

## AP English Language and Composition

Suggested reading time—15 minutes

Suggested writing time—40 minutes

**Directions:** The following question is based on the accompanying seven sources.

This question requires you to synthesize a variety of sources into a coherent, well-written essay. When you synthesize sources you refer to them to develop your position and cite them accurately. Your argument should be central; the sources should support this argument. Avoid merely summarizing or paraphrasing sources.

Remember to attribute both direct and indirect citations.

### Introduction

Global warming is the gradual warming of the Earth's atmosphere reportedly caused by the burning of fossil fuels and industrial pollutants. Though there are a few who reject the notion that the earth is in trouble, most believe that we need to start doing something now to reverse these effects. This would entail the world's population making changes in their lifestyles. Some have already begun by driving fuel-efficient vehicles. Others are advocating the use of renewable energy like wind energy or solar power, thus reducing the dependence on fossil fuels. Some still seem to think that coal-fired power plants will not add to the problems we face today.

### Assignment

Read the following sources (including any introductory information) carefully. Then write an essay in which you evaluate at least two of the following: the role of business, the government, and individuals in reducing the effects of global warming.

Refer to the sources by their titles (Source A, Source B, etc.) or by the descriptions in the parentheses.

Source A (Greenland's Ice Melt Accelerating)

Source B (Eilperin)

Source C (Borenstein)

Source D (Moses)

Source E (Hotz)

Source F (Photo)

Source G (Wald)

Source A  
"Greenland's Ice Melt  
Accelerating." Environmental  
News Service. 21 September  
2006. 22 September  
2006 < [http://www.ens-  
newswire.com/ens/sep  
2006/2006-09-21-01.asp](http://www.ens-<br/>newswire.com/ens/sep<br/>2006/2006-09-21-01.asp)>.

The following is an excerpt from an environmental news web site.

Greenland's ice sheet is melting faster than previously thought, according to research published Wednesday by U.S. scientists. The data shows the rate of loss accelerated from 2004 to 2006, with the massive ice sheet melting two and one-half times faster than the previous two-year period.

Analysis of satellite observations show that Greenland lost roughly 164 cubic miles of ice from April 2004 to April 2006 - more than the volume of water in Lake Erie.

The findings are consistent with earlier results showing increased melting due to rising temperatures blamed on global warming, the researchers said.

The new data comes on the heels of several that show global warming is melting perennial sea ice in the Arctic Ocean. But unlike sea ice, the melting of the Greenland ice sheet has the potential to dramatically affect sea levels.

Greenland harbors about 10 percent of the world's freshwater in its ice sheet, which is up to two miles thick in places. Scientists estimate that if the Greenland ice sheet melted completely, the world's oceans would rise more than 20 feet.

The new study was published in the current issue of the journal "Nature" by researchers with the University of Colorado at Boulder (CU-Boulder).

It comes in the wake of a study published last month in the journal "Science" that showed Greenland lost 57 cubic miles of ice annually from 2002 to 2005.

The new study indicates the speed-up in ice mass loss charted by the researchers has been occurring primarily in southern Greenland.

"The acceleration rate really took off in 2004," said Isabella Velicogna, a researcher at the CU-Boulder-based Cooperative Institute for Research in Environmental Sciences. "We think the changes we are seeing are probably a pretty good indicator of the changing climatic conditions in Greenland, particularly in the southern region."

The findings echo earlier studies by several research groups that indicate increased melting has occurred as temperatures in southern Greenland have risen by about 4.4 degrees Fahrenheit in the past two decades.

Significant ice loss in Greenland has the potential to have severe effects on the climate of the Northern Hemisphere, said Velicogna, who also is affiliated with the Jet Propulsion Laboratory in Pasadena, California.

A 2006 study by researchers at the University of Wales showed the two glaciers have doubled their speed and are dumping twice as much ice into the sea as they did five years ago.

"Our results correlate well with independent observations of glacier acceleration in the south of Greenland," said coauthor John Wahr, also a professor of physics at CU-Boulder. "It's a fairly straightforward story - the ice loss in Greenland increased dramatically in 2004, particularly in the south, and it is continuing."

#### Source B

Eilperin, Juliet. "Scientists put price on ending global warming." Arizona Republic on the Web 8 Sept. 2006. 9 Sept. 2006 <[http://www.azcentral.com/news/articles/0908warming\\_0908.html](http://www.azcentral.com/news/articles/0908warming_0908.html)>.

The following is a news article, written by a Washington Post correspondent, also appeared in an Arizona newspaper.

Worried about global warming? Two experts say there is a way out of our carbon-based economy: But it's going to cost a pretty penny: \$200 billion a year for the next 30 years or so.

Reuel Shinnar and Francesco Citro, two chemical engineers at the Clean Fuels Institute at the City College of New York, published a paper in the current issue of the journal Science that estimates that for that amount of money the United States could reduce its fossil-fuel use by 70 percent within three decades.

Burning fossil fuels, whether to power cars or provide electricity, emits carbon dioxide into the air. The buildup of this and other greenhouse gases, in turn, contributes to climate change. At the moment, 85 percent of the nation's energy comes from carbon-based fossil fuels.

