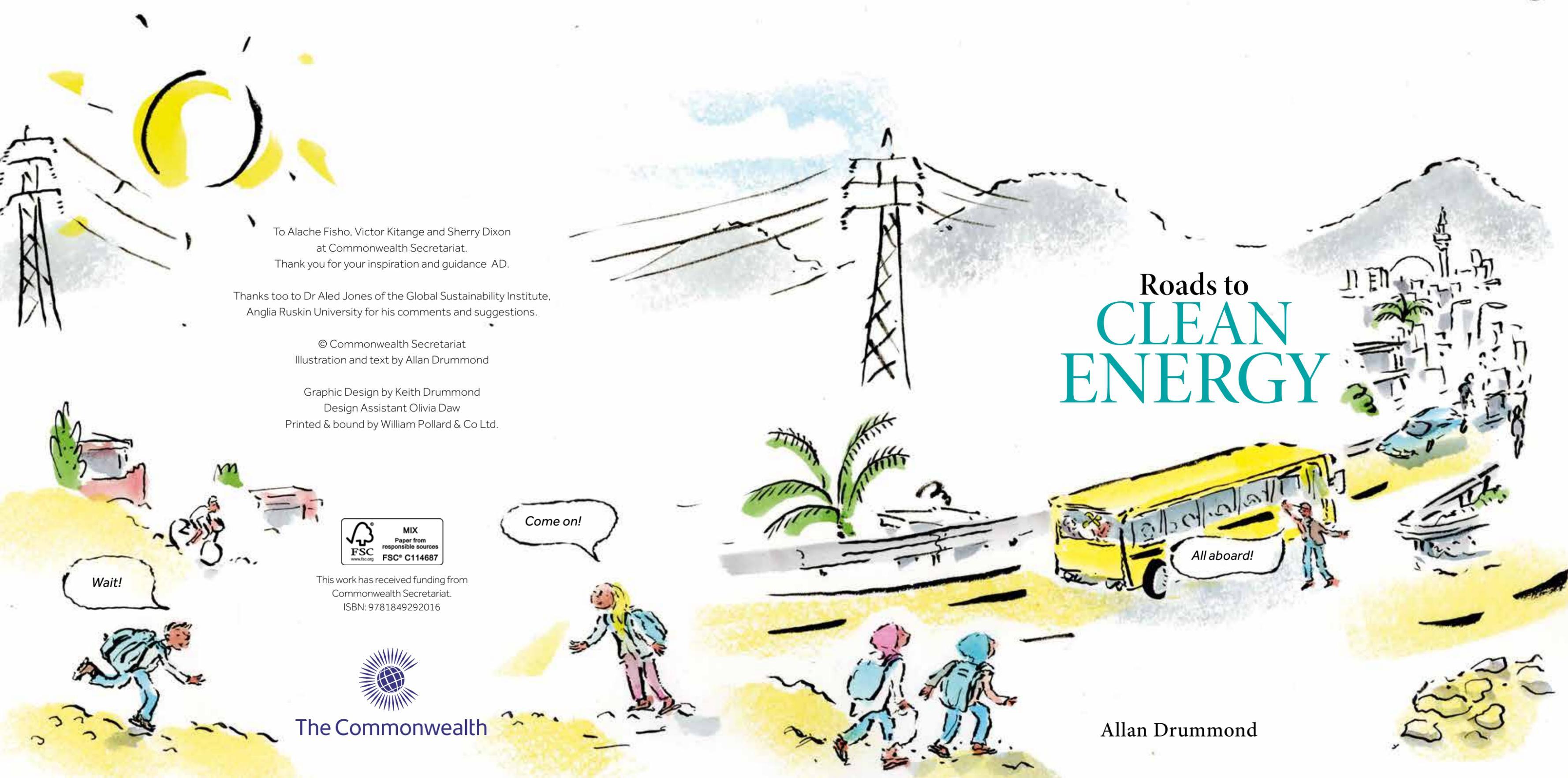


Roads to  
**CLEAN  
ENERGY**

Allan Drummond



To Alache Fisho, Victor Kitange and Sherry Dixon  
at Commonwealth Secretariat.  
Thank you for your inspiration and guidance AD.

