Date _____

AIM: Renewable Energy Resources #4 and #5: GEOTHERMAL AND BIOMASS

Geothermal Energy

- Earth's internal heat is thermal energy generated from radioactive decay and continual heat loss from Earth's formation
- hot water and/or steam can be pumped up to **heat buildings** or used to spin a turbine to **generate electricity**

more for individual residences not in prime locations

geothermal power plants in prime tectonic locations – plate boundaries, hot springs

Pros of Geothermal Energy:	Cons of Geothermal Energy:
1 high efficiency 2 low land use/disturbance 3 abundant supply (both shallow and deep)	1 specific prime locations (to generate electricity) 2 pump needs electricity - $$ (also a high upfront cost to install) 3 some noise… but major improvements have minimized this 4 gas release and land instability - H_2S can react to form SO_2 → acid rain - CH4 and CO2 (greenhouse gases) - earthquakes and land subsidence (sinking)

Biomass is organic material that comes from plants and animals, and it is a renewable source of energy. Biomass contains stored energy from the Sun. Plants absorb the Sun's energy during photosynthesis and when biomass is burned, the chemical energy in biomass is released as heat.

Examples:

plant material (wood, crop residues)	waste material (manure/sewage/household)	biodiesel (vegetable oil/grease)	ethanol (ethyl alcohol from grains) (made from corn)

Biomass Pros:	Biomass Cons:
1 large potential supply 2 helps reduce waste 3 "carbon neutral" no net carbon emissions since plants absorbed CO_2 while they were growing - only if sustainable forestry practices are used (replanting / no clear-cutting of forests)	1 less efficient / less energy density 2 production can be more expensive (ex. ethanol) 3 environmental impacts - deforestation (leads to soil erosion and habitat destruction) - air pollution