Shinnar and Citro suggest that the country can alter that mix by promoting other energy sources.

Eighty percent of the gas used to power privately owned cars and light trucks in the United States, they estimate, "can be replaced by hybrid cars with plug-in batteries, the cheapest way to reduce oil consumption."

Shinnar said the government would have to foot much of the bill initially because "nothing can compete with dirty coal" in a free market.

Shinnar, who has worked as a consultant for ExxonMobil Corp. since 1967, said he knows that spending \$200 billion a year for the next 30 years would be a hard sell to policymakers, but he argued that it's worth it in light of how climate change is transforming Earth.

#### Source C

Borenstein, Seth. "Latest global warming study predicts 'wild ride' for certain regions." Arizona Daily Sun on the Web. 21 Oct. 2006. 21 Oct. 2006 <[http://azdaily\\_sun.com/articles/2006/10/21/news/20061021\\_news\\_18.txt](http://azdaily_sun.com/articles/2006/10/21/news/20061021_news_18.txt)>.

The following is an excerpt from a news article written by an AP Science journalist.

The world -- especially the Western United States, the Mediterranean region and Brazil -- will likely suffer more extended droughts, heavy rainfalls and longer heat waves over the next century because of global warming, a new study forecasts.

But the prediction of a future of nasty extreme weather also includes fewer freezes and a longer growing season.

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As the world warms, there will be more rain likely in the tropical Pacific Ocean, and that will change the air flow for certain areas, much like El Nino weather oscillations now do, said study co-author Gerald Meehl, a top computer modeler at the research center. Those changes will affect the U.S. West, Australia and Brazil, even though it's on South America's eastern coast.

For the Mediterranean, the issue has more to do with rainfall in the tropical Atlantic Ocean changing air currents, he said.

"Extreme events are the kinds of things that have the biggest impacts, not only on humans, but on mammals and ecosystems," Meehl said. The study, to be published in the December issue of the peer-reviewed journal *Climatic Change*, "gives us stronger and more compelling evidence that these changes in extremes are more likely."

The researchers took 10 international agreed-upon indices that measure climate extremes -- five that deal with temperature and five with precipitation -- and ran computer models for the world through the year 2099. What Tebaldi called the scariest results had to do with heat waves and warm nights. Everything about heat waves -- their intensity, length and occurrence -- worsens.

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"This notion of the greening of the planet ... generally is a positive benefit," Christy said.

Christy, who did not participate in the study but acknowledges that global warming is real and man-made, said an increase in nighttime low temperatures makes much more sense than the rain-and-drought forecasts of the paper.

One of the larger changes in precipitation predicted is in the intensity of rain and snowfall. That means, Tebaldi said, "when it rains, it rains more" even if it doesn't rain as often.

Tebaldi's assessment jibes with the National Climatic Data Center's tracking of extreme events in the United States, said David Easterling, chief of the center's scientific services. Easterling's group has created a massive climate extreme index that measures the weather in America. Last year, the United States experienced the second most extreme year in 95 years; the worst year was in 1998.

#### Source D

Moses, Sarah. "Seeking solutions for global warming."  
Indian Country Today on the Web. 8 Dec. 2006. 9  
Dec. 2006 <<http://www.indiancountry.com/content.cfm?id=1096414128>>.

The following is an excerpt from a news article.

Conference speakers offered several solutions to wage the battle on global warming, including looking at ways to educate the tribes.

Wahleah Johns is a Campus Climate Challenge coordinator and a member of the Black Mesa Water Coalition. She said that working to educate the youth is key.

"Our communities don't understand that they need to take action now," said Johns, who is from the Navajo Reservation. "More young people need to get involved. They need to be at the table for these discussions. These are things that are going to affect them."

One solution that was discussed at the conference was the use of wind energy. Robert Gough is secretary of the Intertribal Council on Utility Policy, an organization composed of federally recognized Indian tribes in the northern Great Plains that provides a forum for discussions on rights and resources for utility services on tribal lands.

The use of greenhouses, carbon sequestration and solar energy are ways of reducing the amount of carbon dioxide that is building up in the atmosphere and causing global warming.

Johns said there are things all people, as individuals, can do every day to reduce the amount of carbon dioxide released into the atmosphere. She said people should replace the light bulbs in their homes with compact fluorescent bulbs. She also said to turn down the thermostat at night by two degrees. These small changes, she said, will make big differences over time.

Other recommendations made by conference attendees were to recycle and use reusable water bottles instead of purchasing bottled water.

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Lockwood has traveled the country to educate her peers, politicians and tribal leaders about the effects of global warming. She said that people need to act now, instead of waiting until it is too late.

"We need to make everyone aware of all the little things that everyone can do," she said. "Little things you can do will make a big difference for Alaska, and around the world."

#### Source E

Hotz, Robert Lee. "Western Warming Warning." Los Angeles Times on the Web. 6 Oct. 2006. 6 Oct. 2006 <<http://www.latimes.com/news/science/environment/la-sci-warming6oct06,1,7,7118523.story?coll=la-news-environment>>.

