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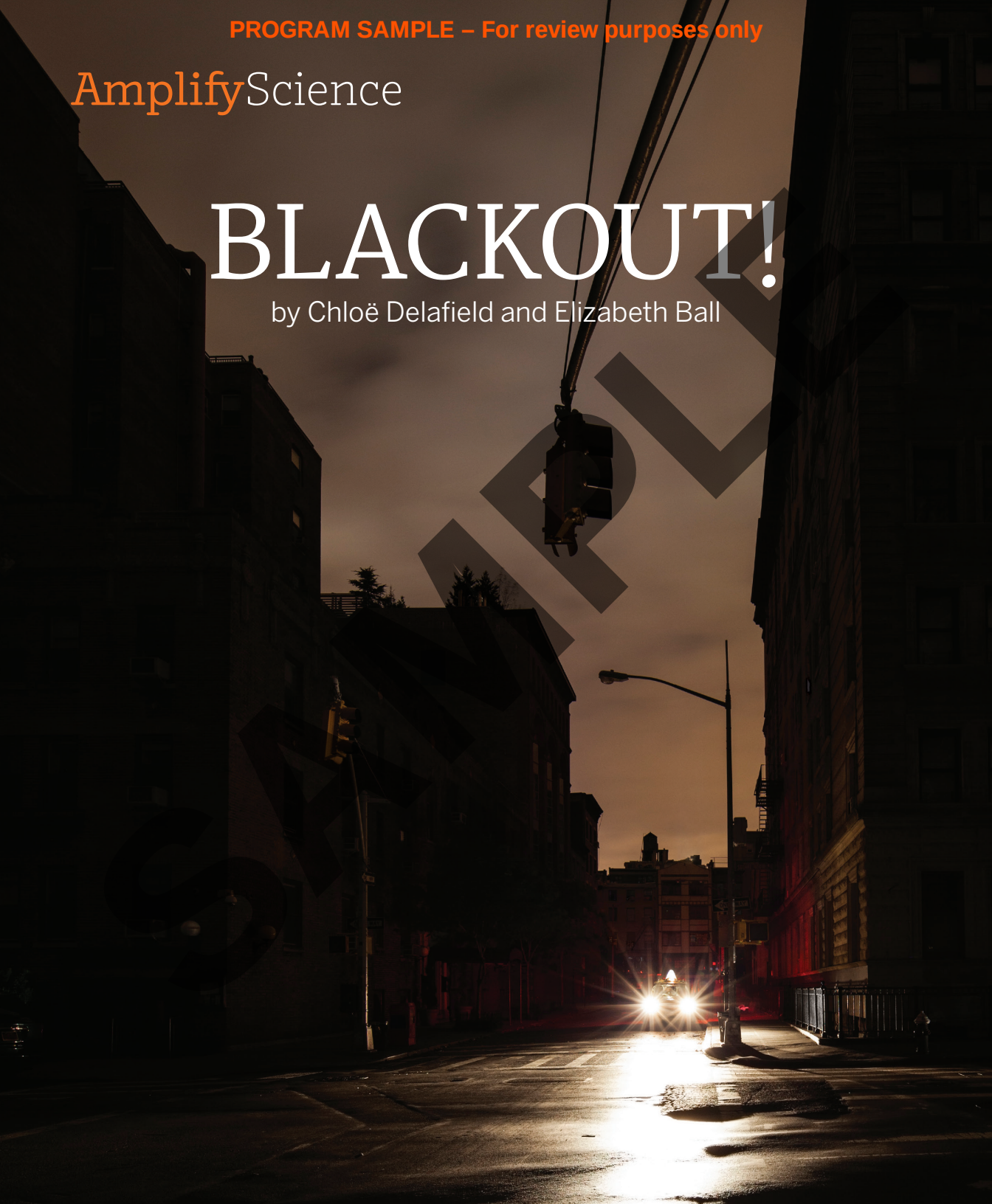
AmplifyScience

BLACKOUT!

by Chloë Delafield and Elizabeth Ball



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These materials are based upon work partially supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A130610 to The Regents of the University of California. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Developed by the Learning Design Group at the University of California, Berkeley's Lawrence Hall of Science.

