

## **FACT SHEET HANDOUT**

### **Information about the Science and Education Center at Black Rock Forest.**

- The Footprint of a building is the area of land the structure stands on. For the Black Rock Science and Education Center (SEC), the footprint is approximately 22m x 13m or 286 sq meters. The total useable interior floorspace of the building is 8881 sq feet, or 825 sq meters, spread across three floors.
- The long dimension of the building is oriented on an east-west axis to take advantage of solar heat in winter, and to protect against solar heat in summer.
- The windows are on the south and north facades to reduce solar gain in summer, and increase solar gain in winter, and to allow for cross-ventilation. Windows use high R-value glass with high visibility, low shading coefficient, and have overhang and awnings for shade on the south side.
- The SEC additionally has these green building features: energy efficient lighting, light sensors, a good thermal insulation envelope, efficient HVAC system using the GHP, good Indoor Air Quality (IAQ) and rate of air exchange, non-toxic interior materials and finishes; uses sustainably harvested wood and local stone; has composting toilets.

### **Information about Geothermal Heat Pumps and Energy Use.**

- The Geothermal Heat Pump (GHP) at BRF is installed within five 500 ft bore holes in rock.
- The GHP at BRF accounts for approximately one half of its total power demand.
- Space heating and air conditioning account for 20% of energy used in the US.
- A Geothermal Heat Pump uses 45% of the amount of fuel as a furnace, and can reduce consumption of heating energy by 20-40%; and of cooling energy by 30-50%. In general, a GHP uses < 1/2 the conventional energy to heat and cool SEC, according to Pachi Modi.

### **Fact about Energy Use and Global Warming.**

- About 99% of the energy used to heat the earth and all its structures is derived directly from the Sun.
- Solar energy is converted into renewable resources: biomass of trees and other plants by converting to chemical energy through photosynthesis, and wind and water by converting to mechanical energy.
- About 1% of the remaining energy is generated primarily from non-renewable fossil fuels.
- According to the United Nations International Panel on Climate Change (IPCC), July 2000, average global temperature could warm by 5.8° C by 2100, twice the previously

anticipated rate.

- The United States with about 4.6% of the world's population uses 25% of the world's commercial energy, 85% of that from non-renewable fossil fuels.
- In the US, roughly 43% of commercial energy used is wasted unnecessarily due energy inefficiency of poorly designed buildings.
- A modern power plant produces electrical energy at the rate of about one billion watts or 1000 megawatts.