

Answer Key: “Renewable Energy Use for Electricity in the U.S.” Graph

1. Between 2005 and 2015, what is the lowest level of kWh provided by renewable energy sources?

a) Approximately 55 billion kWh
b) Approximately 65 billion kWh
c) Approximately 75 billion kWh
d) Approximately 85 billion kWh

Answer explanation: Occurred approximately July 2007

2. When did the number of kWh produced by renewable energy sources reach more than 100 billion kWh for the first time?

a) March 2005
b) April 2008
c) June 2010
d) February 2013

Answer explanation: It is the first time that the graph moves over the 100 billion line.

3. Of the following time periods, which one experienced the biggest drop in kWh produced from renewable energy?

a) July 2005 – October 2005
b) April 2007 – July 2007
c) May 2008 – August 2008
d) June 2010 – September 2010

Answer explanation: During that time period, the graph drops from nearly 100 billion kWh to approximately 60 billion kWh.

4. According to the graph, something significant occurred in October 2010. Why is that time significant?

a) It was the only time on the graph when Americans used 100 billion kWh generated from renewable energy.
b) After that point, Americans have never reached 100 billion kWh of electricity generated from renewable energy.
c) After that point, Americans always used at least 75 billion kWh of electricity generated from renewable energy.
d) It was the only time on the graph when Americans decreased the amount of electricity generated from renewable energy.

Answer explanation: Though the graph dips to 75 billion kWh around September 2012, it never moves under that level starting in approximately October 2012.

5. Which of the following homes most closely resembles the average home in its use of electricity?

a) The Washington home uses 10,250 kWh each month.
b) The Jefferson home uses 3,550 kWh each month.
c) The Lincoln home uses 1,250 kWh each month.
d) The Roosevelt home uses 950 kWh each month.

Answer explanation: The challenge here is to convert the answer to kWh per year, which the graph indicates that the average use is 11,000 kWh per year.



6. Of the following time periods, which one experienced the biggest rise in kWh produced from renewable energy?

- a) January 2008 – August 2008
- b) August 2010 – April 2011**
- c) January 2012 – August 2012
- d) August 2013 – April 2014

Answer explanation: In that time period, the graph moves from approximately 73 billion kWh to 115 billion kWh — an increase of 42 billion kWh

7. Which of the following statements can best be supported by the information presented in the graph?

- a) Approximately 40 billion more kWh were produced with renewable energy sources in January 2015 than in January 2005.**
- b) Renewable energy sources will always provide less than 20% of the electricity produced in the United States each year.
- c) Throughout 2003, less than 50 billion kWh of electricity produced in the United States came from renewable energy sources.
- d) In 2010, Americans did a better job of conserving energy than they did in 2014 due to better technology for electricity generation.

Answer explanation: Only this answer is indicated by the graph. Choices b and c deal with either the future or the past relative to the graph. Choice d is not information that the graph reveals; plus, it's more likely that technology was better in 2014 than in 2010.

8. A kilowatt hour (kWh) is the same as 1,000 watts. That means that a 25-watt light bulb that stays on for 40 hours uses 1 kWh of electricity. [Think about it this way: 25 (watts) x 40 (hours) = 1,000 (watts).] That means that a 50-watt bulb takes 20 hours to use 1 kWh of electricity.] How long would it take a 10-watt LED light bulb to use 1 kWh of electricity?

- a) 10 hours
- b) 100 hours**
- c) 250 hours
- d) 400 hours

Answer explanation: The simplest way to get to the answer is to divide 1,000 watts by 10 (for the LED light bulb), which is 100.



Answer Key: “So ... Why Conserve?”

1. The introduction to the interview with Doug Kopp says that it’s a good idea to learn about energy conservation even if you’re already convinced that conservation is important. According to the introduction, why is it a good idea to learn about energy conservation?
- a) Because learning about conservation can help you teach others about its importance
 - b) Because Doug Kopp is a good resource to learn about the importance of conservation
 - c) Because conserving energy not only saves money but is also good for the environment
 - d) Because the introduction indicates that the interview includes insights on conservation

Answer explanation: All of the answer choices may be true statements, but only this one addresses the question because it is taken directly from the introduction.