Amplify Science Elementary is based on the *Seeds of Science/Roots of Reading*® approach, which is a collaboration between a science team led by Jacqueline Barber and a literacy team led by P. David Pearson.

www.scienceandliteracy.org

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55 Washington Street, Suite 800
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Grade 4
Blackout!
ISBN: 978-1-943228-27-0

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Contents

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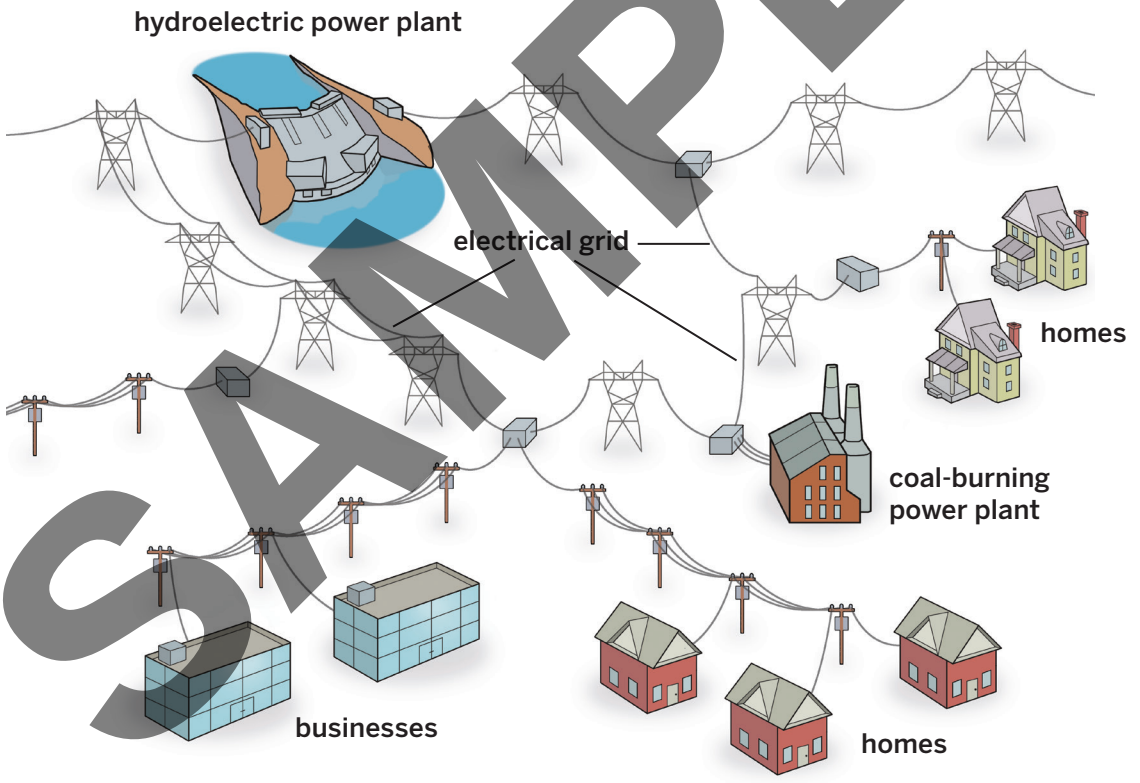
Introduction

Electrical energy is all around us. It is working for us all the time. However, we usually don't think about it until it *stops* working. **Blackouts** remind us how much we use this **energy**.

The **system** that brings us electrical energy is huge. This system includes many different power plants. Power plants **convert** energy from different **sources** into electrical energy. The system also includes millions of miles of wires. These wires make up the **electrical grid**.



A system like this one brings electrical energy to your home.

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The grid brings energy to homes and businesses. When the grid and the other parts of the system work, we get energy. When the grid or another part of the system fails, we can be left in the dark.

This book has articles about **failures** in the electrical system. Each article is like one you might see in a newspaper or online. See what you can learn from these articles about different ways that parts can fail, causing the whole electrical system to fail.

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This city is having a blackout because of a problem with the electrical grid.

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blackout

BAY AREA NEWS ONLINE

Runaway Truck Causes Huge Blackout

August 27, 2003

A runaway truck knocked down utility poles.

The lights went out in a small California city yesterday. The blackout began when a runaway truck crashed into several **utility poles**. The truck then slammed into a house, which burst into flames. Eight people were hurt.

The truck was going down a steep hill when its brakes failed. When it knocked down the utility poles, it pulled down several power lines. Those power lines deliver electrical energy to a large area.

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Twenty thousand homes lost power after the crash. Businesses closed for the day. Emergency workers had to keep people away from the dangerous electrical wires.

The utility poles were replaced today. This allowed people to turn on their lights and begin using their **electrical devices** again.

This was one of the largest blackouts ever caused by a runaway truck.

Workers fixed the power lines to get the lights back on.

