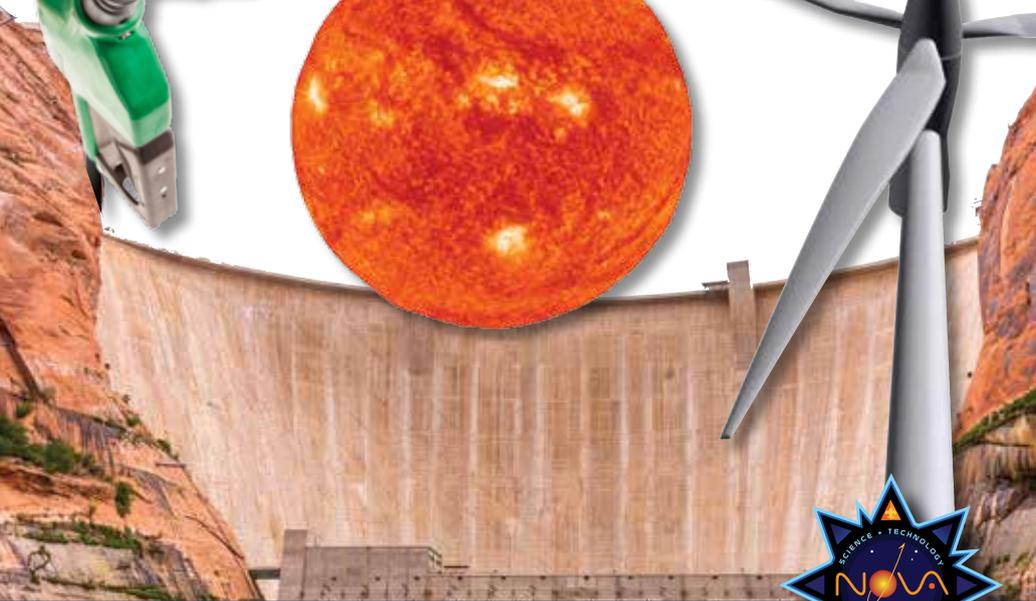


# MERIT BADGE SERIES



# ENERGY



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MERIT BADGE SERIES

# ENERGY



*"Enhancing our youths' competitive edge through merit badges"*



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# Requirements

1. Do the following:
  - a. With your parent's permission, use the internet to find a blog, podcast, or website, or find an article on the use or conservation of energy. Discuss with your counselor what you learned that was interesting to you, the questions it raises, and what ideas were addressed that you do not understand.
  - b. After you have completed requirements 2 through 8, revisit your source for requirement 1a. Explain to your counselor what you have learned in completing the requirements that helps you better understand the article or internet source.
2. Show you understand energy forms and conversions by doing the following:
  - a. Explain how THREE of the following devices use energy, and explain their energy conversions: toaster, greenhouse, lightbulb, bow drill, cell phone, nuclear reactor, sweat lodge.
  - b. Construct a system that makes at least two energy conversions and explain this to your counselor.

3. Show you understand energy efficiency by explaining to your counselor a common example of a situation where energy moves through a system to produce a useful result. Do the following:
  - a. Identify the parts of the system that are affected by the energy movement.
  - b. Name the system's primary source of energy.
  - c. Identify the useful outcomes of the system.
  - d. Identify the energy losses of the system.
4. Conduct an energy audit of your home. Keep a 14-day log that records what you and your family did to reduce energy use. Include the following in your report and, after the 14-day period, discuss what you have learned with your counselor.
  - a. List the types of energy used in your home such as electricity, wood, oil, liquid petroleum, and natural gas, and tell how each is delivered and measured, and the current cost; OR record the transportation fuel used, miles driven, miles per gallon, and trips using your family car or another vehicle.
  - b. Describe ways you and your family can use energy resources more wisely. In preparing your discussion, consider the energy required for the things you do and use on a daily basis (cooking, showering, using lights, driving, watching TV, using the computer). Explain what is meant by sustainable energy sources. Explain how you can change your energy use through reuse and recycling.
5. In a notebook, identify and describe five examples of energy waste in your school or community. Suggest in each case possible ways to reduce this waste. Describe the idea of trade-offs in energy use. In your response, do the following:
  - a. Explain how the changes you suggest would lower costs, reduce pollution, or otherwise improve your community.
  - b. Explain what changes to routines, habits, or convenience are necessary to reduce energy waste. Tell why people might resist the changes you suggest.

6. Prepare pie charts showing the following information, and explain to your counselor the important ideas each chart reveals. Tell where you got your information. Explain how cost affects the use of a nonrenewable energy resource and makes alternatives practical.
  - a. The energy resources that supply the United States with most of its energy
  - b. The share of energy resources used by the United States that comes from other countries
  - c. The proportion of energy resources used by homes, businesses, industry, and transportation
  - d. The fuels used to generate America's electricity
  - e. The world's known and estimated primary energy resource reserves
7. Tell what is being done to make FIVE of the following energy systems produce more usable energy. In your explanation, describe the technology, cost, environmental impacts, and safety concerns.
  - Biomass digesters or waste-to-energy plants
  - Cogeneration plants
  - Fossil fuel power plants
  - Fuel cells
  - Geothermal power plants
  - Nuclear power plants
  - Solar power systems
  - Tidal energy, wave energy, or ocean thermal energy conversion devices
  - Wind turbines
8. Find out what opportunities are available for a career in energy. Choose one position that interests you and describe the education and training required.

