

# GOING GREEN

## LESSON OBJECTIVE

By the end of this lesson, students will be able to describe why we need to look for alternatives to fossil fuel energy sources, identify how economic policy decisions have intended and unintended consequences, and explain the impact of multinational economic organizations like OPEC.

## VIDEO SYNOPSIS

Students will hear from the Executive Director of the Ohio Corn Growers Association to find out how corn grown in Ohio is being used to create alternative fuels that pollute—and cost—less. Students will also learn how wind power is currently used as an alternative energy source.

## TEACHER BACKGROUND

Today, the United States is the world's greatest consumer of petroleum using approximately 20 million barrels of oil per day. Roughly 60 percent of petroleum used in the United States comes from other countries. Recent data suggests that the world oil supply is set to peak in the year 2010. Despite this, American demand for oil continues to increase while domestic production is on the decline. With skyrocketing oil costs, greenhouse gases, and political instability in the most oil-rich countries, finding alternative energy sources is now more important than ever.

Some people think the answer could be in an alternative fuel called E-85, a blend of 15% petroleum and 85% ethanol. E-85 burns much cleaner than high-petroleum blends. Further, since corn grown in Ohio and around the country is used to produce ethanol, E-85 has the potential to reduce American usage of foreign petroleum.

Additionally, E-85 could mean big rewards for Ohio farmers. Ethanol production has increased dramatically over the past few years due to provisions in a federal energy bill that require the use of renewable fuels. Ethanol producers are the third largest domestic corn market and are expected to become the second largest corn market for exports in the next few years. Although some data suggests that E-85 gets fewer miles per gallon than standard gasoline, the cost of ethanol is expected to remain 20 to 30 cents per gallon less than its traditional counterpart. This could lead to significant savings for consumers though not without consequences elsewhere in the marketplace. As farmers increase production of non-edible corn for ethanol production, a deficit in food grade corn could lead to an overall increase in the cost of many grocery items.

## VOCABULARY

Alternative Fuel Vehicle  
Ethanol  
E-85

Oligopoly  
Monopoly  
OPEC

Petroleum  
Fossil Fuel



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## OHIO ACADEMIC CONTENT STANDARDS

### ECONOMICS

#### GRADE 12 SCARCITY AND RESOURCE ALLOCATION

1. Compare how values and beliefs influence economic decisions in different communities.
3. Select a current issue; identify the costs and benefits of various choices to determine the impact of personal and social economic decisions on the allocation of productive resources.

#### MARKETS

5. Identify reasons for and the impacts of multinational economic organizations:
  - A. Organization of the Petroleum Exporting Countries (OPEC);

#### GOVERNMENT AND THE ECONOMY

6. Analyze economic policy decisions made by governments that have resulted in intended and unintended consequences.
7. Identify public policies that may cost more than the benefits they generate, assess who enjoys the benefits, who bears the cost and explain why the policies exist.

## INSTRUCTIONAL PROCEDURE

### BEFORE VIEWING

Complete the following exercise with students to familiarize them with where our petroleum supply comes from, and the reasons why we need to look for alternative energy sources.

1. Write the word *Petroleum* on the board. Ask students what petroleum is and what products we derive from it.
  - *Collect ideas on the board*
    - *Use them to spark discussion, or use the following questions:*
2. Where does most of the oil used in the United States come from?
  - *Canada, Mexico, Saudi Arabia, and Venezuela are our top suppliers.*
  - *Middle Eastern countries (or geographically: Southwest Asia) are the largest producers of exported oil in the world.*
3. What are some of the (political and economic problems) of relying on oil from those regions?
  - *Political instability of some regions, the distance the oil must travel, lack of control over a critical resource, etc.*
  - *Limited, non-renewable resource that will get more expensive as supplies dwindle.*
4. What are some of the pollution problems caused by using gasoline engines?
  - *Burning fossil fuels creates greenhouse gases that lead to global warming.*
  - *Oil tankers can wreck and spill oil (describe the Exxon Valdez catastrophe as an example).*



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5. Do alternatives to using petroleum exist?
  - *Ethanol for cars, wind power for electricity, solar power, battery, hydrogen etc.*
6. Now, show students the video *Alternative Energy* and instruct them to take notes while watching.
  - After viewing the video ask students again about alternatives to petroleum-based energy sources.
7. Distribute the multiple choice and short response worksheets and have students complete in groups or individually. After students have completed the worksheets, distribute the homework assignment research questions on pages 8 and 9. Students will need to visit the library or have internet access to complete.

