**Chapter 18: Renewable Energy**

**Section 1: Renewable Energy Today**

**Renewable Energy**

* **Renewable energy** is energy from sources that are constantly being formed.
* Types of renewable energy includes:
  + \_\_\_\_\_\_\_\_\_\_ energy
  + \_\_\_\_\_\_\_\_ energy
  + the power of moving \_\_\_\_\_\_\_\_\_\_
  + Earth’s \_\_\_\_\_\_\_\_
* Remember, all sources of energy, including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sources, affect the environment.

**Solar Energy-Power from the Sun**

* Nearly all renewable energy comes directly or indirectly from the \_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_ solar energy is used every day, like when the sun shines on a window and \_\_\_\_\_\_\_\_\_\_ the room.
* Solar energy can also be used \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in solar cells.

**Passive Solar Heating**

* **Passive solar heating** is the use of sunlight to heat buildings directly.
* In the Northern Hemisphere, \_\_\_\_\_\_\_\_\_\_ facing windows receive the most solar energy.
* Therefore, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solar buildings have large \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that face south.
* An average household could reduce its energy bills by using any of the passive solar features shown on the next slide. List a few:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Active Solar Heating**

* **Active solar heating** is the gathering of solar energy by collectors that are used to heat water or heat a building.
* More than \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ homes in the United States use active solar energy to heat water.
* Solar collectors, usually mounted on a \_\_\_\_\_\_\_\_, capture the sun’s energy.
* A liquid is heated by the sun as it \_\_\_\_\_\_\_\_\_\_ through solar collectors.
* The hot liquid is then \_\_\_\_\_\_\_\_\_\_\_\_ through heat \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which heats water for the building.
* About \_\_\_\_ of the energy used in the United States is used to heat \_\_\_\_\_\_\_\_\_\_; therefore, \_\_\_\_\_\_\_\_\_\_\_\_ solar technology could save a lot of energy.

**Photovoltaic Cells**

* **Photovoltaic cells** are solar cells that convert the sun’s energy into electricity.
* Solar cells have no \_\_\_\_\_\_\_\_\_\_\_\_ parts, and they run on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ power from the sun.
* However, they produce a very \_\_\_\_\_\_\_\_\_\_ electrical current. Meeting the electricity needs of a small city would require covering \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_ with solar panels.
* Sunlight falls on a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, causing it to release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The electrons flow through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that is complete when another semiconductor in the solar cell absorbs electrons and passes them on to the first semiconductor.
* Solar cells require extended periods of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to produce electricity. This energy is stored in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which supplies electricity when the sun is not shining.
* Currently, solar cells provide energy for more than \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ households in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries, where energy consumption is \_\_\_\_\_\_\_\_\_\_\_\_ and electricity distribution networks are \_\_\_\_\_\_\_\_\_\_\_\_.

**Wind Power**

* Energy from the sun warms the Earth’s surface \_\_\_\_\_\_\_\_\_\_, which causes air masses to flow in the atmosphere.
* We experience the movement of these air masses as \_\_\_\_\_\_\_\_.
* Wind power, which converts the movement of wind into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy, is the fastest growing energy source in the world.

**Wind Farms**

* Wind \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are used to capture the energy from the wind.
* Large arrays of wind turbines are called **wind farms**. Large wind farms supply electricity to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of homes.
* In windy \_\_\_\_\_\_\_\_\_\_ areas, small wind farms with 20 or fewer turbines are also becoming common.
* Because wind turbines take up little \_\_\_\_\_\_\_\_\_\_, some farmers can add wind turbines to their land and still use the land for other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The cost of wind power has been steadily \_\_\_\_\_\_\_\_\_\_\_ as wind turbines have become more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**An Underdeveloped Resource**

* Scientists estimate that the windiest spots on Earth could generate more than \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ the energy used worldwide.
* In the future, the electricity may be used on the wind farm to produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_.
* Today, all of the large energy companies are developing plans to use \_\_\_\_\_\_\_\_ wind power.

