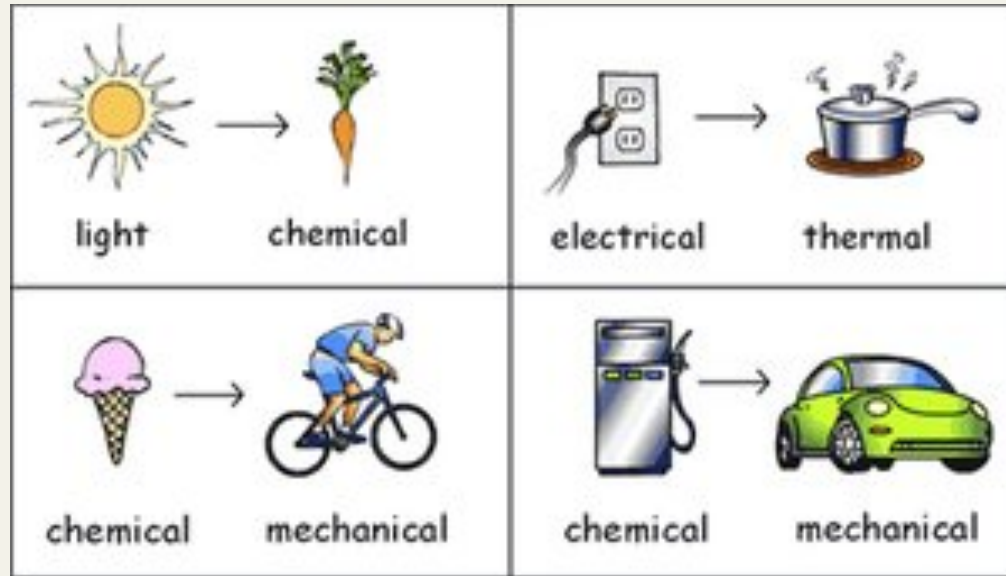


Energy Transformations



Energy transformation is the process of changing energy from one form to another.

What does “Transform” mean?

Someone
explain what
a transformer
is or does?



So if transform means to “change” ...

- Energy can be changed from **one type to another**. For example, as water falls over a waterfall, its gravitational potential energy is first transformed into kinetic energy



- Now let's explore the idea that energy changes from **one form** to another.

Forms of Energy are once again:

Chemical

Electrical

Radiant

Mechanical

Thermal

Nuclear



Radiant Energy



Chemical Energy



Thermal Energy

electrical



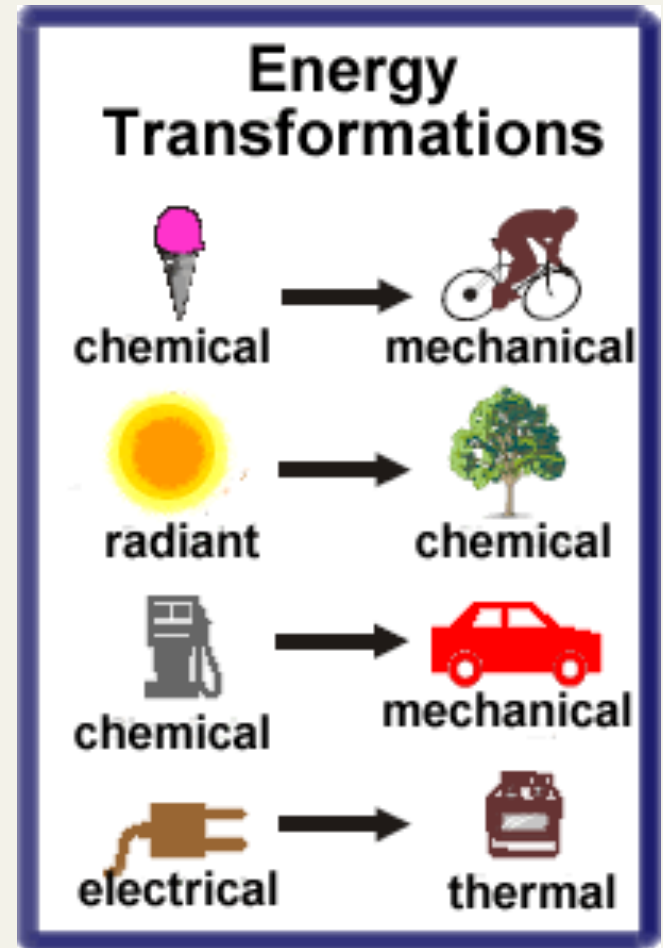
mechanical











nuclear

Examples of Energy Transformations

- Due to the Law of Conservation of Energy, energy cannot be created nor destroyed. Meaning, energy just changes forms!
- Let's go through the examples on the right.