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# Roads to CLEAN ENERGY



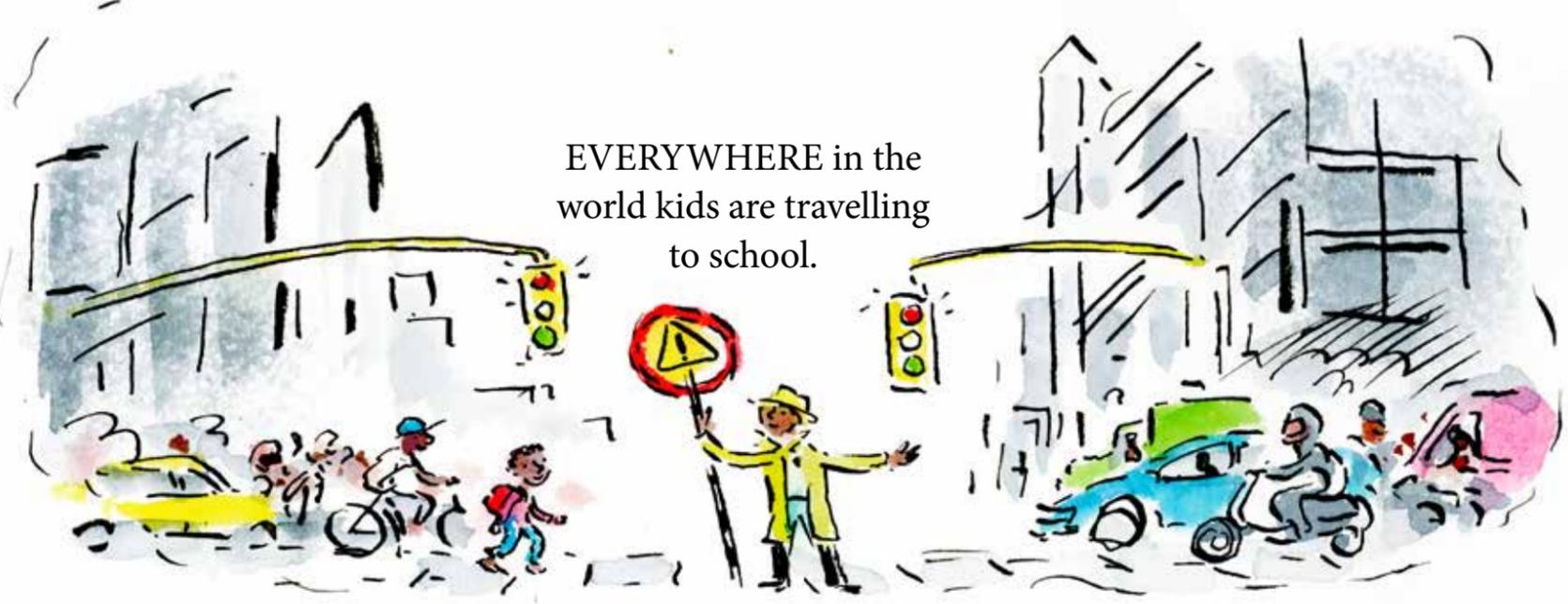
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The Commonwealth

Allan Drummond

EVERYWHERE in the world kids are travelling to school.



Some walk it.



Some bike it.



Some go by boat.

Some go by bus.