2. Which of the following is the best way to describe the cost of a new power plant?
- a) Construction costs for a new power plant are billions of dollars.
 - b) Construction costs for a new power plant are incredibly expensive.
 - c) Construction for a new power plant costs more than 1,000 houses.
 - d) Construction for a new power plant can cost roughly \$1,000,000,000.

Answer explanation: The article states that new power plants can cost “around \$1 billion each.” The other choices are either incorrect (a) or much more vague.

3. What does Doug Kopp predict might happen in the future?
- a) The population will grow, so Alliant Energy will have more customers to serve.
 - b) There will be greater demand for power due to more people needing power.
 - c) If people increase conservation, it will decrease the need for new power plants.
 - d) All of the above

Answer explanation: Both a and c are essentially stated verbatim. Students should be able to understand that more people creates more demand and that idea is implicit in Doug Kopp’s answer.

4. According to Doug Kopp, what will decrease the strain on the environment compared to now?
- a) Decrease use of wind power with an increase in use of coal
 - b) Greater levels of energy conservation among citizens
 - c) Use of more non-renewable resources for power plants
 - d) All of the above

Answer explanation: This comes from the article; plus, the other choices will create more strain on the environment.

5. Which of the following is NOT an example in the interview of how Alliant Energy is using new technology in the generation of power for customers?
- a) Alliant Energy is using new technology to decrease air pollution from power plants.
 - b) Alliant Energy is using new technology to communicate with customers by email.
 - c) Alliant Energy is using new technology to utilize more renewable resources.
 - d) Alliant Energy is using new technology to decrease the costs of using renewables.

Answer explanation: This idea is not referenced at all in the interview, nor does it relate in any way to the generation of power. Whereas, the other three answer choices are all mentioned in Doug Kopp’s last two answers.



6. Doug Kopp says he is excited about using more renewable resources such as solar and wind. Since he is one of Alliant Energy's leaders, why is he likely to be excited by this?
- a) Because Iowa and Wisconsin both have a lot of wind and sometimes some sunlight
 - b) Because wind farms similar to the one in the photo look really interesting
 - c) Because Alliant Energy will be able to decrease its impact on the environment**
 - d) Because Alliant Energy will be your power company when you are an adult

Answer explanation: In the article, Doug Kopp talks about the environmental impact of non-renewable resources.

7. Which of "Doug's Top 5 Ways to Save Energy" are ways to decrease the use of electricity?
- a) #1 and #2
 - b) #1, #2 and #3**
 - c) #2, #3 and #5
 - d) #1, #2, #3 and #5

Answer explanation: All of the suggestions in #s 1 – 3 apply to devices and appliances that run on electricity; whereas, #5 is more about avoiding wasting water.

8. What are LEDs?
- a) Light bulbs that are light-emitting diodes
 - b) Effective means for conserving energy
 - c) Light bulbs with a longer life than other types of light bulbs
 - d) All of the above**

Answer explanation: Students may need to consult the glossary to see what LED stands for, and they may need to use context clues to figure out the meaning of "means" in b.



Answer Key: “Sources of U.S. Electricity Generation” Chart

1. What percentage of electricity was generated by something other than coal in 2014?

- a) 39%
- b) 50%
- c) 61%**
- d) 72%

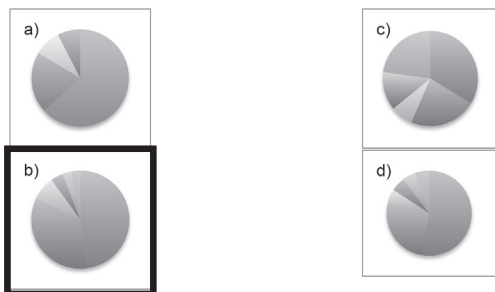
Answer explanation: By adding up all of the percentages except for coal, the answer is 61.