Examples of energy transformations and their uses:

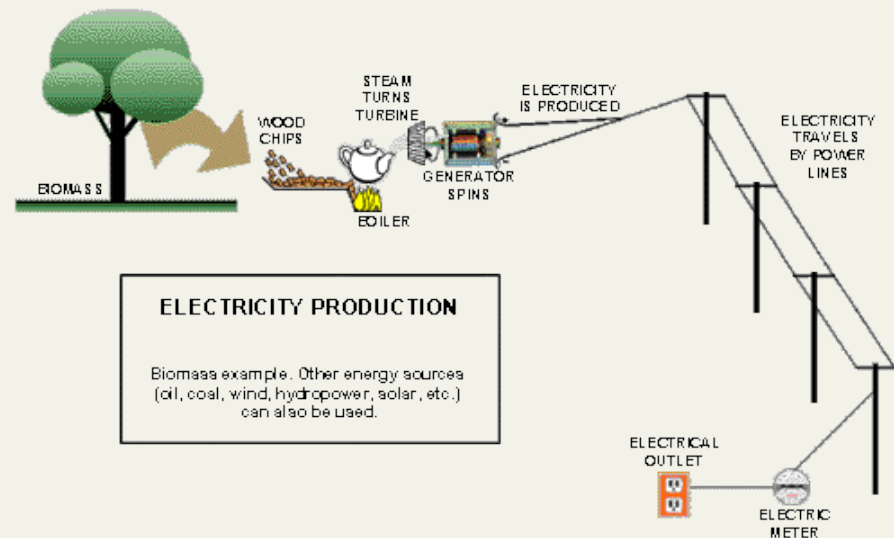
	A television changes electrical energy into sound and light energy.
	A toaster changes electrical energy into thermal energy and light.
	A car changes chemical energy from fuel into thermal energy and mechanical energy.
	A flashlight changes chemical energy from batteries into light energy.
	When you speak into your telephone, sound energy from your voice is changed into electrical energy. The electrical energy is then converted back into sound energy on another phone, allowing someone to hear you.
	Light energy is converted into electrical energy using solar panels.
	Campfires convert chemical energy stored in wood into thermal energy, which is useful for cooking food and staying warm.
	Nuclear energy generates a tremendous amount of thermal energy, which can be converted into electrical energy in a nuclear power plant.

Natural Energy Transformations

Sunlight (radiant) converts to chemical energy in plants through the process of photosynthesis



Trees then use this chemical energy to grow. And we can use this energy as biomass!!



Machine or man-made transformations:

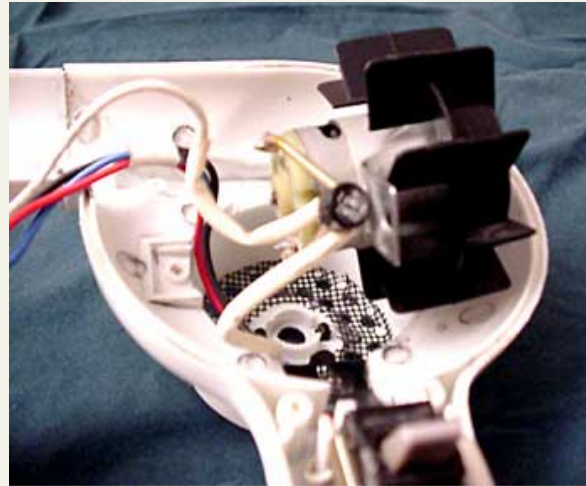
- Electric motors, such as those in power tools, blenders, and washing machines, convert electrical energy into mechanical energy through the interaction of magnetic fields.



When you plug in a drill (electrical), this activates the magnetic field, which turns the motor. The motor causes the drill to move! (mechanical energy)

Energy transformations can be multi-stepped:

- A hairdryer: electrical → mechanical → thermal



- A flashlight: chemical → electrical → radiant



Let's take this one step further: What are the energy transformations in an **hydro-electrical** power plant?