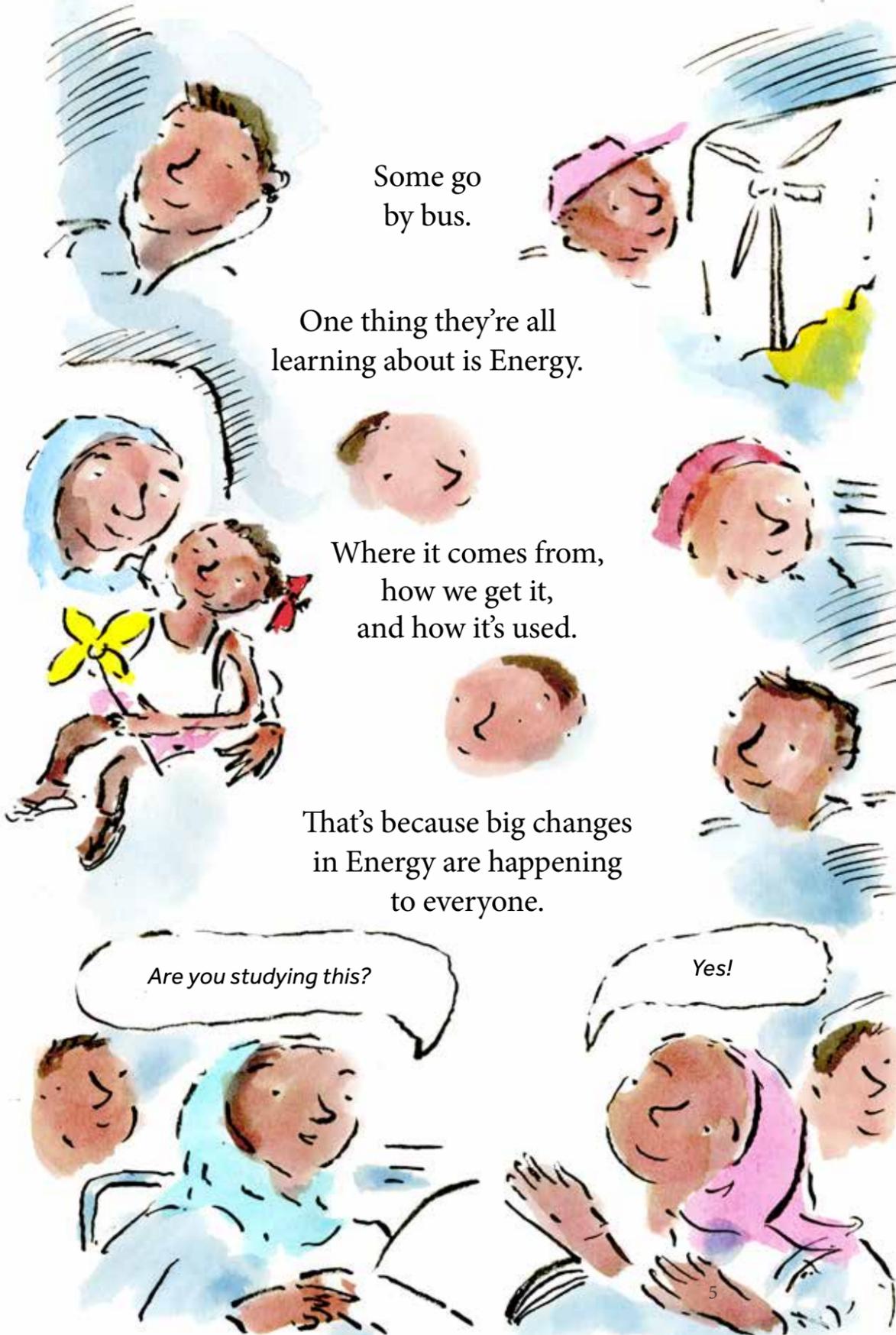
One thing they're all learning about is Energy.

Where it comes from, how we get it, and how it's used.

That's because big changes in Energy are happening to everyone.

Are you studying this?

Yes!



### All aboard! Change is here.

Have you ever seen a wind turbine spinning, or a solar panel glittering on a rooftop? You probably know a little bit about how they work – gathering energy from wind and sun to make electricity.

These things are part of a huge change that is happening in the whole world. The world is moving from traditional sources of energy like oil, coal and gas, to new, clean sources. Because our world is so interconnected, the changes we make in our own countries to the way we generate and use energy will impact other countries across the globe. Therefore we all need to work together to make sure change happens in a way that is fair to everyone all over the world and to make sure that everyone benefits from the exciting opportunities that this change can bring.

This book is one of three books about the Global (worldwide) Transition (that means change or journey) to **Sustainable** (long-lasting) **Clean** (not harmful) **Energy** (or power). In this book we'll look at why the change is happening, and the journey to sustainable energy for everyone.

