# **Issue Overview: Solar energy**

**Directions:**

**Monday**- read and thoroughly ANNOTATE the text (20 points)

**Tuesday**- complete the Sensational Summary activity (20 points)

**Wednesday**- answer the questions (\*Be sure to identify key words in the questions and label text evidence.\*) (5 points per question for identifying key words, 5 points per question)

**Thursday**- Find at least five words with word parts in this article. Write the word, word part, definition of word part, and definition of the word using context clues in the margins.. (20 points)

Bloomberg, adapted by Newsela staff

The idea that solar power may soon be everywhere isn’t as much of a long shot as it was a few years ago. Photovoltaics, or solar panels, are flat surfaces that convert light directly into electricity. In just the past five years, the price of solar panels has plunged more than 80 percent. For the last decade, the electric output of solar panels has increased by 40 percent each year. The solar industry is drawing roughly $150 billion in annual investment, which is half the total funding committed to renewable energy. In some places where the price of power is high, solar is already able to compete with fossil fuels in terms of cost.

Despite all this success, the idea that solar could soon meet energy needs on a global level seems far less likely. For one thing, those big increases come on top of a tiny base. In 2013, solar accounted for less than 2 percent of the world’s electricity supply.

Since people like their power to always be available, cost versus coal isn’t the only hurdle. A big obstacle is keeping the grid active when it's dark and cloudy. It's important to figure out how to maintain a lot of power in a system meant for uninterrupted production. Because of this, the outlook for solar might be cloudier than supporters claim.

**The Situation**

Energy generated by solar grew by a third in 2015, more than for any other power source. The global agreement reached in Paris, France, in December on fighting climate change didn’t include specific provisions on solar. However, the pact was considered certain to lead to significant new investments in renewable energy.

The U.S. Congress reached a budget deal that extended tax credits for wind and solar power for five years. The solar credit was due to end in 2017. Bloomberg New Energy Finance estimated that the extension will generate $38 billion in new solar power investment. In addition, federal rules announced in August 2015 require states to reduce carbon emissions, which could encourage investments in renewable energy.

Already, 43 of the 50 states have adopted renewable power goals. California’s target is 50 percent of power by 2020, up from about 20 percent now. Elsewhere, a number of nations led by Germany and Spain and most recently the United Kingdom have scaled back profitable solar incentives as prices have fallen. Worldwide, installations are highest in China, followed by Japan. In India, plans have been announced for $160 billion in solar power projects. Some big businesses have made splashy announcements, including Apple’s plan to spend $850 million on solar power.

**The Background**

The U.S. invented solar cells but never had the determination to commercialize them. AT&T’s Bell Labs in New Jersey made the first photovoltaic cell in 1953. For decades, solar only made economic sense in space satellites. In 1973, when oil prices underwent a huge increase, creating demand for new energy sources, oil companies led by Exxon and Arco began investing in photovoltaic cells. These same companies then backed out once the price of crude oil crashed in the 1980s.

Japan kept the industry alive through the 1990s, when Sharp, Kyocera and Sanyo were producing the majority of the world’s cells. In 2004, Germany introduced an expanded system of feed-in tariffs. These are investment policies in which more funding is offered to energy plants whose cost of generation is higher. Since this applies to photovoltaics, solar installations soared, and for several years Germany led the world in solar panel manufacturing. The tariff model was copied in other countries, and many new solar panel makers sprouted up. This level of competition led to the crash in the price of panels.

Another consequence was the concentration of the industry in China. There, companies led by Suntech Power built giant panel factories with loans from the government and cash from foreign investors. All of this support allowed them to survive a winnowing that shut many manufacturers elsewhere.

**The Argument**

The environmental group Greenpeace says solar “could meet the world’s energy demands many times over.” The more cautious International Energy Agency says photovoltaics might generate 16 percent of the world’s electricity by 2050. Fossil fuel backers say photovoltaic power will never be a practical source because it can’t work when the sun doesn’t shine and because it’s too expensive.

Solar power’s cost is now almost double the cost of the same energy from coal. But a longer view may be more favorable to solar, whose cost is falling as the price of coal goes up. Utility officials and regulators make decisions on the basis of decades-long predictions, and price is only part of the equation. There are technical considerations, like whether the grid can absorb changing flows of electricity from renewables.

The biggest question is ultimately political: what countries are willing to pay now for an energy source that may be cheaper and will undoubtedly be cleaner in the long run. The logic of the Paris agreement suggests the amount could be substantial. And if there’s a breakthrough in solar’s biggest weakness — an affordable way to store electricity for use at night — all those calculations could be upended.

**Sensational Summary:** Write a 5-7 sentence summary of the article.

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**Multiple-Choice Questions**

1. **The CENTRAL idea of the article is developed by:**
2. illustrating improvements in photovoltaics, and identifying problems that need to be solved
3. comparing investments in solar power with other sources of renewable energy
4. explaining changes in the solar industry over the last decade, current issues and predictions for the future
5. highlighting solar power projects around the globe, beginning in the U.S. and ending up in China
6. **Which of these sentences would be MOST important to include in an objective summary of the article?**
7. Despite all this success, the idea that solar could soon meet energy needs on a global level seems far less likely.
8. For decades, solar only made economic sense in space satellites.
9. Fossil fuel backers say photovoltaic power will never be a practical source because it can’t work when the sun doesn’t shine and because it’s too expensive.
10. Utility officials and regulators make decisions on the basis of decades-long predictions, and price is only part of the equation.
11. **Which statement BEST explains why the graphic “Here Comes the Sun” is included with the article?**
12. The graphic illustrates the recent dramatic shift in cost and production of solar power that could make it a workable energy source.
13. The graphic illustrates how photovoltaics provide more power to U.S. utilities than residents to show why fossil fuel backers say it will never be a practical energy source.
14. The graphic shows the cost of solar systems for the average U.S. resident since 1998 to explain why the U.S. Congress is encouraging investments.
15. The graphic shows how the cost of solar systems dropped in the U.S. to explain why production moved to China to keep the prices low.
16. **What is the summary of the section “The Background”?**
17. Japan and Germany became the leaders of solar technology.
18. The economy has caused changes in the solar energy industry.
19. China is the only country that can afford to manufacture solar panels.
20. The future of the solar energy business is dependent on Suntech Power Company.