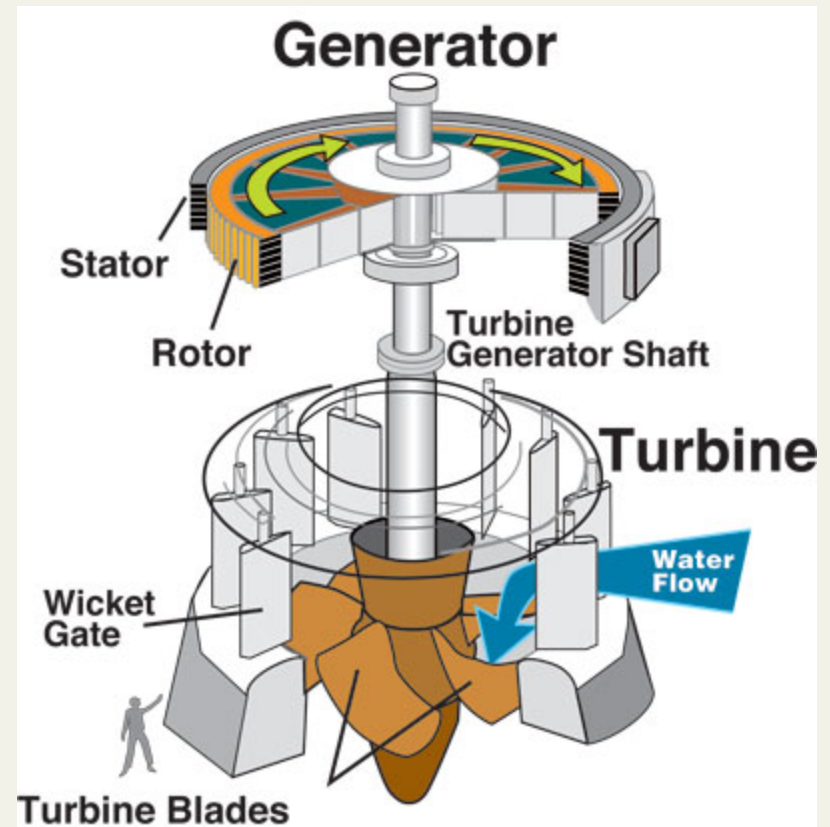


What is a turbine?

- A turbine has blades at one end and electromagnets at the other which create electricity as the blades move. Turbines are used in creating electricity from wind, water and steam power.

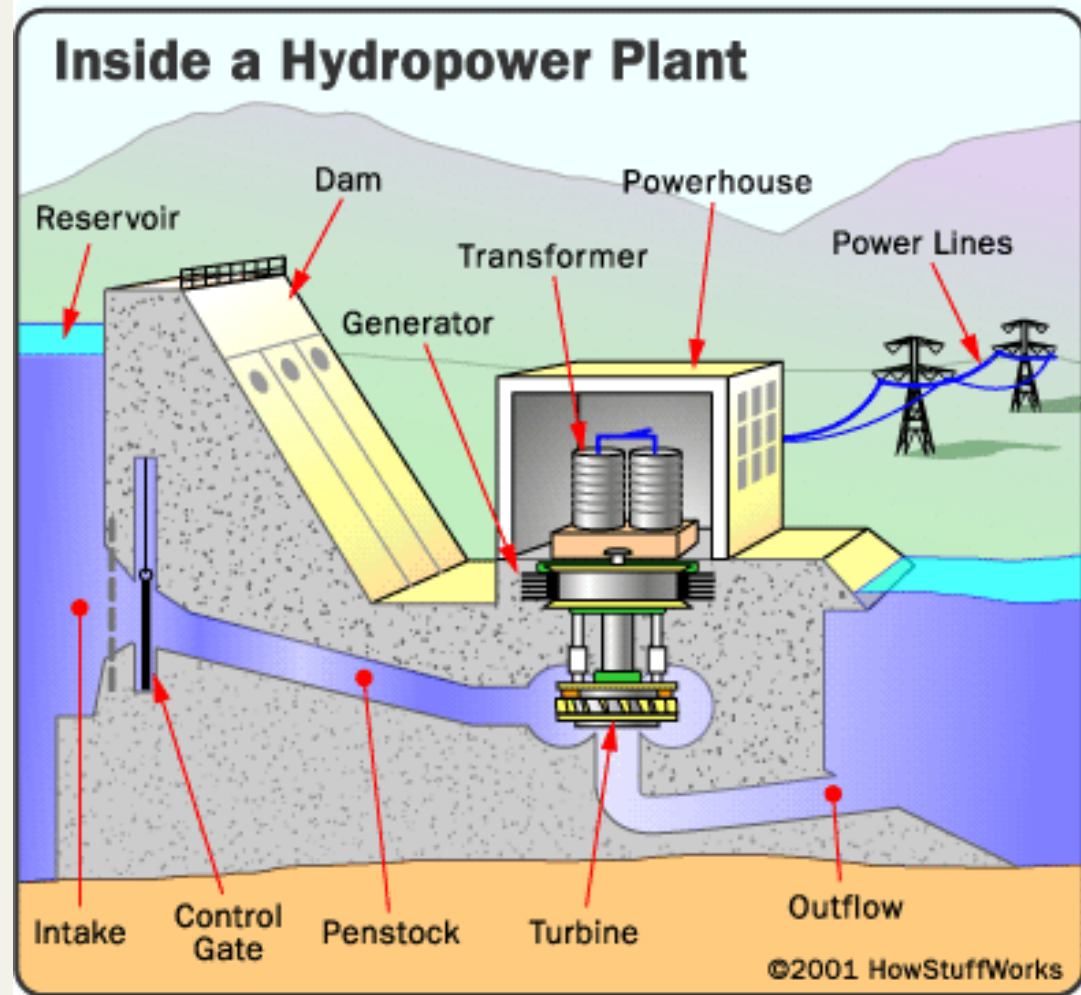
The generator converts
The mechanical energy to
Electrical energy.