## ANSWER KEY

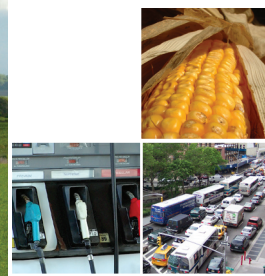
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### MULTIPLE CHOICE QUESTIONS

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|------|------|-------|
| 1. A | 5. D | 9. C  |
| 2. D | 6. A | 10. A |
| 3. D | 7. B |       |
| 4. B | 8. D |       |

### SHORT ANSWER QUESTIONS

1. The intended effect of this legislation is to reduce dependence on foreign oil and increase bio-fuel production and usage.
2. The potential unintended effect is that the cost of gasoline could increase.
3. The oil industry scaled back on refinery expansion because they anticipate a decrease in demand.



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## MULTIPLE CHOICE QUESTIONS

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

READ THE QUESTIONS BELOW AND CIRCLE THE CORRECT ANSWER FOR EACH. (1 POINT)

- 1) **The cost of gasoline and natural gas has gone up dramatically in recent years, causing many consumers to reduce spending in other areas. What is the result of limited consumer spending?**
  - A. a general slowdown in the economy
  - B. a speedup in the economy
  - C. higher prices for goods
  - D. inflation
  
- 2) **If farmers were to produce mostly inedible corn to sell to the ethanol market, what would happen to the price of edible corn?**
  - A. It would go up, because demand is higher.
  - B. It would go up, because supply is higher.
  - C. It would go up, because demand is lower.
  - D. It would go up, because supply is lower.
  
- 3) **Section 701 of the Federal Energy Bill requires all U.S. federal fleet flexible-fuel vehicles to use only E-85 fuel. Which of the following may be an unintended outcome of this provision?**
  - A. Demand for E-85 could lead to a shortage of the fuel.
  - B. The bill may stimulate the ethanol industry.
  - C. The ethanol boom may lead to a corn shortage causing the price of food to go up.
  - D. all of the above
  
- 4) **Based on the headline below, what will be the effect on the price of gasoline?**

**OPEC'S BIG GAMBLE: THE CARTEL IS SET TO CUT PRODUCTION BY 1 MILLION BARRELS** 

- A. The price will stay the same, because OPEC has no power over the price of gasoline.
- B. The price will go up, because oil production will decline.
- C. The price will go down, because both supply and demand will decrease.
- D. The price will stay the same, because oil production has nothing to do with gasoline prices.

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## MULTIPLE CHOICE QUESTIONS

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

- 5) **In 2006, the U.S. was the largest consumer of oil. This means that the U.S. economy is very sensitive to OPEC actions. Which of the following is a negative effect of this dependence on oil from other countries?**
- A. OPEC can attempt to manipulate U.S. policy decisions with threatening to reduce oil production.
  - B. U.S. dollars are being spent outside the country instead of on domestically-produced energy sources.
  - C. Money spent by Americans to buy expensive gasoline may supports the economy of totalitarian regimes.
  - D. all of the above
- 6) **In the wake of the ethanol boom the cost of corn used to feed cattle and to make food has gone up. If the cost of food continues to go up, but wages do not, what might be the result?**
- A. Inflation would occur.
  - B. Recession would occur.
  - C. Stagflation would occur.
  - D. Deflation would occur.
- 7) **The federal government currently offers subsidies to make wind energy competitive with coal and natural gas based energy. It also offers subsidies to companies to make ethanol competitive with gasoline. Because government intervention impacts the market, what might be the result of these subsidies?**
- A. The amount of taxes will increase as consumers use more corn and wind fuels.
  - B. The price of wind and corn fuels will be artificially low, leading more people to use them.
  - C. The supply of wind and corn fuels will be artificially low, creating a high price.
  - D. The true costs of fossil fuels in pollution and global warming will be passed on to customers as a tax to help pay for green energy subsidies.