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Texas Times

April 18, 2006

Heat Wave Leads to Rolling Blackouts

Yesterday's surprise heat wave had a surprising result: blackouts. Thousands of homes and businesses turned on their air conditioners. There was not enough electrical energy to power all those air conditioners at the same time. The demand for electrical energy was more than the system could handle.

Power companies had to cut people's power. They cut the power in different areas for a few hours at a time. This kept the entire system from failing. These "rolling blackouts" meant everyone could have power for some of the time. That was better than having no power at all! The rolling blackouts meant that some buildings could not run their air conditioning during the hottest part of the day. Many people left school and work early to avoid the heat.

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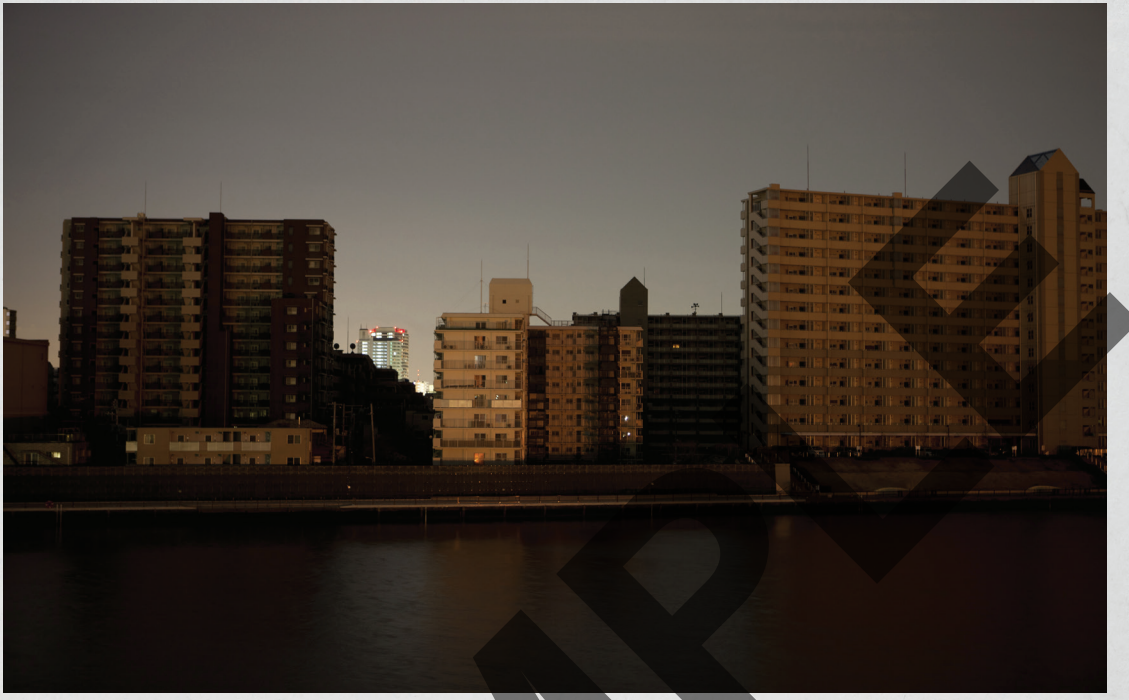

This city is having rolling blackouts.

Even with the blackouts, people used more electrical energy than they would on a normal spring day. Air conditioners make life more comfortable, but they use a lot of energy. When everyone uses them at the same time, it puts a strain on the electrical system. Too many electrical devices being used at the same time can make the system fail. There is not enough electrical energy to power them all.

Temperatures should be lower tomorrow. There probably won't be more rolling blackouts. Still, people should use less electrical energy, especially during the hottest part of the day.