The water spins the
blades of the turbine,
turning the shaft (pole).



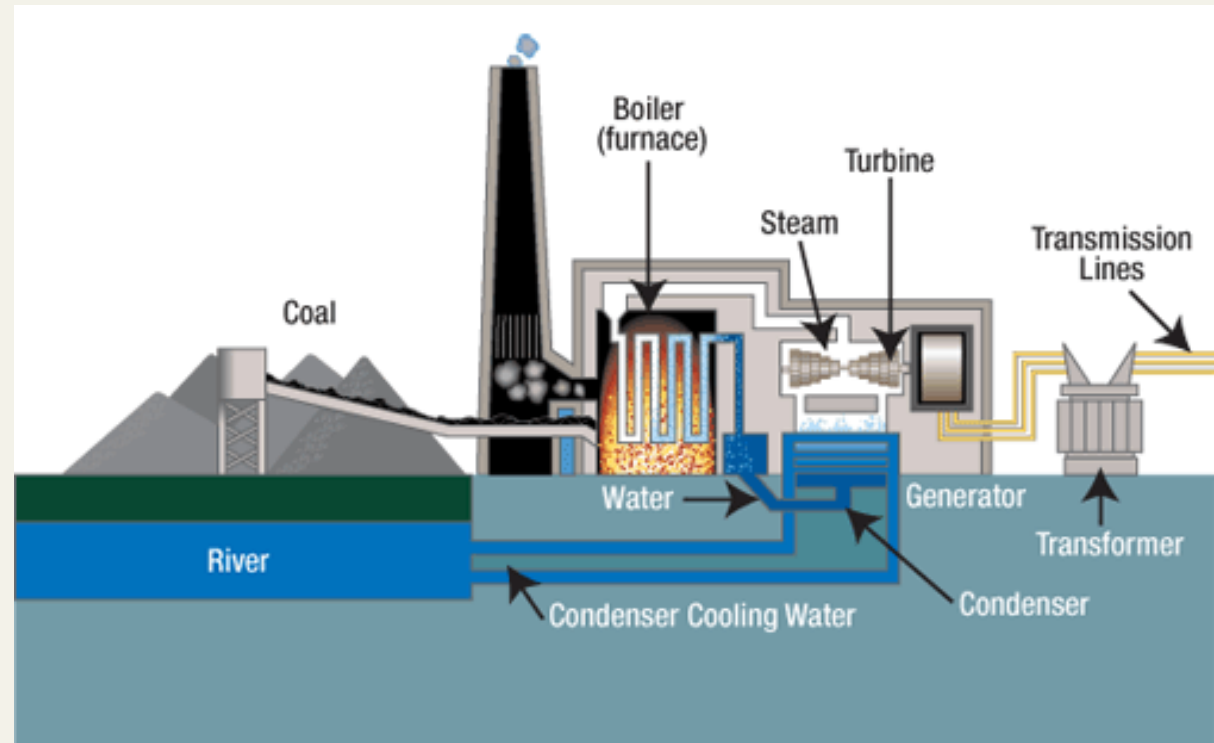
Hydro-power

1. Water flows down and turns the blades of the turbine
2. The shaft of the turbine spins
3. The generator stores the power that is converted from mechanical to electrical energy.
4. Power lines carry the electricity away



The energy transformations in an (coal-based) electrical power plant:

- Coal is burned → Water is heated → Steam turns the blades of a turbine → Turbine spins coil in generator → Generator produces electricity



Summary

- Understand that energy exists in a cycle and transforms from one form to another.
- Energy transformations can be natural or man-made.
- Energy transformations can be simple or complex with a just few steps or many steps.
- When we take a form of energy and change it into usable electricity, a TURBINE is used. This device changes the energy by rotating it.

The energy transformations in an (coal-based) electrical power plant:

1. What is burned? _____. What type of energy transformation occurs? _____
2. Water is _____ from the released energy.
3. Steam does what? _____.
4. Turbine spins the _____ in a generator
5. The generator makes _____.