2. How does electricity generated by coal compare to electricity generated by renewable resources in 2014?

- a) Electricity generated from coal was nearly two times (2x) more than electricity generated by renewable sources.
- b) Electricity generated from coal was three times (3x) more than electricity generated by renewable resources.**
- c) Electricity generated by coal accounts for 39% of the overall resources used to generate electricity in 2014.
- d) Electricity generated from coal is done more in the Southeastern part of the U.S. than it is in the Midwest.

Answer explanation: Coal is 39% and renewables 13% (3x difference); a and c don't compare coal to renewables, and d is not information provided by the graph.

3. Pie charts are good for showing different “pieces” that make up the whole. There are six different renewable energy sources that generated electricity in 2014. Which pie chart below best represents the percentages of those six renewable energy sources that generated electricity in 2014?



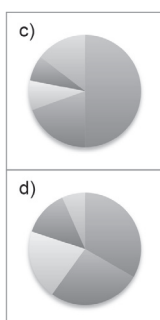
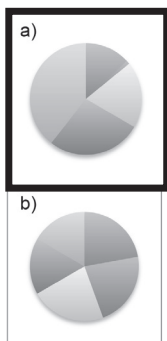
Answer explanation: The first clue is that there are six wedges/pieces and that two dominate the graph since hydro (48%) and wind (34%) are by far the most prominent. While d has two dominant, one is more than 50% of the pie, and four pieces are identical.

4. Based on the information in the chart about renewable energy sources in 2014, which of the following statements is NOT shown to be true?

- a) Among renewable sources, hydropower generated the highest percentage of electricity.
- b) Less than 20% of electricity generated from renewables came from sources other than wind or hydro.
- c) Twice as much energy was generated from wood biomass than from waste biomass.
- d) The percentage of electricity generated from wind was twice as much as it was in 2013.**

Answer explanation: The first half of the statement is true, but there is no way to know how much it increased from 2013.

5. Which pie chart below best represents the percentages of sources for all of the electricity generated in the U.S. in 2014?



Answer explanation: The main indicators are three substantial wedges/pieces to represent coal, natural gas, and nuclear and one tiny sliver to represent petroleum (1%).

6. If hydropower provided roughly half of the renewable energy used to generate electricity in 2014, approximately what percentage of electricity overall was generated from hydropower?

- a) 6% - 7%
 b) 13% - 15%
 c) 24% - 26%
 d) 48% - 50%

Answer explanation: This requires knowing that approximately half of 13% is 6% - 7%, since renewable sources accounted for 13% of electricity generated in 2014.

7. Renewable energy sources and nuclear power sources are the only sources that are not fossil fuels. What percentage of electricity was generated by fossil fuel sources in 2014?

- a) 27%
 b) 32%
c) 67%
 d) 86%

Answer explanation: The question helps identify that petroleum (1%), natural gas (27%) and coal (39%) are all fossil fuels, and adding them together equals 67%.

8. If you add up all of the percentages in the chart, they equal 99%. What is the best explanation for the reason they don't add up to 100%?

- a) The missing 1% is due to rounding the numbers to the nearest whole number.
 b) The missing 1% is a different source of electricity that could not fit on the chart.
 c) The missing 1% is due to the fact that people in the U.S. saved energy in 2014.
 d) The missing 1% is because it's sometimes hard to determine an energy source.

Answer explanation: This one may be difficult for some students, but based on the other answer choices, it is clearly the most logical. It is a good opportunity to talk about rounding numbers.

Answer Key: “Know What? No, What?”

1. The article states that the sun is the biggest source of energy. How does the article say that we can see evidence of the sun’s ability to provide electricity to homes?