## A New Journey

We are living in an exciting time when it comes to our energy. But why is the Global Energy Transition happening?

There are lots of reasons. One is that the traditional fuels we have used for a long time like coal and oil are getting more difficult to source – we are using them up and they can't be replaced, so we have to find other sources.

These fuels are called fossil fuels. They come from dead plants and other organisms that were buried in swamps or under the sea and have slowly decayed. It takes millions of years for organic matter to decay into fossil fuels, which must then be dug up from the ground and piped to the earth's surface. Fossil fuels are called non-renewable sources of energy because the earth cannot create new fuels at the same rate that we use them up.

Another big reason for the Transition is that energy from burning fossil fuels is not Clean Energy. When they burn, they make a gas called CO<sub>2</sub> which has a bad effect on the earth's atmosphere and climate.

More reasons for the change include reducing other pollution that comes from burning fossil fuels, reducing these effects on the natural world, and – most importantly – giving people a fair share of energy by using the renewable energy that is all around us.

The fuel systems we use to make our energy are changing.



From familiar wood,



coal, oil and gas.



To new, Clean Energy Systems... that are appearing everywhere. Big and small.



Wind Energy!

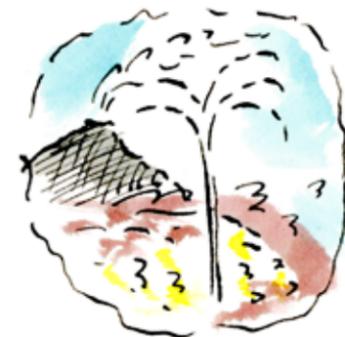
And sun – Solar Energy!



Hydro – water flowing down!



Geothermal Energy – from hot rocks underground!



Even gas from waste. – sometimes human waste!



## Continuation to renewable energy

The world has been through a big energy change in the past. Before we discovered fossil fuels, people burned mostly wood from trees and plants for energy.

Renewable energy comes from sources that will never run out. For example, wind is a renewable source, since the wind will always blow. Windmills of all kinds have been invented to catch that energy.

Most rivers keep flowing all year, so they are a source of renewable energy. People have been using dams, water mills and other means of harnessing waterpower for thousands of years.

Sunlight, which can be converted into solar power, is another example of a renewable resource. So are plants and trees that can be harvested and converted into bio fuels, and their seeds replanted.

Scientists have even worked out how to make energy from our food waste – and even our own toilet waste!

## It's complicated

For example, on a big scale, some countries rely a lot on mining coal and drilling for oil and gas. Often whole cities, towns, communities and indigenous people depend on the jobs and money that this work creates. Entire countries rely on the money they create from selling these fuels to other countries.