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## MULTIPLE CHOICE QUESTIONS

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

Use the chart below to answer the following question. (Source: John Halley, Community Wind Energy Co-Founder)

WIND ENERGY	BENEFITS	PROBLEMS
	<ul style="list-style-type: none"><li>• Renewable resource</li><li>• No pollution</li><li>• More even job development</li><li>• Economic benefits are distributed</li><li>• Price stability</li></ul>	<ul style="list-style-type: none"><li>• Need a lot of land for a large plant</li><li>• Inconsistent winds</li><li>• Not all areas have sufficient winds</li><li>• Expensive to build</li></ul>

8) **Based on the information in the chart above who would best be able to use wind energy as a source of power the most effectively?**

- A. A small business situated in a valley.
- B. A large coastal corporation with access to capital.
- C. A small town with high unemployment and little funding.
- D. A large city with high energy needs, high wind, and capital.

9) **Subsidies are a form of government assistance such as grants and tax breaks. Who likely benefited from the subsidy that granted a tax credit for purchasers of alternative fuel vehicles?**

- A. The consumer benefited by saving money on taxes.
- B. The auto manufacturer benefited because of increased demand.
- C. Both consumer and manufacturer benefited from this subsidy.
- D. No one benefited as the cars were too expensive for most people to purchase.

10) **The oil industry in America has been around for over one hundred years. Recently, Exxon and Mobil merged to form ExxonMobil. Both companies were at one time part of John D. Rockefeller's Standard Oil Company and were forcibly separated by the United States government almost a century ago, this was because**

- A. Standard Oil had become a monopoly and violated anti-trust laws.
- B. Standard Oil was stealing oil from Mexico.
- C. Standard Oil was selling oil to Iraq.
- D. all of the above



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## SHORT ANSWER QUESTIONS

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

### DIRECTIONS

Analyze the following article summary to answer the questions that follow.

#### ***Ethanol Could Keep Price of Gas High***

*Industry Won't Expand Refineries Since Demand for Gas will Remain the Same*

Associated Press June, 2007

In a bid to reduce dependence on petroleum based fuels, there have been several recent initiatives from Washington to increase bio-fuel use. This is prompting oil companies to pull back on their plans for refinery expansion which could keep the price of fuel high for years.

As President Bush calls for a 20 percent decrease in gasoline usage, and with the Senate debating legislation for big increases in ethanol production, the oil industry is uncertain that the demand for gasoline will support expanding or building new refineries.

This spring gasoline prices soared to over \$3 a gallon –some consumer advocates contend that the oil industry likes it that way. An industry lobbyist describes that oil companies have scaled back expansion plans by nearly 40 percent citing declining demand due to increased ethanol production which does not bode well for future gas prices.

**1. What is the intended effect of the proposed legislation referred to in the article?**

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**2. What are the potential unintended effects of the legislation being debated in Washington?**

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**3. Why has the oil industry scaled back on refinery expansion?**

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# GOING GREEN

## RESEARCH QUESTIONS

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

**Conduct library and internet research to learn about OPEC –the Organization of Petroleum Exporting Countries. Answer the questions in complete sentences, use a separate sheet of paper if necessary.**

1. What is OPEC and who are the member nations?

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2. In what regions of the world are the member nations located? Where, and how often do OPEC members meet and what do they decide during these meetings?

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3. Define the terms monopoly and oligopoly. What differentiates the two? Is OPEC an oligopoly or monopoly?

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## RESEARCH QUESTIONS

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

4. Explain how OPEC can cause prices to be lower or higher than the price that would naturally come about in a free market. Explain how an oligopoly can affect supply and demand.

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5. What happens when an OPEC member produces more oil than the quota set?

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6. How does the price of oil impact the economies of oil producing and non-oil producing countries?

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