**Biomass-Power from Living Things**

* **Biomass fuel** consists of plant material, manure, or any other \_\_\_\_\_\_\_\_\_\_\_\_\_\_ matter that is used as an energy source.
* \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ can be thought of as biomass energy sources, although they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Renewable biomass fuels, such as wood and dung, are major sources of energy in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries.
* More than \_\_\_\_\_\_\_ of all wood cut in the world is used as fuel for heating and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Although materials like wood are a renewable resource, if trees are cut down \_\_\_\_\_\_\_\_\_\_\_\_ than they grow, the resulting \_\_\_\_\_\_\_\_\_\_\_\_\_\_ loss, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be severe.
* In addition, harmful air \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ may result from burning wood and dung.

**Methane**

* When bacteria \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organic wastes, one byproduct is methane gas.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be burned to generate heat or electricity.
* In China, more than \_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ households use biogas digesters to ferment \_\_\_\_\_\_\_\_\_\_\_\_ and produce gas for heating and cooking.
* Some landfills in the United States generate electricity by using the methane from the decomposition of \_\_\_\_\_\_.

**Alcohol**

* \_\_\_\_\_\_\_\_\_\_\_\_ fuels can also be derived from biomass.
* For example, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, an alcohol, can be made by fermenting fruit or agricultural waste. In the United States, corn is a major source of ethanol.
* Cars and trucks can run on ethanol or **gasohol**, a blend of gasoline and ethanol. Gasohol produces \_\_\_\_\_\_\_\_ air pollution than fossil fuels.
* Some states \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the use of gasohol in vehicles as a way to reduce air pollution.

**Hydroelectricity-Power from Moving Water**

* **Hydroelectric energy** is electrical energy produced by falling water.
* Hydroelectric energy accounts for \_\_\_\_\_\_ of the world’s electricity.
* Large hydroelectric power plants have a \_\_\_\_\_\_ that is built across a \_\_\_\_\_\_\_\_\_\_ to hold back a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of water.
* The water in the reservoir is released to turn a \_\_\_\_\_\_\_\_\_\_\_\_\_\_, which generates electricity.

**The Benefits of Hydroelectric Energy**

* Hydroelectric dams are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_, but relatively \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Unlike fossil fuel plants, hydroelectric dams \_\_\_\_ \_\_\_\_\_\_ release air pollutants that cause acid precipitation.
* Hydroelectric dams also tend to \_\_\_\_\_\_\_\_ much \_\_\_\_\_\_\_\_\_\_\_\_ than fossil fuel-powered plants.
* Dams also provide other benefits such as \_\_\_\_\_\_\_\_\_\_ control and \_\_\_\_\_\_\_\_\_\_ for drinking, agriculture, industry, and recreation.

**Disadvantages of Hydroelectric Energy**

* A dam changes a river’s \_\_\_\_\_\_\_\_, which can have far-reaching consequences.
* A reservoir \_\_\_\_\_\_\_\_\_\_\_\_ large areas of habitat above the dam. Water flow below the dam is reduced, which disrupts ecosystems downstream.
* For example, many \_\_\_\_\_\_\_\_\_\_\_\_ fisheries of the northwestern United States have been destroyed by dams that prevent salmon from swimming upriver to spawn.
* When the land behind a dam is flooded, people are often displaced. If a dam bursts, people living in areas below the dam can be \_\_\_\_\_\_\_\_\_\_\_\_.
* River \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ build up behind the dam instead of enriching land farther down the river, making farmland below the dam \_\_\_\_\_\_\_\_ productive.
* Recent research has also shown that the decay of plant matter trapped in reservoirs can release \_\_\_\_\_\_\_\_\_\_\_ amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gases-sometimes more than a fossil-fuel powered plant.

**Modern Trends**

* While in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries the construction of large dams continues, in the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_, the era of large dam construction is probably over.
* One modern trend is **micro-hydropower**, which is electricity produced in a \_\_\_\_\_\_\_\_\_\_ stream without having to build a big dam. The turbine may even \_\_\_\_\_\_\_\_\_\_ in the water, not blocking the river at all.
* Micro-hydropower is much \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than large hydroelectric dam projects, and it permits energy to be generated from small streams in \_\_\_\_\_\_\_\_\_\_\_\_ areas.

