

## Lecture Questions: Renewable Energy Sources

These questions are largely taken from chapter 8 of the textbook, and from the two supplementary reading articles (published by UCS and in the journal *Science*) that are available online.

1. We have studied fossil fuel and nuclear fission as energy sources; both are nonrenewable. Make a list of all renewable energy sources. For each, provide a brief (1 sentence) description and describe the environmental impacts of its use.
2. What are batteries and how do they work? Explain in detail. In your explanation, define the following terms: redox reaction, anode and cathode.
3. Explain how the following specific batteries work: the alkaline cell and the lead-acid storage battery. The latter is a rechargeable battery; what makes it so? In your explanation, be sure to differentiate between galvanic and electrolytic electrochemical cells.
4. How do fuel cells work? In your answer, include an explanation of *distributed generation*.
5. *External research*. Make a list—as complete as possible—of the environmental impacts of batteries, including fuel cells.
6. What is the hydrogen economy? Describe its components in some detail. In your answer, explain how the hydrogen economy could potentially serve as the basis for a renewable energy system that emits little or no carbon dioxide or other air pollution.