- a) The water cycle, which includes water evaporating and then becoming rainfall
- b) The visible growth of plants, particularly vegetables that provide us with food
- c) The presence of solar panels on rooftops indicating the use of solar energy**
- d) The sun is the largest source of solar energy in our solar system.

Answer explanation: While all of the answer choices are true of the sun’s energy, only this answer speaks to the sun’s ability to “provide electricity.”

2. Which one of the following is an example of a potential energy source?

- a) Banana**
- b) Extension cord
- c) Dam
- d) Coffee maker

Answer explanation: The article specifically mentions food as an example of potential energy. Neither an extension cord or a dam provides energy, it’s the electricity moving through the extension cord and the water moving through the dam that do.

3. According to the article which of the following statements is NOT true?

- a) We can observe and experience energy in a number of different forms.
- b) The only forms of energy are heat, light, motion, electrical, nuclear and chemical.**
- c) Getting hit in the gut with a soccer ball is an example of energy at work.
- d) Energy’s work happens in ways we can’t observe, even at a microscopic level.

Answer explanation: The key word in this answer is “only.” The article states that the forms of energy in this answer are “just a few” of them.

4. The sun provides energy that solar panels capture and convert to electricity. Which of the following pairs has a similar relationship as the sun and solar panels?

- a) Solar power/hydropower
- b) Moving water/dam**
- c) Nuclear energy/chemical energy
- d) Potential energy/kinetic energy

Answer explanation: This is a good question to introduce analogies/analogous thinking. While there are relationships between all of the pairs, only this answer has a source of power and a capturer and converter of that power.

5. Which of the following is true of electrons?

- a) Electrons are smaller than atoms.
- b) Electrons flow in an orbit around an atom’s nucleus.
- c) The flow of electrons is what creates electricity.
- d) All of the above**

Answer explanation: Answers b and c are stated verbatim. Students should be able to figure out that electrons must be smaller than an atom since they are part of the atom.



6. What is the relationship between lightning and the electricity that we use at home?

- a) Lightning and electricity both result from electrons moving to new atoms.
- b) Benjamin Franklin invented electricity from observing lightning with a kite.
- c) Power plants can capture the energy from lightning and convert it to electricity.
- d) Rarely is someone struck by lightning twice or shocked by bad wiring twice.

Answer explanation: The first paragraph on page 10 describes both electricity and lightning as the flow of electrons from one atom to another.

7. Which one of the following is NOT part of the generation of electricity at a power generator?

- a) Turbine
- b) Steam
- c) Magnets
- d) Kitchen appliance

Answer explanation: The first three answer choices are all mentioned in the article as key elements in the process of generating power.

8. Which of the following is the best explanation for why coal is a non-renewable resource?

- a) The supply of coal is limited and can't be replaced once it's used.
- b) Geothermal, solar and wind energy are all examples of renewable resources.
- c) Coal provides the largest source of energy to generate electricity in the U.S.
- d) The burning of coal creates carbon dioxide (CO₂) in the atmosphere.

Answer explanation: This is the only answer that addresses the question, essentially restating the definition of a "non-renewable resource."

9. What does the article suggest is likely to occur in the future as technologies for power generation improve?

- a) Power generators will utilize more renewable resources to generate electricity.
- b) Both solar and wind power will be sources for more electricity than they are now.
- c) Power generators will cause less air pollution in the future than they do now.
- d) All of the above

Answer explanation: The last paragraph on page 10 mentions each of these probable outcomes of advances in technology.

10. Though the article uses a title that is a clever play on words, it doesn't indicate what the article is about. Which of the following titles would give readers the best idea of the article's focus?

- a) "You Have Entered the Energy Zone"
- b) "Answers to Questions about Energy & Electricity"
- c) "What Is a Renewable Resource?"
- d) "Alliant Energy Gives You the Power!"

Answer explanation: This question requires students to make a judgment on what constitutes the "best" title to inform readers. Answers a and d are more vague than b, and c speaks only to part of the article.