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Daily News Online

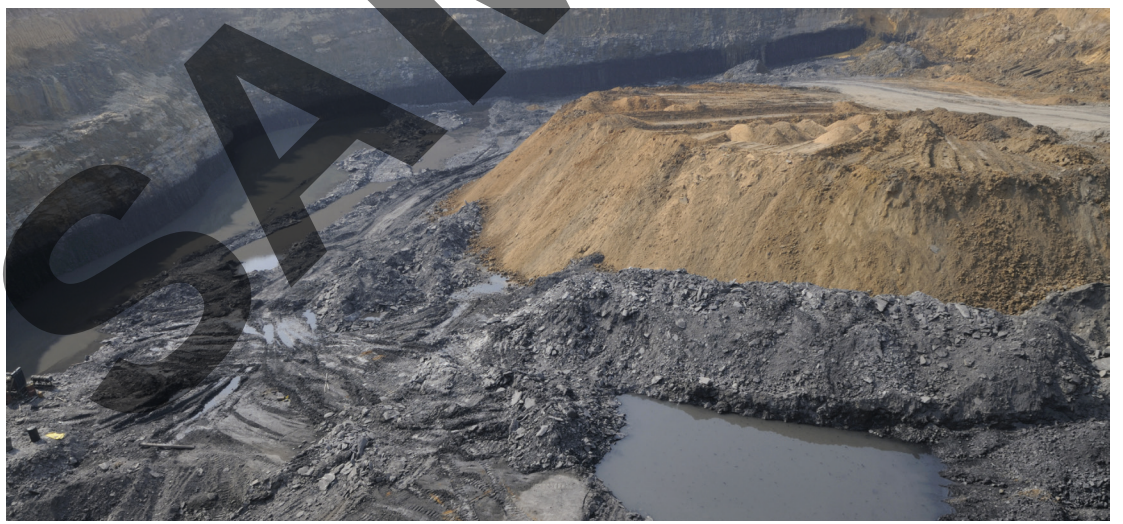
Blackouts Across India

As Fuel Supplies Run Out

September 4, 2014

Blackouts are affecting millions of people in India. Coal **shortages** have shut down several big power plants.

Coal is one of the main sources of power in India. The country gets more than two-thirds of its electricity from burning coal. Rainstorms are making it difficult to mine and ship the coal. That means there is not enough reaching the power plants. When the plants run out of coal, they can no longer **generate** electrical energy. This means homes, stores, and factories have no power.



This is one of India's large coal mines.

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Several towns are having blackouts for up to 10 hours a day. Some homes and businesses are paying extra for other kinds of fuel. They use this fuel to power small electric **generators**. That way they can keep using electrical energy during the blackouts.

Power companies are looking for sources of coal outside the country. This coal will be much more expensive and hard to get.

Many people use small generators like this one during blackouts.

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World News

August 18, 2009

Russian Power Station Accident Cuts Off Supply to Grid

A terrible accident happened at this hydroelectric power plant.

Yesterday morning in Russia, one **turbine** of a large **hydroelectric** power plant broke apart violently. The power plant was flooded with water. The ceiling fell down. Nine turbines were damaged.

The turbine had problems for many years. It had cracks even when it was first built. It was fixed several times, but not well enough.

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After the accident, the entire plant shut down. It cut off supply to the local electrical grid. This led to power failure in a large area. Many homes and businesses had to go without electricity. Factories and other big electricity users had to use backup generators.

Engineers think that it will take four years to fix the plant. Meanwhile, local homes and businesses must get their power from another energy source. This may be difficult and expensive.

Workers cleaned up after the accident.

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Brazil Today
English Edition

July 14, 2014

Drought Can Cause Blackouts—But Not This Time!

Brazilians were excited to host the World Cup this year. However, many were worried that there would be a blackout during the soccer tournament. Brazil has had a terrible water shortage for months. The country generates 70% of its electrical energy from water at hydroelectric power plants. Combined with the extra power used by millions of people watching soccer on TV, that could mean blackouts.

There were no major problems with Brazil's electrical system this time. However, there were good reasons to be worried.

This hydroelectric dam in Brazil is one of the biggest in the world.

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The soccer stadium kept its lights on in spite of blackout fears.

Other countries that rely on hydroelectric energy have had blackouts during water shortages. For instance, a **drought** in the Philippines left millions of people without electricity. There was not enough water to run their hydroelectric power plants. They did not have other sources of energy. People predicted that the same thing would happen in Brazil.

People in Brazil took steps to solve this problem. It seems to have worked. They brought in water from far away to use in the hydroelectric plants. They also used natural gas to run fuel-burning power plants. All of these steps cost the country extra money, but kept the TVs on during the World Cup.

Brazil scored a goal by keeping the electrical energy on. However, droughts are becoming more common. Systems that use hydroelectric energy may have more shortages in the future.

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Northeastern News

October 30, 2012

Millions Without Power After Hurricane Sandy

Hurricane Sandy caused big floods.

Seven million people lost power during Hurricane Sandy. The storm blew through the East Coast of the United States today. Strong winds and flooding disconnected many parts of the electrical system. They caused damage to the grid that may take months to fix.

Those without power have no heat, no refrigeration, and no phone service. Many are cold and hungry. Some people have traveled far just to charge their cell phones.

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Many people did not have power.

