

**Learn About  
Alternative  
Fuels**

# Clean Cities For Kids

**Teach your family  
and friends the  
importance of  
driving clean  
vehicles**

## WHAT IS CLEAN CITIES?

Clean Cities is a locally based government/industry partnership, coordinated by the U.S. Department of Energy (DOE) to expand the use of alternatives to gasoline and diesel fuel. The program is dedicated to getting alternative fuel vehicles on the road. There are Clean Cities across the United States and each local area makes decisions for their individual areas. Many volunteers help to make Clean Cities a success by working to develop a nationwide alternative fuel market.



## What are Alternative Fuel Vehicles?

Alternative fuel vehicles (AFVs) run on fuels other than gasoline or diesel. Other fuels include electricity, propane, liquefied petroleum gas or compressed natural gas, methanol, ethanol, and biodiesel. These fuels burn up to 90% cleaner than gasoline and diesel, which helps to reduce air pollution. Plus these fuels are available in the United States, which means less dependence on foreign countries and more money for the United States.

### Why Alternative Fuels?

- Reduced dependence on foreign oil supplies
- Reduced emissions
- Renewable energy sources can be used to create some fuels
- Cleaner air



## Where can I get more information on AFVs?

The U.S. Department of Energy has numerous resources to help you learn more about AFVs. There are several helpful Web sites, many documents, and a telephone hotline with personalized assistance. You can use the DOE tools to conduct research for a paper, help educate your parents and friends, or just to become more informed.

### Alternative Fuels Data Center Hotline:

**1-800-423-1DOE or 1-800-423-1363**

**e-mail: [hotline@afdc.nrel.gov](mailto:hotline@afdc.nrel.gov)**

### Web Sites:

- Clean Cities  
[www.ccities.doe.gov](http://www.ccities.doe.gov)
- Alternative Fuels Data Center  
[www.afdc.doe.gov](http://www.afdc.doe.gov)
- DOE's Office of Transportation Technologies  
[www.ott.doe.gov](http://www.ott.doe.gov)

# Games

## Word Scramble

1. neaporp \_\_\_\_\_
2. rautlan sga \_\_\_\_\_
3. eivtnarlae lufse \_\_\_\_\_
4. sonirevnco \_\_\_\_\_
5. rai aluqtyi \_\_\_\_\_
6. ssnsiime \_\_\_\_\_
7. ctreleic \_\_\_\_\_
8. lnatheo \_\_\_\_\_
9. hatmenlo \_\_\_\_\_
10. lenac setiic \_\_\_\_\_

## What do these stand for?

1. CAA
2. CO<sub>2</sub>
3. LPG
4. AFV
5. EV
6. DOE
7. CNG
8. EPACT
9. LEV
10. AFDC

## Questions and Answers

1. What vehicle runs on batteries and gives off no pollution?
2. What is the primary automotive fuel in Brazil?
3. What fuel is often used in Indy race cars?
4. What fuel is transported through pipelines and costs 50% less than gasoline?
5. What clean fuel is a by-product of petroleum refining?
6. What fuel is derived from renewable biological resources?
7. What is one of the benefits of alternative fuel vehicles?
8. Which law requires fleets to use alternative fuels?
9. What do you call a car that uses one of these fuels: ethanol, methanol, LPG, CNG, LNG, electric, or biodiesel?
10. What is the name of the program that is helping to get AFVs on the roads?

# Answers

## Word Scramble

1. Propane
2. Natural Gas
3. Alternative Fuels
4. Conversion
5. Air Quality
6. Emissions
7. Electric
8. Ethanol
9. Methanol
10. Clean Cities

## What do these stand for?

1. Clean Air Act
2. Carbon Dioxide
3. Liquefied Petroleum Gas
4. Alternative Fuel Vehicle
5. Electric Vehicle
6. Department of Energy
7. Compressed Natural Gas
8. Energy Policy Act
9. Low Emission Vehicle
10. Alternative Fuels Data Center

## Questions and Answers

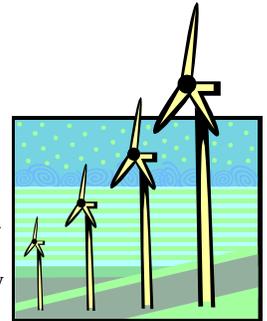
1. Electric Vehicle
2. Ethanol
3. Methanol
4. Compressed Natural Gas (CNG)
5. Liquefied Petroleum Gas (LPG) or Propane
6. Biodiesel
7. Clean Air
8. Clean Air Act (CAA) or Energy Policy Act (EPA Act)
9. Alternative Fuel Vehicle
10. Clean Cities

# Learning About Renewable Energy



Today, most of the energy we use comes from fossil fuels. Coal, oil, and natural gas are all fossil fuels. Over millions of years, the decay of plants, dinosaurs, and other animals was formed into fossil fuels. These fuels lie buried between layers of earth and rock. The only way to get them out is to drill or mine for them. While fossil fuels are still being created today by underground heat and pressure, they are being consumed more rapidly than they are created. For that reason, fossil fuels are considered nonrenewable; that is, they are not replaced as soon as we use them. So, we could run out of them sometime in the future. Or, we might someday use so much fossil fuel that we won't be able to drill or mine fast enough to keep up with the demand.

Because our world depends so much on energy, we need to find sources of energy that will last a long time. What if there was a type of energy that never ran out? There is. It is called renewable energy.



In addition, because there are so many people on the earth using fossil fuels, we create a lot of pollution. So, we should also use energy sources that produce as little pollution as possible. While all energy sources cause some pollution in their creation or their consumption, renewable energy systems generally are less polluting than fossil fuel systems.

## Types of Renewable Energy:

### Solar energy

We can use the energy in sunshine to warm and light our homes, heat our water, and provide electricity to power our lights, stoves, refrigerators, and other appliances. This energy comes from processes called solar heating, solar water heating, photovoltaic energy, and solar thermal electric power.

### Wind Energy

People use the wind to generate electricity. Wind turbines usually have two or three blades that turn when the wind blows. Wind turbine blades can be up to 82 feet (25 meters) long! The blades drive a generator that produces electricity, much like steam turbines. The longer the blades and the faster the wind speed, the more electricity the turbine generates.

### Geothermal energy

We can get energy directly from the heat in the earth. This is known as geothermal energy, from "geo" for earth and "thermal" for heat. Geothermal energy starts with hot, molten rock (called magma) miles below the earth's surface that heats a section of the earth's crust. The heat rising from the magma warms underground pools of water known as geothermal reservoirs.

### Biomass energy

When you burn a log in your fireplace or in a campfire, you are using biomass energy. Because plants and trees depend on sunlight to grow, biomass energy is a form of stored solar energy. Although wood is the largest source of biomass energy, we also use corn, sugarcane wastes, and other farming byproducts. There are three ways to use biomass. It can be burned to produce heat and electricity, changed to a gas-like fuel such as methane, or changed to a liquid fuel.

### Hydropower

The water in rivers and streams can be captured and turned into hydropower, also called hydroelectric power. The most common form of hydropower uses dams on rivers to create large reservoirs of water. Water released from the reservoirs flows through turbines, causing them to spin. The turbines are connected to generators that produce electricity.

**What is Renewable Energy?**  
Renewable energy systems use resources that are constantly replaced and are usually less polluting. Examples of renewable energy systems include solar, wind, and geothermal energy. We also get renewable energy from trees and plants, rivers, and even garbage.

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For more information, please call the Energy Efficiency and Renewable Energy Clearinghouse (EREC) 1-800-DOE-EREC