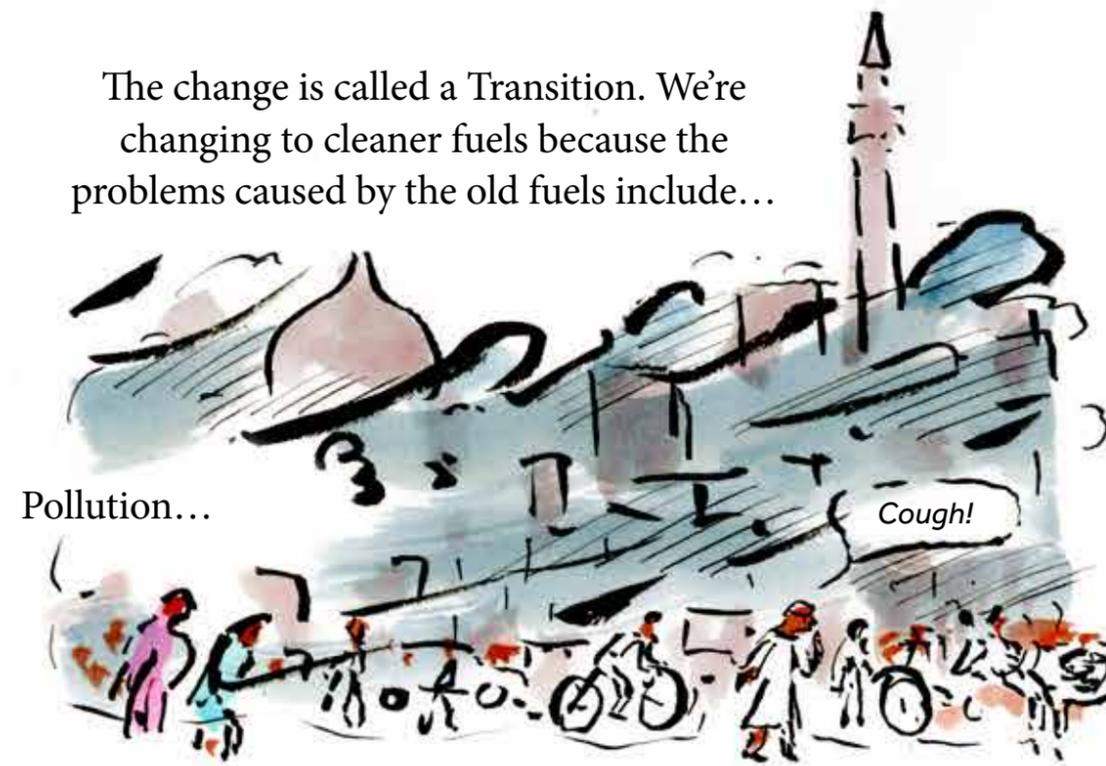
So for these countries the change may seem more challenging and uncertain. They will have to find ways of shifting their systems away from just one energy source and out towards renewable sources. They will also have to find new jobs and different ways of making money for the country and for themselves. Habits will have to change, and so will the way the people live, and even where they live.

There will be disruption to a lot of people's lives. That's why it's important that there is a focus on making the transition fair to everyone, and to make sure the change includes everyone.

The change will affect things like how people heat and cool their homes and workplaces, how they work and how they travel.

Yes, change is coming!

The change is called a Transition. We're changing to cleaner fuels because the problems caused by the old fuels include...



Pollution...

Cough!

...and harm to the environment.



It's getting hot!



Too far out!

The old fuels have created other problems for us too...  
Not everyone has easy access to the traditional fuels or the energy that can be made from them.



I didn't know about that.  
It's not fair!

Yeah...things should become  
more equal for everyone.

## Which way to go?

Nations, cities, towns, and communities need to be clever and smart about finding different ways of making energy and getting that energy to people.

Diversification will mean different things in different countries. Some countries have already seen ways of moving from coal, for example, to a mix of several different ways of generating electricity.

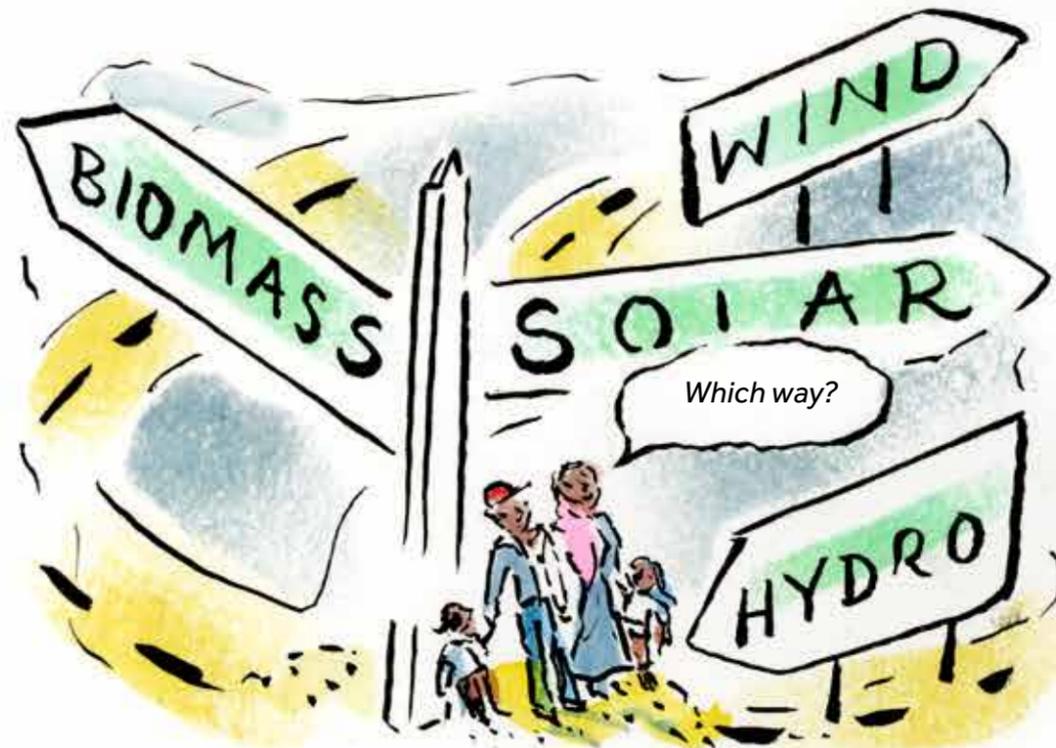
But imagine how change like this actually works. It will take lots of money, lots of planning, and people might have to move house and learn new ways of working. At first, all this change may seem to make people's lives harder. Jobs that they have done for many years may disappear, and that can be really worrying for communities and individuals – but that's a challenge that can be solved. For example new clean energy systems will create new jobs and ensure secure energy for communities and families.