**Geothermal Energy-Power from the Earth**

* In some areas, deposits of water in the Earth’s \_\_\_\_\_\_\_\_\_\_ are heated by geothermal energy.
* **Geothermal energy** is the energy produced by heat within the Earth.
* The United States is the world’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_ producer of geothermal energy.
* Although geothermal energy is considered a renewable resource, the water that is used must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_ carefully so that it is not depleted.
* Geothermal power plants generate electricity using the following steps
  + Steam \_\_\_\_\_\_\_\_\_\_ through a well
  + Steam drives turbines, which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electricity
  + Leftover liquid is \_\_\_\_\_\_\_\_\_\_\_\_ back into the hot rock
* The leftover liquid, water, is returned to Earth’s crust because it can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by geothermal energy and used again.

**Geothermal Heat Pumps: Energy for Homes**

* More than \_\_\_\_\_\_\_\_\_\_\_\_\_ homes in the United States are heated and cooled using geothermal heat pumps.
* A **geothermal heat pump**uses \_\_\_\_\_\_\_\_\_\_\_\_ underground temperatures to warm and cool homes because the temperature of the ground is nearly constant year-round.
* A heat pump is simply a \_\_\_\_\_\_\_\_ of piping that circulates a fluid underground.
* In the \_\_\_\_\_\_\_\_\_\_\_\_, the ground is \_\_\_\_\_\_\_\_\_\_\_\_ than air and the fluid cools the home.
* In the \_\_\_\_\_\_\_\_\_\_\_\_, the ground is \_\_\_\_\_\_\_\_\_\_\_\_ than air, and the fluid warms the home.

**Section 2: Alternative Energy and Conservation**

**Alternative Energy**

* To achieve a future where energy use is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, we must make the most of the energy sources we already have and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ new sources of energy.
* **Alternative energy** describes energy that does not come from \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ and that is still in development.
* For an alternative energy source to become a viable option for the future, the source must be proven to be \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Also, the environmental effects of using the energy source must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Tidal Power**

* A tidal power plant works much like a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dam.
* As the tide rises, water enters a bay behind a dam. The gate then \_\_\_\_\_\_\_\_\_\_\_\_ at \_\_\_\_\_\_\_\_ tide.
* At \_\_\_\_\_\_ tide, the gate \_\_\_\_\_\_\_\_\_\_ and the water in the bay rushes through, spinning a turbine that generates electricity.
* Although tidal energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ become a major energy source in the future.
* The \_\_\_\_\_\_\_\_ of building and maintaining tidal power plants is high, and there are few suitable \_\_\_\_\_\_\_\_\_\_\_\_\_.

**Ocean Thermal Energy Conservation**

* In the tropics, the temperature difference between the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the ocean and the \_\_\_\_\_\_\_\_ ocean waters can be as much as 24ºC (43ºF).
* **Ocean thermal energy conservation (OTEC)** is the use of temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in ocean water to produce electricity.
* An OTEC plant produces energy using the following steps
  + Warm surface water is \_\_\_\_\_\_\_\_\_\_\_\_ in a vacuum chamber.
  + This produces a \_\_\_\_\_\_\_\_\_\_ that drives a turbine to generate electricity.
  + Cold deep-ocean water will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the steam.
  + The steam turns into \_\_\_\_\_\_\_\_\_\_ that can be used again.
* The \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ have experimented with OTEC power, but so far, no project has been able to generate \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electricity.
* OTEC plants are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the electricity the plant produces is used to pump cold water up from the deep ocean.
* The environmental \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of pumping large amounts of cold water to the surface are also \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Hydrogen-A Future Fuel Source?**

* Hydrogen, the most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ element in the universe, can be burned as a fuel.
* Hydrogen does not contain carbon, so it does not release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ associated with burning fossil fuels and biomass.
* When hydrogen is burned in the atmosphere, it combines with oxygen to produce \_\_\_\_\_\_\_\_\_\_ vapor, a harmless byproduct, and small amounts of nitrogen oxides.
* Hydrogen gas (H2) can be produced by using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to split molecules of water (H2O).
* Hydrogen \_\_\_\_\_\_\_\_ can be made from any material that contains a lot of hydrogen.
* In the future, we may also be able to grow \_\_\_\_\_\_\_\_\_\_\_\_ to produce hydrogen cost effectively.

