

Energy Efficiency and Renewable Energy

Chapter Sixteen

Energy Efficiency

- Energy efficiency is the percentage of total energy input that does useful work in an energy conversion system.
- In the United States, 84% of all commercial energy is wasted (about half of which is due to degradation of quality imposed by the _____ law of energy).
- Why is reducing energy waste important?
 - Makes nonrenewable fossil fuels last longer
 - Decreases dependence on oil _____
 - Increases competitiveness in international marketplace
 - Reduces local and global environmental damage
 - Slows _____
 - Saves money

Solar Energy

- _____ Solar Heating is the heating of buildings directly by orienting energy-efficient windows toward the south (in the northern hemisphere)
- _____ Solar Heating involves the use of solar collectors (converts solar energy into heat energy) or solar cells (converts solar energy into electrical energy)

Hydrogen Fuel Cell

- Water can be split by electricity to produce gaseous hydrogen and oxygen.
- _____ gas is the simplest chemical fuel, and does not produce carbon dioxide like fossil fuels.
- The use of solar energy to produce hydrogen gas for fuel is an important focus for future fuels. Currently, however, the process is much more expensive than fossil fuels.

Hydroelectric Energy

- Hydroelectric Energy uses the power of falling water to turn _____, providing electricity.
- Dams provide the vertical distance for hydroelectric power, and disrupt the river ecosystem.
- Other hydroelectric sources include Tidal Energy, _____ Energy and Ocean Thermal Energy Conversion.
-

Wind Energy

- Wind Energy is an indirect form of _____ energy. The sun heats the Earth unevenly, creating atmospheric movements of air
- A windmill converts the mechanical energy of the wind to spin the turbine connected to an electric generator.

Biomass Energy

- Promising examples of biofuels include _____ (made from fermentation of plant sugars) and _____ (made from vegetable oil)
- Solid biomass (ex. wood, charcoal) is a renewable resource, but burning it faster than it is replenished produces a net gain in greenhouse gases.
- Liquid biofuels derived from biomass can be used in place of conventional fossil fuels.

Geothermal Energy

- While renewable, the locations where geothermal energy can be exploited are _____.
- Geothermal energy is harnessed by using heat from within the Earth to drive electrical generators.

Sustainable Energy

- Three major goals are suggested to attain a sustainable energy future:
 - Improve energy _____
 - Use more renewable energy
 - Reduce _____ and health risk
- Improving Energy Efficiency
 - Increase fuel efficiency standards for vehicles, buildings, and appliances
 - Mandate government purchases of efficient products
 - Provide tax _____ for buying efficient products
 - Reward utilities for reducing demand
 - Increase efficiency _____ and development
 - Cogeneration (using a fuel source to generate both electricity and useful heat)
- Use More Renewable Energy
 - Provide _____ and tax credits for renewable energy
 - Encourage government purchase of renewable energy products
 - Increase renewable energy research and development
- Reduce Pollution and Health Risk
 - Cut coal use and phase out coal subsidies
 - Levy _____ on coal and oil use
 - Phase out nuclear power and nuclear power subsidies