Date _____

AIM: Renewable Energy Resource #3: HYDROPOWER / HYDROELECTRIC POWER

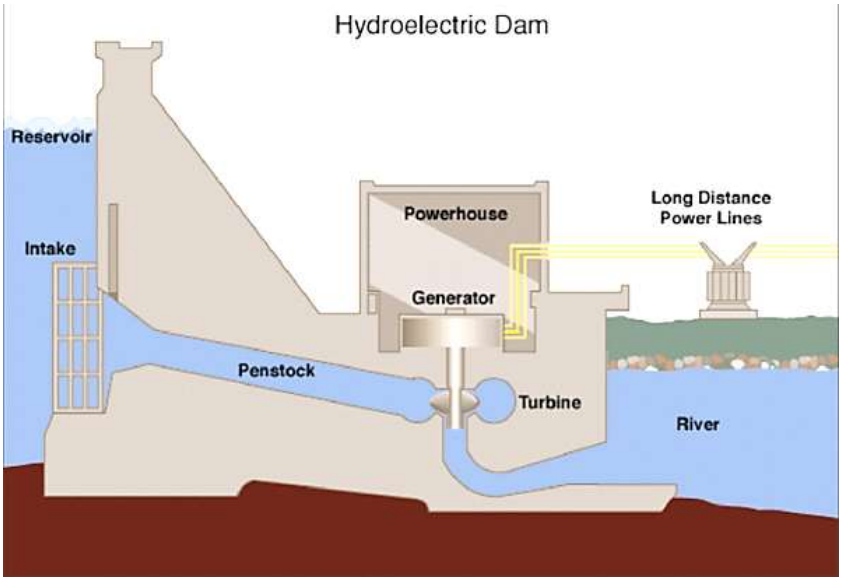
** flowing water can also be traced back to the Sun – solar energy (and gravity) drives the water cycle**

large-scale (high dam with reservoir)

manmade reservoir behind dam raises the height of the water to create more potential energy that will be converted into kinetic energy

reservoir water flows through penstock (tunnel inside dam) to spin turbines that spin the generator to produce electricity

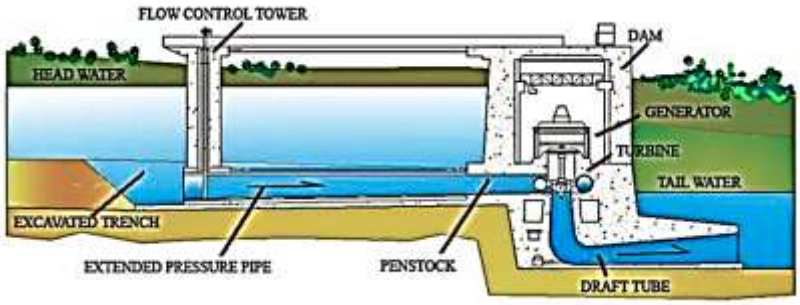
Largest in U.S. – Grand Coulee - Washington
Largest in World – Three Gorges – China



small-scale (low-head dam)

"run-of-the-river" – uses the natural drops in elevation (waterfalls / steeper streambeds) with minimal excavation

the stream water flow directly spins the turbines that spin the generator to produce electricity



Pros of Hydroelectric Dams:

1. high efficiency / net energy
2. no direct CO_2 emissions*
3. helps with flood control and irrigation (dams have multiple purposes)

Cons of Hydroelectric Dams:

1. high cost to construct
2. trapped decaying plants emit CO_2 and CH_4 (both are greenhouse gases)
3. prevents nutrient-rich silts from getting downstream (ex. Aswan Dam in Egypt prevents nutrients from reaching the Nile Delta farmland)
4. high environmental impact
   - migratory patterns of fish (building of fish ladders)
   - diverts natural flow of water – may control flooding downstream, but could cause flooding upstream