

# Solar Absorbers and the Future of Electricity

By James Folta



Electricity is what we use to power things at home or at school. You can probably look around right now and see an electrical outlet or two. Everything that we plug into one of these outlets uses electricity. But where does this electricity come from? Right now we have a few ways to make electricity. Some are better than others. There are some scientists who are trying to find new ways to get electricity that are better for the planet Earth.

Most electricity is generated by machines that are run by steam. Making a lot of steam is the hard part. Water has to be heated up so that it boils and becomes steam. In the United States, we burn a lot of different things to create this steam. The most common things that are burned are oil, gas, and coal. The United States uses a lot of electricity and so we burn a lot of oil, gas, and coal. In 2012, the United States of America used more oil and gas than any other country in the world and was number two in the world for using coal.

The problem with using these things is that burning them can be harmful and damaging to the Earth. Also, there is only a certain amount of coal, gas, and oil in the world, and they are running out very quickly. We can't make more of them. What happens when they run out? How else can we get electricity?

There are some people who are trying to answer this question. There are many scientists who are developing different methods of getting electricity. One of these people is Jeff Chou, who is a scientist and researcher working on new ways of getting electricity. Jeff works at MIT, which

stands for Massachusetts Institute of Technology. It is a university in Cambridge, Massachusetts. MIT is very well known and people from all over the world go to study there. It is one of the best colleges to learn and practice science.

Jeff is at MIT working as a researcher on electricity. He decided he wanted to be a scientist in high school: "I happened to like the math and physics classes, so in college I chose to focus on electrical engineering." Electrical engineering is studying how electricity works. This is helpful for knowing how things like computers work. In fact, Jeff can build the computer chips that make computers run!

Jeff likes being a scientist because he can change the world. "I get to work on tough problems that could help out everyone on Earth," Jeff said. Jeff likes that he gets to try to "come up with new solutions by thinking creatively. In fact, in science, wild and crazy ideas are encouraged!"

One of these ideas that Jeff is working on is how to get better solar power. Solar power, Jeff says, is "converting the light we get from the sun into usable electrical energy." You can feel this energy yourself: the sun feels hot on your skin because it is sending out energy. Solar power is different from oil, gas, or coal because it is what is called renewable energy. This means that its source is not consumed when we use the energy, as happens with gas, for instance, which burns away. Things like the wind, the sun, and ocean currents are called renewable because they won't go away anytime soon.

At MIT, Jeff is "working on new ways to convert solar energy into electricity." He is making something called an absorber. It takes the heat from something hot, like the sun, and turns it into electricity. These absorbers are very small. They are special panels made out of silicon and other materials. These panels can "absorb and convert each photon [from the sun] that comes in, into an electron." These electrons can be used to make electricity. This can power anything, like a toaster, or a TV, or even some cars.

Jeff's job as a researcher involves doing lots of experiments. Jeff says that experiments are the heart of science. You have to take your ideas and test them to see if they work or not. "Sometimes the ideas work and sometimes they don't, and that's science in a nutshell," Jeff says. These experiments involve lots of special equipment and laboratories. Jeff does most experiments in a clean room, which is a room that has no germs or dirt or anything that might damage his experiments. In the clean room, Jeff makes the tiny solar absorbers. Then he shines light on them to see how much energy they can make. He has to take careful notes and measurements, so he "can tell everyone how good or bad our device is."

Jeff likes working with solar energy because it is better for the Earth. “Solar energy is very important because we can create electrical energy without polluting the Earth,” Jeff says. Older ways of getting electricity that use oil, gas, or coal are more harmful. They “burn toxic chemicals and release them into the sky and Earth, which are harmful to you and me,” Jeff says. But the absorbers that Jeff is building are cleaner. “All we have to do is point our solar silicon panels towards the sun, and we get clean energy,” Jeff says. There are few harmful byproducts.

For Jeff, his solar absorbers are very exciting because they can help us turn anything hot into electricity. Jeff is hoping that if his panels are sensitive enough, anything hot could generate electricity, not just the sun. He says, “There are a lot of hot things we encounter every day; imagine if we can now use those to help power an entire city!” This is the exciting part of science for Jeff. He is helping to make the world a cleaner and better place through his solar panels. If scientists like Jeff are successful, the world could get all its electricity thorough clean, renewable sources. This would make our world a cleaner and safer place to live.

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

1. What kinds of energy is Jeff Chou working with?

- A energy from coal, gas, and oil
- B solar energy and energy from coal
- C electrical energy and energy from oil
- D solar energy and electrical energy

2. What does the passage describe?

- A The passage describes electricity and the efforts of a scientist to turn solar energy into electricity.
- B The passage describes the reasons that people from all over the world go to study at MIT.
- C The passage describes what Jeff Chou does to keep the room where he does his experiments clean.
- D The passage describes the few harmful byproducts that are created by people use energy from the sun.

3. Getting electricity from oil, gas, and coal pollutes the Earth.

What evidence from the passage supports this statement?

- A Jeff Chou hopes that his panels will be sensitive enough to absorb electricity from anything hot, not just the sun.
- B In order to generate steam for its electricity needs, the United States has to burn a lot of oil, gas, and coal.
- C Using oil, gas, and coal burns toxic chemicals and releases them into the sky and Earth, which is harmful to people.
- D According to Jeff Chou, testing your ideas to see whether or not they work is at the heart of science.

4. What is solar power?

- A energy that comes from burning oil, gas, and coal
- B energy from the sun that is turned into electricity
- C steam that is created by boiling water
- D the study of how electricity works

5. What is this passage mostly about?

- A the reasons that the United States of America used more oil and gas than any other country in 2012
- B the computer chips that Jeff Chou learned how to build as an electrical engineer
- C electrical engineering, the process of burning coal, and the importance of electrical outlets in daily life
- D electricity, solar energy, and a scientist working on new ways to turn solar energy into electricity

6. Read the following sentence: "At MIT, Jeff is 'working on new ways to convert solar energy into electricity.'"

What does the word **convert** mean?

- A increase
- B decrease
- C change
- D destroy

7. Choose the answer that best completes the sentence below.

Solar power is renewable; \_\_\_\_\_, power from oil, gas, and coal is not renewable.

- A however
- B especially
- C in conclusion
- D initially

8. What is Jeff making to convert solar energy into electricity?

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9. According to Jeff, why is solar energy “very important”?

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10. Are the solar absorbers that Jeff is working on a better way of getting electricity than oil, gas, and coal? Use evidence from the passage to explain why or why not.

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## Teacher Guide &amp; Answers

Passage Reading Level: Lexile 870

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8. What is Jeff making to convert solar energy into electricity?

**Suggested answer:** Jeff is making solar absorbers. (Also acceptable: Jeff is making absorbers.)

9. According to Jeff, why is solar energy "very important"?

**Suggested answer:** Jeff says that solar energy is "very important" because it creates electricity without polluting the Earth.

10. Are the solar absorbers that Jeff is working on a better way of getting electricity than oil, gas, and coal? Use evidence from the passage to explain why or why not.

**Suggested answer:** Answers may vary, as long as they are supported with evidence from the passage. Students in favor of solar absorbers may argue that the absorbers do not pollute the Earth and harm people, as oil, gas, and coal do. Students in favor of oil, gas, and coal may argue that the absorbers are still being worked on, and it is not yet known whether they can provide enough electricity for people to use. People are already using oil, gas, and coal, so the reliability of these sources has been proven.