Some people without power don't have water either. Electricity is needed to pump water to their homes.

Some homes, businesses, and hospitals have generators for emergency energy during the blackout. Generators don't provide as much power as the larger electrical system can. However, in this emergency, some people can offer power to their neighbors.

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Glossary

blackout: a time when electricity is off due to a power failure

convert: to change from one form to another

drought: a long period of dry weather

electrical device: a machine that converts electrical energy to another form of energy

electrical energy: the form of energy that is transferred through wires

electrical grid: wires that transfer electrical energy from many sources to many other places

energy: the ability to make things move or change

engineer: a person who uses science knowledge to design something in order to solve a problem

failure: when something stops working

generate: to make something exist

generator: a machine that can convert other forms of energy to electrical energy when it spins

hydroelectric: producing electricity using the movement of water

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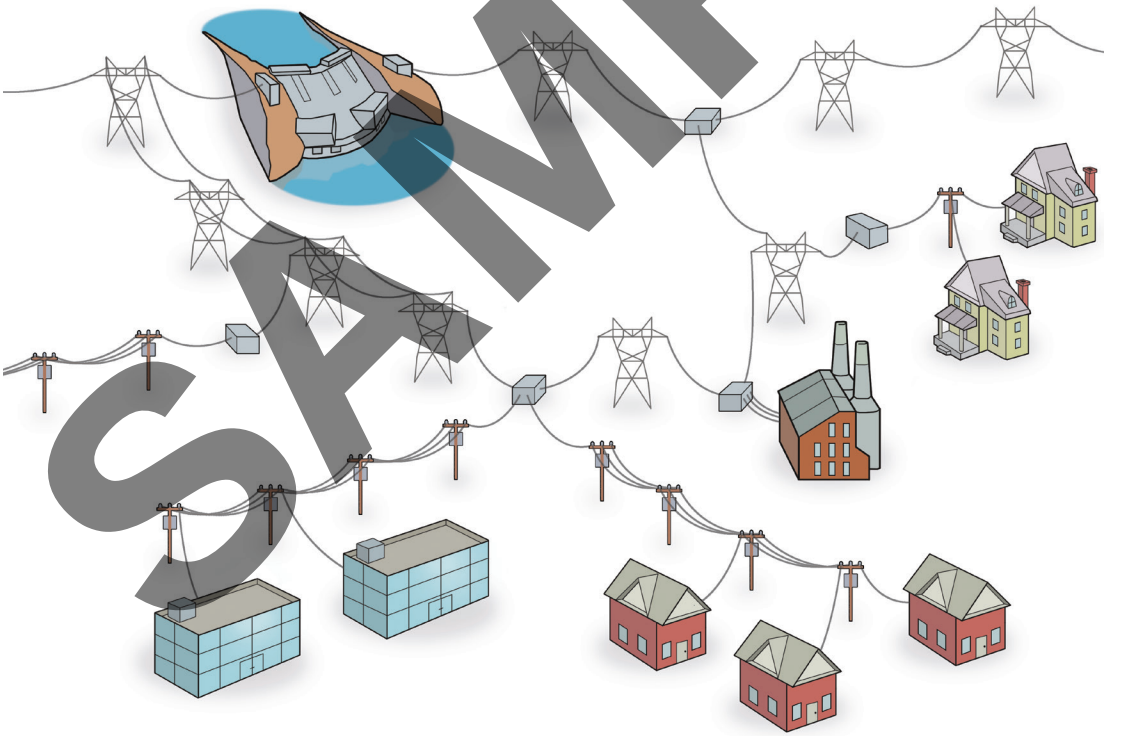
shortage: a problem when there is not enough of something

source: the place where something comes from

system: a group of parts that work together

turbine: an engine driven by a moving fluid, such as water, steam, or air

utility pole: a pole used by power companies to hold up power lines



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Books for *Energy Conversions*:

Systems
Energy Past and Present
Sunlight and Showers
Blackout!
It's All Energy

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Photographs: Cover, Page 1: blueperfect/Getty Images; Pages 5–12, 14–17: Shutterstock; Page 13: RIA Novosti/Science Source; Page 20: Abd Doumany/AFP/Getty Images

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Energy Conversions

Blackouts can happen for all kinds of reasons.

Blackouts happen when some part of the electrical energy system fails. Learn about many different reasons for blackouts in these true stories about power failures around the world.

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THE LAWRENCE HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY

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Published and Distributed by Amplify.
www.amplify.com

ISBN 978-1-943228-27-0