

## **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)

#### **The Solar-Hydrogen Revolution**

- 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.

#### **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
- 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