Green Systems

Solar Hot Water

- Solar Thermal Panels (Trex enclosure)
- Hot Water Storage Tank (TS-5; basement)
- Hot Water Heaters (HW-1,2; basement)
  - Pre-heats water so water heaters don’t need to use as much energy
  - Gas-powered, high efficiency
  - Two: one for domestic and one for labs (industrial)

Heating the Building

Co-generation:

- Gas-powered Generator (basement)
- Co-generation Unit (CHX-1; basement)
- Water Storage Tank (TS-3; basement)
- Radiant Panels (ceilings)
  - Provides electricity to building when solar panels not enough
  - Generates heat energy
  - Captures heat from generator and transfers it to water
  - Stores heated water before it is circulated through the building
  - Two gas boilers (GWB-1,2; basement) can be used to supplement heat from the cogeneration system
  - Pipes in ceilings carry hot or cold water, depending on need, on 2nd and 3rd floors
  - Pipes in floor carry hot or cold water on 1st floor

Heat Recovery System:

- Venting Tower (roof)
- Heated water (pipes)
- Cooled water (pipes)
- Air Handler (basement)
  - Ventiing towers capture heat from the exhaust leaving the building and transfer it to water
  - The heated water flows to the basement, where the heat is transferred to the air entering the building
  - The now-cool water goes back to the roof
  - There are two of these systems; one for each air handler
**Cooling the Building**

- **Evaporative Cooling Tower** (Trex enclosure)
  - The water from outside returns to the tower to be cooled again

- **Heat Exchanger** (HX-1; basement)
  - The water is filtered before passing through the heat exchanger
  - The heat exchanger uses the water from outside to cool water in a second, separate system

- **Radiant Panels** (ceilings)
  - The water in the second system flows through pipes near the radiant panels to cool the building (when needed).
  - The building has no traditional AC
  - This system uses approximately 5-10% of the energy of a traditional AC system

- **Storage tanks** (underground)
  - Water drips down the tower at night (even in winter) while air blows up, which cools the water
  - This cooled water is stored in two tanks (below the manhole covers)

**Using Rain and Snow**

- **Storage Tank** (SWT-1; basement)
  - The water is passed through UV and carbon filters
  - Low-flow, dual-flush (1.6/0.8 gallons)

- **Filtration**
  - Rainwater and snowmelt from the roof is collected in the 3000 gallon tank

**Air Handlers**

- **Plenum** (basement)
  - Brings fresh air in to two separate air handlers: one for domestic and one for industrial
  - 100% fresh air is constantly circulating

- **Filter and Humidifier** (basement)
  - Filters out particulates (dust, pollen, etc.)
  - Humidifies the air for occupant comfort
  - Air is also pre-heated before being circulated (see Heat Recovery System)

- **Diffusers (floors and walls)**
  - Diffusers are located in the lower wall on the 1st floor and in the floor on the 2nd and 3rd floors
  - Air is exhausted through vents in the ceiling