**EAS 375**

**Spring 2011**

**Lecture Questions - Geothermal Power**

What are the two sources in the Earth that produce geothermal energy?

Radioactive decay in the crust of the earth.

Conduction of heat trickling through the mantle from the earth’s core.

What are the three types of geothermal systems?

* Conventional hydrothermal systems.
* Enhanced geothermal systems (EGS).
* Shallow geothermal.

What is a conventional geothermal system?

Region with high heat flow (volcanically active).

What is an enhanced geothermal system (EGS)?

Requires deep drilling, hydrofraction of rock, low geothermal gradient.

What the six major uses of geothermal energy?

* Food processing
* Apartment building
* Greenhouse
* Fish farm
* Power plant
* Refrigeration plant.

What is the difference between “dry steam” generation and “flash steam” generation?

Dry steam flows from the well and drives the turbine.

Flash steam: superheated water flashes to steam at surface atmospheric pressure.

How does “binary geothermal” generation differ from dry and flash steam generation?

High temperatures but BELOW boiling. Hot water is used to vaporize a second fluid with lower boiling point.

What is the major problem of hydrothermal brines in the generation of geothermal generation?

Corrosive brines must be treated, which has a costs.

Environmental effects: Produces a mixture of gases (carbon dioxide, hydrogen sulfide, methane, ammonia)

What are the major problems of sustainable enhanced geothermal systems?

Sustainability: Production may decline after a few years.

Loss of pressure.

Cooling.

How does a shallow geothermal heat pump system work?

Heat exchange system with a series of loop in the ground.

Uses the constant temperature of the ground (or water) several feet underground.

In the winter, warm fluid carries heat into the house, in the summer, cool fluids draw heat out of the house.