# Energy Information Resources

## Scouting Literature

*Chemistry, Citizenship in the Community, Citizenship in the World, Electricity, Electronics, Engineering, Environmental Science, Geology, Home Repairs, Nuclear Science, Oceanography, Plumbing, Pulp and Paper, Radio, Railroad, Space Exploration, Sustainability, Truck Transportation, and Weather* merit badge pamphlets

Visit the Boy Scouts of America's official retail website at <http://www.scoutstuff.org> for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

## Books

- Bickerstaff, Linda. *Oil Power of the Future: New Ways of Turning Petroleum Into Energy*. Rosen, 2002.
- Boxwell, Michael. *Solar Electricity Handbook*, 7th ed. Greenstream Publishing, 2012.
- Boyle, Godfrey. *Renewable Energy: Power for a Sustainable Future*, 3rd ed. Oxford University Press, 2012.
- Challoner, Jack, and Clive Streeter. *Eyewitness: Energy*. DK Publishing, 2000.
- Chiras, Dan, Mick Sagrillo, and Ian Woofenden. *Power From the Wind: Achieving Energy Independence*. New Society Publishers, 2009.
- Draper, Allison Stark. *Hydropower of the Future: New Ways of Turning Water Into Energy*. Rosen, 2003.
- Ferguson, Charles D. *Nuclear Energy: What Everyone Needs to Know*. Oxford University Press, 2011.
- Giacobello, John. *Nuclear Power of the Future: New Ways of Turning Atoms Into Energy*. Rosen, 2004.
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- Graham, Ian S. *Fossil Fuels: A Resource Our World Depends On*. Heinemann, 2004.
- . *Fossil Fuels, Energy Forever? Series*. Hodder Wayland, 2001.
- . *Geothermal and Bio-Energy, Energy Forever? Series*. Hodder Wayland, 2001.
- . *Water Power, Energy Forever? Series*. Raintree, 1998.
- Hawkes, Nigel. *New Energy Sources*. Copper Beech, 2000.

Hayhurst, Chris. *Biofuel Power of the Future: New Ways of Turning Organic Matter Into Energy*. Rosen, 2003.

———. *Hydrogen Power of the Future: New Ways of Turning Fuel Cells Into Energy*. Rosen, 2003.

Jones, Susan. *Solar Power of the Future: New Ways of Turning Sunlight Into Energy*. Rosen, 2003.

Kidd, J.S., and Renee A. Kidd. *Nuclear Power: The Study of Quarks and Sparks*. Chelsea House, 2006.

MacKay, David J.C. *Sustainable Energy—Without the Hot Air*. UIT Cambridge Ltd., 2009.

Parker, Steve. *Fuels for the Future*. Raintree, 1998.

Riddle, John. *Coal Power of the Future: New Ways of Turning Coal Into Energy*. Rosen, 2003.

Schobert, Harold. *Energy: The Basics*. Taylor & Francis, 2013.

Tecco, Betsy Dru. *Wind Power of the Future: New Ways of Turning Wind Into Energy*. Rosen, 2003.

Tester, Jefferson W., Elisabeth M. Drake, et al. *Sustainable Energy: Choosing Among Options*, 2nd. ed. The MIT Press, 2012.

## Organizations and Websites

### GENERAL ENERGY INFORMATION

#### Energy Efficiency and Renewable Energy

U.S. Department of Energy  
1000 Independence Ave. SW  
Washington, DC 20585  
Toll-free telephone: 800-342-5363  
Website: <http://www.eere.energy.gov>

#### EIA Kid's Page

Energy Information Administration  
Website: <http://www.eia.doe.gov/kids>

#### EarthTrends: Energy and Resources

World Resources Institute  
Website: <http://earthtrends.wri.org>

### ENERGY EFFICIENCY AND CONSERVATION

#### EnergyHog.org

Alliance to Save Energy  
Website: <http://www.energyhog.org>

#### PowerSave Schools

Alliance to Save Energy  
Website:  
<http://www.powersaveschools.org/>

#### Home Energy Saver

Energy Technologies Area,  
Lawrence Berkeley National Laboratory  
Website: <http://www.hes.lbl.gov>

#### Energy Star

U.S. Environmental Protection Agency  
Website: <http://www.energystar.gov>

### ENERGY SOURCES AND DATA

#### American Wind Energy Association

Telephone: 202-383-2500  
Website: <http://www.awea.org>

#### National Hydropower Association

Telephone: 202-682-1700  
Website: <http://www.hydro.org>

#### Nuclear Energy Institute

Telephone: 202-739-8000  
Website: <http://www.nei.org>

#### National Renewable Energy Laboratory

Telephone: 303-275-3000  
Website: <http://www.nrel.gov>

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The Boy Scouts of America thanks Dennis E. Showers, Ph.D., for his work as principal author of this new edition of the *Energy* merit badge pamphlet. Dr. Showers serves as director of the Center for Science, Mathematics and Technology Education and associate professor of Science Education at State University of New York (SUNY) at Geneseo. He received the Xerox Center for Multicultural Teacher Education Award of Excellence in 2003. A long-time supporter of the BSA, Dr. Showers also wrote the former *Atomic Energy* merit badge pamphlet and cowrote the current *Nuclear Science* pamphlet.

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