

Future Energy

ALEX RAYNHAM

3

OXFORD BOOKWORMS

Want to read more? [CLICK HERE TO BUY!](#)

You can also visit www.oup.com/elt to purchase the reader. Search for

All ▼

9780194656870



FUTURE ENERGY

Gas goes across the earth in great pipes. Oil and coal travel from one country to another in big ships, often for thousands of miles. We do not think about this when we take a cold drink from the fridge, or turn on a light. Energy has always been there when we wanted it.

But the clock is ticking. The oil, coal, and gas will not last forever. Scientists are working hard to find new ways to get energy, and some of their ideas will surprise you. A car that sails with the wind, a turbine at the bottom of a river, machines that use the heat from people's bodies – these are some of the places that the energy of the future will come from. And that future is not far away . . .

Want to read more? [CLICK HERE TO BUY!](#)



OXFORD BOOKWORMS LIBRARY

Factfiles

Future Energy

Stage 3 (1000 headwords)

Factfiles Series Editor: Christine Lindop

Want to read more? [CLICK HERE TO BUY!](#)

You can also visit www.oup.com/elt to purchase the reader. Search for

All ▼

9780194656870



ALEX RAYNHAM

Future Energy



OXFORD UNIVERSITY PRESS

Want to read more? [CLICK HERE TO BUY!](#)

You can also visit www.oup.com/elt to purchase the reader. Search for

All ▼

9780194656870



OXFORD

UNIVERSITY PRESS

Great Clarendon Street, Oxford, OX2 6DP, United Kingdom

Oxford University Press is a department of the University of Oxford. It furthers the University's objective of excellence in research, scholarship, and education by publishing worldwide. Oxford is a registered trademark of Oxford University Press in the UK and in certain other countries

This simplified edition © Oxford University Press 2012

The moral rights of the author have been asserted

First published 2012

10 9 8 7 6 5 4 3 2 1

No unauthorized photocopying

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of Oxford University Press, or as expressly permitted by law, by licence or under terms agreed with the appropriate reprographics rights organization. Enquiries concerning reproduction outside the scope of the above should be sent to the ELT Rights Department, Oxford University Press, at the address above

You must not circulate this work in any other form and you must impose this same condition on any acquirer

Links to third party websites are provided by Oxford in good faith and for information only. Oxford disclaims any responsibility for the materials contained in any third party website referenced in this work

ISBN: 978 0 19 479449 7

A complete recording of *Future Energy* is available on CD. Pack ISBN: 978 0 19 479448 0

Printed in China

Word count (main text): 10,244

For more information on the Oxford Bookworms Library, visit www.oup.com/elt/bookworms

ACKNOWLEDGEMENTS

Cover image: Corbis (solar panels/Tetra Images)

The publishers would like to thank the following for their permission to reproduce photographs: Alamy Images pp.4 (Coal miners/Miguel Sayago), 24 (Petrol pumps/Sandy Young), 26 (Solar cooking/Joerg Boethling), 33 (Itaipu hydroelectric dam/Mike Goldwater), 37 (Turbine/Francis Roberts); Andrew Engineering Ltd p.39 (Ground loop); Corbis pp.7 (Fuel tanker ships/Tim Wright), 11 (Rusting oil barrels/Ashley Cooper), 12 (Heavy traffic/David Butow/CORBIS SABA), 16 (Nuclear storage pond/Ocean), 22 (Sugar cane harvest/Tim Page), 27 (Solar-powered airplane/Denis Balibouse/Pool/epa), 28 (The PS20 solar tower/Ashley Cooper), 31 (Bahrain World Trade Centre/Hamad I Mohammed/X01444/Reuters), 41 (Human-powered Daedalus Aircraft/Charles O'Rear), 50 (1973 Opec Oil Crisis/H.Armstrong Roberts/ClassicStock), 54 (Crowds in Shanghai/Imaginechina); Maybach pp.52 (Maybach DRS), 52 (Maybach DRS); Oxford University Press p.32 (Windmill); Peter Lyons p.32 (Greenbird wind powered car); PlayPump p.42 (PlayPump roundabout); Rex Features pp.14 (Freegans/John Alex Maguire), 18 (Damaged Fukushima Dai-ichi Nuclear Power Station), 29 (Wind farm/Invicta Kent Media); Science Photo Library pp.0 (Seoul, South Korea, at night/NASA), 2 (Steam engine/Jean-Loup Charmet), 5 (Oil rig/F. Ayer), 8 (Deepwater Horizon oil rig fire/USCG), 9 (Coal-fired station/Martin Bond), 15 (Landfill site/Martin Bond), 20 (Fusion reactor maintenance/Maximilian Stock Ltd), 23 (Microalgae production/Matteis/Look at Sciences), 35 (Pelamis wave power/Ocean Power Delivery/Look At Sciences), 38 (Blue lagoon geothermal pool/Martyn F. Chillmaid), 44 (Medical nanorobots/Hybrid Medical Animation), 46 (International Space Station construction/NASA), 52 (RepRap machine/James King-Holmes).

Want to read more?

CLICK HERE TO BUY!