The Transition to Sustainable Clean Energy will cause Disruption – old ways of working will have to change. However, even though change can be hard, it can also be exciting and full of opportunities. It's already happening, and different countries are taking different routes.

The transition is already happening.  
It's different in each country and region.  
And it can cause disruption.



Communities will have to continue to diversify and work with a variety of new clean energy systems.



For so many years people have only known the old fuels.  
Many communities and cities rely on them.



These people will have to make different and sometimes difficult decisions.

## Change for everyone

Making sure everyone is included in the changes will mean exciting opportunities, and huge challenges.

World leaders – like Presidents, Prime Ministers, Business Leaders, Scientists and Educators - have realised that everybody must be on board for this transition. They have seen that the Global Energy Transition will be a chance to actually help poorer people, boost education, offer new training and skills, and create new kinds of jobs. Nobody must be left behind.

The new opportunities that come with the Global Energy Transition must be spread to men and women equally, and to people who are not as able as others, to rich and poor countries, to the young and to the old. It's a world effort that should not depend on a person's race, beliefs or gender.

It's a chance to make sure that everyone has access to electricity. 860 million people in the world have no access to electricity – sometimes because they live in remote places far away from the grid, but often because electricity is too expensive for them.

So nations and people need help from governments and banks. Local organisations and groups - where people share resources and help each other - will be more important than ever.

The transition brings many great opportunities for everyone. Some might seem small...



But they all add up. There's hope that electricity will reach the many millions of people in the world who have no access at the moment... because they can't afford it...or it can't reach them.



## Inclusion, Justice and Equity

Our leaders, from a local level right up to a world level, are agreeing that the change to clean energy should be Inclusive (everyone must be involved). It must also be Just (it must be fair), and it must be Equitable (people must be treated equally).

Lots of people are working to make sure the change will be fair for everybody all over the world. If not managed in a fair and equitable way, the changes that will happen from the Global Energy Transitions can make poorer peoples' lives worse. That's quite a problem to solve. So the aim is that everyone should have equal access to energy.

Nobody must be left behind in the transition.

We'll all have to learn to adapt to new ways of working and thinking about where our energy comes from. We'll all have to take care not to waste the energy we use.

Key words for the Transition to Clean Energy are:



Inclusive - everyone must be involved.