**The Challenge of Hydrogen Fuel**

* One difficulty of using hydrogen as a fuel today is that hydrogen takes a lot of energy to \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* If this energy came from burning fossil fuels, generating hydrogen would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and polluting.
* One \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is to use electricity from solar cells or wind power to split water molecules to produce hydrogen.
* Hydrogen could then be \_\_\_\_\_\_\_\_\_\_\_\_ in pressurized tanks and transported in gas pipelines.
* Or hydrogen might not be stored at all-it might be used as it is produced, in \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.

**Fuel Cells**

* A **fuel cell** is a device that produces electricity chemically by combining hydrogen fuel with oxygen from the air.
* When hydrogen and oxygen are combined, electrical energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and water is the only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Fuel cells can be fueled by anything that contains plenty of hydrogen, including \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, or even \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Energy Efficiency**

* There are two main ways to reduce energy use:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes
  + increases in energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Energy efficiency** is the percentage of energy put into a system that does useful work.
* Energy efficiency can be determined by this equation:

energy efficiency (in %) = energy out/energy in × 100

* Most of our devices are fairly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. More than \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ of all commercial energy used in the United States is wasted.
* Increasing efficiency may involve \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in new technology.

**Efficient Transportation**

* Developing efficient engines to power \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and increasing the use of public \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ systems would help increase energy efficiency of American life.
* The internal combustion engines that power most vehicles do so \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and produce air \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* In the next \_\_\_\_ years, the design of these engines may change radically to meet the need for more efficient transportation.

**Hybrid Cars**

* Hybrid cars are examples of energy-efficient vehicles.
* Hybrid cars use small, efficient \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ most of the time, but they also use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ when extra power is needed, such as while accelerating.
* Hybrid cars do not cost much more than conventional vehicles, they cost \_\_\_\_\_\_\_\_ to refuel, and they produce \_\_\_\_\_\_\_\_ harmful emissions.
* Hybrid cars feature many efficient technologies.
  + They convert some energy of \_\_\_\_\_\_\_\_\_\_\_\_ into electricity and store this energy in the \_\_\_\_\_\_\_\_\_\_\_\_\_.
  + The gasoline engine is sometimes \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ to save fuel, such as when the car is stopped at a red light.
  + They are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in design and need less energy to accelerate.

**Cogeneration**

* **Cogeneration** is the production of \_\_\_\_\_\_ useful forms of energy from the same fuel source.
* For example, the \_\_\_\_\_\_\_\_\_\_ heat from an industrial furnace can power a steam turbine that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ electricity.
* Small cogeneration systems have been used for years to supply heat and electricity to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ buildings at specific sites.

**Energy Conservation**

* **Energy conservation** is the process of saving energy by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy use and waste.
* This can occur in many ways, including using energy-efficient devices and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ less energy.
* Between \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_, conservation made more energy available in the United States than all alternative energy sources combined did.

**Cities and Towns Saving Energy**

* The town of Osage, Iowa, numbers \_\_\_\_\_\_\_\_\_ people.
* This town saved more than \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ each year in energy because they found ways to conserve energy.
* In addition to saving energy, the town has greatly improved its \_\_\_\_\_\_\_\_\_\_\_\_\_\_ through energy conservation.
* Businesses have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the area to take advantage of low energy costs. Unemployment rates have also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Conservation Around the Home**

* The average household in the U.S. spends more than \_\_\_\_\_\_\_\_\_ on electricity bills each year.
* Unfortunately, much of the energy from homes is \_\_\_\_\_\_\_\_ through poorly insulated windows, doors, walls, and the roof.
* There are dozens of ways to \_\_\_\_\_\_\_\_\_\_\_\_ energy use around the home.

**Conservation in Daily Life**

* There are many simple \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes that can help save energy.
* Using less of any \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ usually translates into saving energy.