CONTENTS

INTRODUCTION	i
1 Energy today	1
2 Fossil fuels	2
3 Energy and our planet	8
4 Saving energy	12
5 The power of the atom	16
6 Super fuels	21
7 A bright future	26
8 When the wind blows	29
9 Water world	33
10 Heat all around us	38
11 People power	41
12 Nanopower	44
13 Energy in space	46
14 Going local	49
15 Where next?	54
GLOSSARY	56
ACTIVITIES: Before Reading	60
ACTIVITIES: While Reading	61
ACTIVITIES: After Reading	65
ABOUT THE AUTHOR	68
ABOUT THE BOOKWORMS LIBRARY	69

Want to read more? [CLICK HERE TO BUY!](#)



Seoul, South Korea, at night



Want to read more? [CLICK HERE TO BUY!](#)

You can also visit www.oup.com/elt to purchase the reader. Search for

All ▼

9780194656870



1 Energy today

I can feel the plane shaking as it gets faster, then suddenly lifts into the air. Its engines are burning 1.5 litres of fuel every second as we climb into the sky above Istanbul. It is seven o'clock on a cold February evening in a city of 13 million people. Below me, people are travelling home from work in cars, buses, trains, and boats.

Through the plane window, I can see thousands of lights from factories, streets, shops, houses, and ships in the Marmara Sea. The city lights look beautiful at night, but have you ever thought about how much energy they use? Where does all this energy come from?

About two hours later, I open the front door of my house in Adana in eastern Turkey. I can smell food cooking, and hear the sound of a TV. A red light goes on and off on the telephone. All over the house, machines are taking messages, washing, cooking, and heating the house.

Perhaps you are reading this book at home. Are the lights on in your room? Are you listening to music? How many machines can you see around you right now?

At this moment around the world, billions of lights, computers, TVs, and fridges are turned on. At any moment of any day, 25 million cars are driving on roads and nearly 700,000 people are flying somewhere in a plane. Most of the energy that we use for these things comes from fuels like coal, oil, and natural gas. One day soon, we will not have any more of these fuels. Where will our energy come from in the future, and how will this change our world?

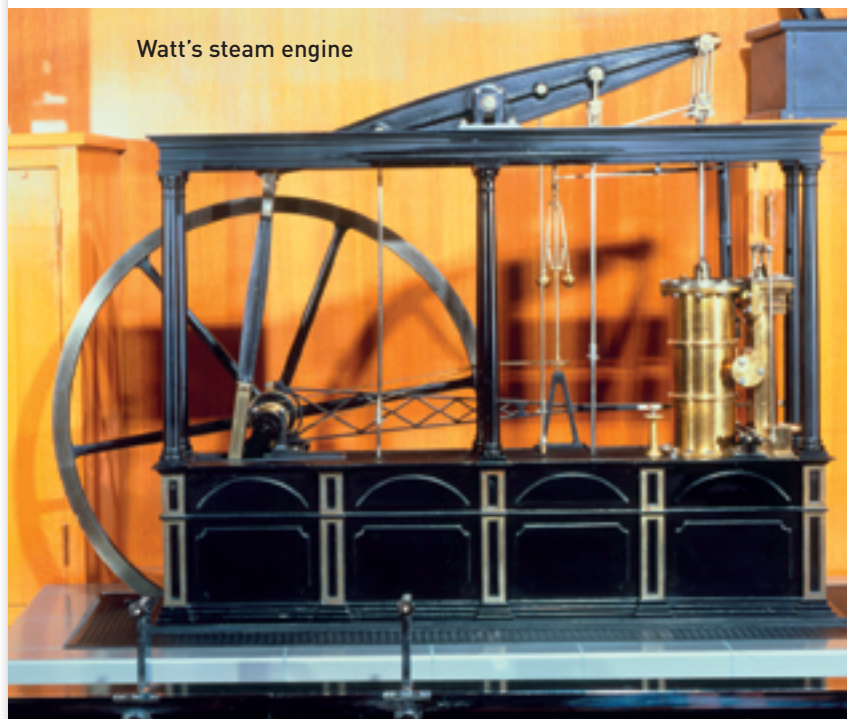
Want to read more? [CLICK HERE TO BUY!](#)



2 Fossil fuels

For thousands of years, people made things with their hands. They used the power of the wind, water, and animals to travel, move, or build things. Most people burnt wood to heat their homes and to cook. Then, in October 1765, a young engineer called James Watt built a machine that changed the world – a steam engine.

To make a steam engine work, coal is burnt to heat water, and this makes steam. The steam goes into the engine and moves the parts inside it. There were steam engines before 1765, but Watt's new engine worked much better and could move big machines in factories. Soon people began to build factories everywhere.



Want to read more? [CLICK HERE TO BUY!](#)

In the next hundred years, lots of new factory machines were invented. They made new products for people to buy. Suddenly our houses were full of new things. In many countries, thousands of people left their villages and moved to the cities to work in the factories. Poor workers worked long hours with dangerous machines, and life was very hard for them. Smoke from the burning coal filled the air in the towns.