The following is an excerpt of a news article.

Rising temperatures in the 11 Western states due to global warming will cause more prolonged droughts, more widespread wildfires, and extensive die-offs in regional plant, fish and game habitats, according to a report Thursday from the National Wildlife Federation.

"The American West is truly on the front line," said Patty Glick, the federation's global warming specialist. "The latest science is painting a bleak picture."

To address climate change, the organization urged national limits on the greenhouse gases responsible for rising temperatures, such as carbon dioxide and methane. California recently adopted such limits.

The national appetite for energy, fed by carbon-rich coal, oil and natural gas, imposes a double penalty on the ecological well-being of the West, said the group, which has 1 million members.

The search for more fossil fuels — drilling permits on public lands have tripled in six years — disrupts fragile habitats even as increasing carbon dioxide alters the regional climate in ways that will make it impossible for many species to survive.

The federation report, called "Fueling the Fire," brings a regional focus to climate research findings from federal agencies, academia and science journals.

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All told, the winter snowpack, which is the source of 75% of the West's water, has declined by up to a third in the northern Rocky Mountain region and more than 50% in parts of the Cascades since 1950, the federation reported.

Indeed, the West is in the middle of a prolonged drought that may be the worst since record-keeping began more than a century ago — the direct consequence of altered weather patterns caused by warmer temperatures in the Pacific and Indian oceans, other research groups have reported.

This past wildfire season was the most severe on record, said ecologist Steven W. Running at the University of Montana College of Forestry and Conservation.

More than 9.6 million acres burned over the summer — twice the seasonal average — and at \$1.5 billion, the expense to fight them was the greatest ever.

#### Source F

Olsen, Dave. "Disappearing by Degrees." Zoogoer. July/August 2006. 30 Dec. 2006 <<http://nationalzoo.si.edu/Publications/ZooGoer/2005/4/polarbears.cfm>>.

The following is a picture that shows "as global warming heats up the Arctic, polar bears in western Hudson Bay, Canada, are losing their icy hunting grounds."

#### Source G

Wald, Matthew L. "The Energy Challenge: It's Free, Plentiful and Fickle." New York Times on the Web. 28 Dec. 2006. 29 Dec. 2006 <<http://www.nytimes.com/2006/12/28/business/28wind.html>>.

The following is an excerpt from a news article.

But Frank P. Prager, managing director of environmental policy at the company, said that the higher the reliance on wind, the more an electricity transmission grid would need to keep conventional generators on standby — generally low-efficiency plants that run on natural gas and can be started and stopped quickly.

He said that in one of the states the company serves, Colorado, planners calculate that if wind machines reach 20 percent of total generating capacity, the cost of standby generators will reach \$8 a megawatt-hour of wind. That is on top of a generating cost of \$50 or \$60 a megawatt-hour, after including a federal tax credit of \$18 a megawatt-hour.

By contrast, electricity from a new coal plant currently costs in the range of \$33 to \$41 a megawatt-hour, according to experts. That price, however, would rise if the carbon dioxide produced in burning coal were taxed, a distinct possibility over the life of a new coal plant. (A megawatt-hour is the amount of power that a large hospital or a Super Wal-Mart would use in an hour.)

But Mr. Reicher drew a quick response from James E. Rogers, chief executive of Duke Energy, one of the nation's largest utilities, and chairman of the Edison Electric Institute, the industry's trade association.

Mr. Rogers said that wind and another big renewable source that is available only when nature cooperates, solar power, will be necessary because the government would eventually regulate carbon emissions from coal-fired power plants. He later said that his reply to Mr. Reicher had been a "cheap shot," but he and others are still wondering how much wind the nation can absorb.

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In many places, wind tends to blow best on winter nights, when demand is low. When it is available, power from wind always displaces the most expensive power plant in use at that moment. If wind blew in summer, it would displace expensive natural gas. But in periods of low demand, it is displacing cheap coal.

And in places where suppliers enter bids each day to supply power on the next day, on an hour-by-hour basis, wind is at a disadvantage. Wider use of wind requires the invention of a new kind of weather forecasting, according to the Electric Power Research Institute, a nonprofit consortium based in Palo Alto, Calif., sponsored by the utility industry and its suppliers. Rather than forecasting from temperature or rainfall, what is needed is a focus on almost minute-by-minute predictions of wind in small areas where the turbines are.

The economics of wind would change radically if the carbon dioxide emitted by coal were assigned a cash value, but in the United States it has none. Coal plants produce about a ton of



carbon dioxide each megawatt hour, on average, so a price of \$10 a ton would have a major impact on utility economics.

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A problem for new power lines is that they would be fully loaded for only some of the year, since the amount of energy that the average wind turbine produces over 12 months is equal to just 30 to 40 percent of the amount that would result from year-round operation at capacity. That number runs closer to 90 percent at a nuclear or coal plant.

Thus a 1,000-megawatt nuclear plant will produce nearly three times as much electricity as 1,000 megawatts of wind turbines. But operating costs at the wind farm are lower, and the fuel is, of course, free.