The first steam train was built in 1804. By 1850, trains and ships with steam engines were carrying passengers around the world. In the 1880s, the first power stations were built. They burnt coal to make steam for huge machines called steam turbines. When steam turbines move, they turn parts in machines called generators, which use this movement to make electricity. Soon electric lights appeared on the streets and people had electric power at home.

In 1885, German engineer Karl Benz invented the first car. It used a new type of engine and a new type of fuel: petrol. Petrol burnt inside the engine to make the parts move, and this made it much smaller than a steam engine. Twenty years later, factories were producing thousands of cars every year, and new roads crossed the land. Most of these cars used petrol, which comes from oil. In 1903, Orville and Wilbur Wright used a petrol engine to fly the world's first aeroplane.

Things like the steam engine, electricity, and the car changed the lives of everyone on earth. They also changed the way that we get energy. Today about 87 per cent of the world's energy comes from burning coal, oil, and natural gas. Where do these fuels come from, and how do we use them today?

Coal, oil, and natural gas come from things that were alive millions of years ago. Oil and natural gas come from animals that lived in the sea. Coal comes from plants that

Want to read more? [CLICK HERE TO BUY!](#)



lived in wet places, such as land next to rivers or lakes. Over millions of years, far under the ground, they changed into coal, oil, and natural gas. We call these kinds of fuel fossil fuels, and the oldest ones are about 400 million years old!

Coal

We have used coal for a long time. Two thousand years ago, the Roman people used it to heat their homes and make metals. We still use coal for these things today, but most coal is burnt in power stations to make electricity. About 40 per cent of the world's electricity comes from coal. Every week, somewhere in the world, a new power station that burns coal is built!

To make the electricity that your fridge uses in one year, you need about 300 kilograms of coal! The biggest coal power stations burn 10–15 million tonnes of coal every year. A lot of that coal comes in ships from thousands of kilometres away.

In some places, we get this coal from huge holes on the surface of the earth. In other places, the coal comes from hundreds of metres under the ground. There is not much room to move, and the temperature can be 40 °C or more.



Coal miners at work in Chile

Want to read more? [CLICK HERE TO BUY!](#)

It is difficult to get enough clean air and often too noisy to speak. Getting the coal from under the ground is dirty, dangerous work, but millions of people do it every day. Every year, about 5,000 of them die.

Oil

In places like Saudi Arabia, Nigeria, and Venezuela, there are lakes of oil, called oil fields, under the ground. To get the oil, people drill holes in the ground called oil wells. Some of these wells are several kilometres deep! In other places, huge machines called oil platforms drill wells under the sea. There are often bad storms at sea, so oil platforms have to be very strong. Under the water, some platforms are as tall as skyscrapers – the world's tallest buildings.

An oil platform
in the North Sea



Want to read more? [CLICK HERE TO BUY!](#)

Countries with oil fields send the oil to other countries in long pipes, or in huge ships called oil tankers. The world's biggest oil tankers can carry 440 million litres of oil – that is as heavy as 350,000 family cars!

Oil contains many chemicals. The tankers take it to factories where it is heated and cooled to get the different chemicals from it. Some of these chemicals are used to make things like plastic or clothes. However, about 85 per cent of the oil is made into fuels. There are different types of fuel for engines in cars, ships, and planes. The factories also make fuel for heating buildings, and for burning in power stations to make electricity.

Every year, we make about 60 million new cars, and thousands of ships and planes – so every year we need more and more oil.

Natural gas

About 2,000 years ago, people in China made pipes from tall bamboo plants. They used them to drill wells and find natural gas hundreds of metres under the ground. The pipes carried the gas to their homes, where they used it for gas lights and heating water.

Today we burn natural gas in factories and power stations. We also use it in homes for heating and cooking. There are even cars and buses which drive on natural gas instead of petrol. Natural gas is the cleanest fossil fuel: it produces much less pollution than burning coal or oil.

When a person in Britain cooks something, the natural gas that they use may come from Norway, Russia, or Kazakhstan. How do they get the gas from these places? Often the gas goes through pipes. One gas pipe under the sea from Norway to Britain is 1,200 kilometres long! In

Want to read more?

[CLICK HERE TO BUY!](#)





Gas tankers in
Virginia, USA

other places, the gas is cooled to make it into a liquid. This liquid gas is put in ships called gas tankers.

A lot of the world's natural gas is found inside a type of rock called shale. In the past, it was too difficult and expensive to get the gas from inside the rock. Now in places like Pennsylvania, in the USA, people are using water to break the shale rocks under the ground and get the gas. In the first ten weeks of 2011, three hundred new gas wells were drilled in the USA. The problem is that each well will produce millions of litres of polluted water. You have to clean all this water or keep it somewhere safe.

It is always the same story. Today shale gas is the newest fossil fuel to bring good things for some people – new jobs and money – and bad things for others – pollution from dirty water. In rich countries, fossil fuels have made it possible for most people to live a very comfortable life. Will they destroy that life one day too?

YOU HAVE REACHED THE END OF THE SAMPLE.

Want to read more? [CLICK HERE TO BUY!](#)