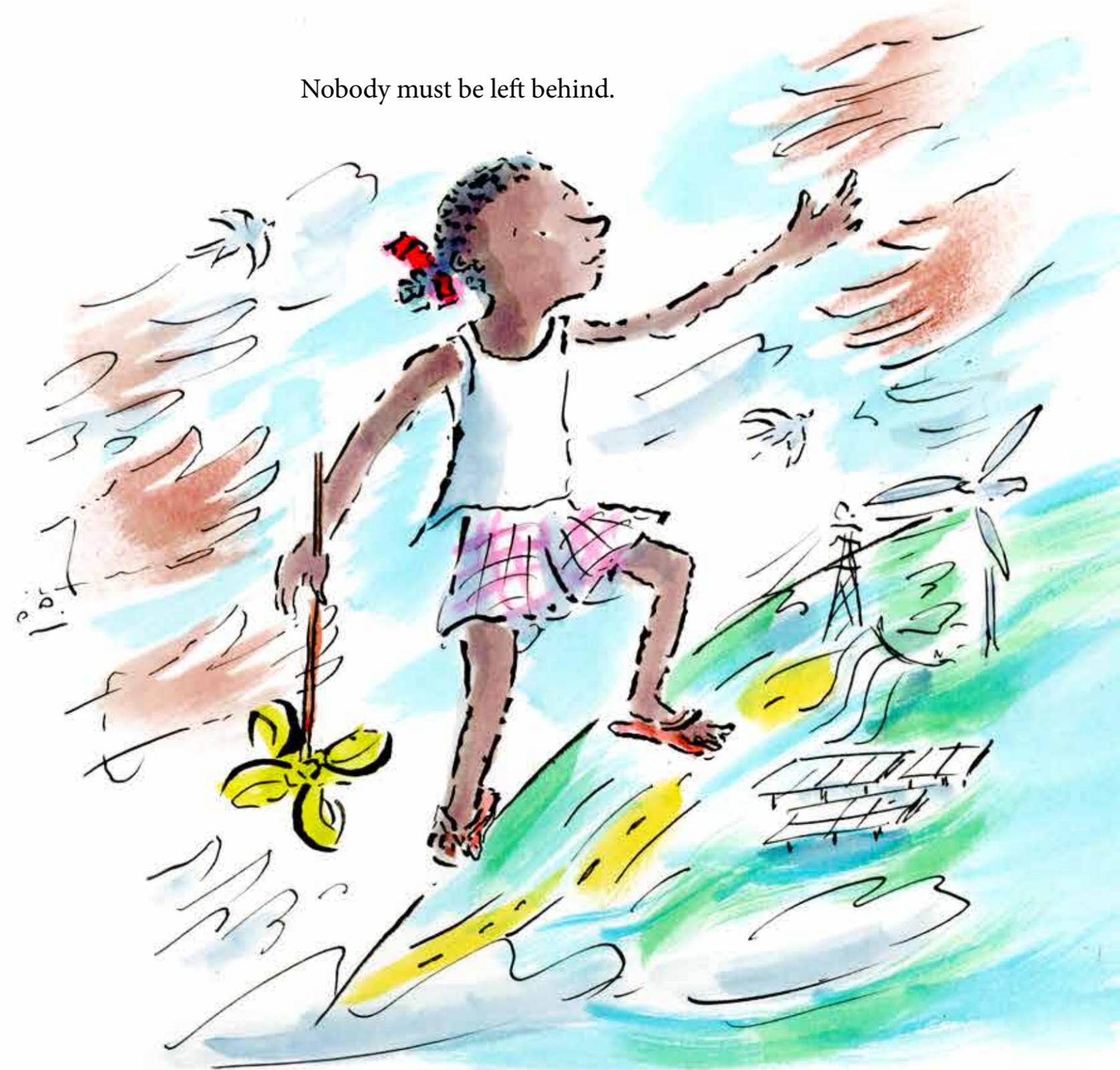


Just - it must be fair to everyone.



Equitable - people must be treated equally.

Nobody must be left behind.



THE 193 COUNTRIES OF THE UNITED NATIONS...

... HAVE SET THESE GOALS FOR AFFORDABLE, CLEAN ENERGY...

# U-N-I-T-E D-N-A-T-I-O-N-S

Universal access to modern energy.

Increase the global percentage of renewable energy.

Double the improvement in energy efficiency.

Promote access to research, technology, and investments in clean energy.

Expand and upgrade energy services for developing countries.



## Clean energy we can call our own.

The Global Energy Transition's aim is for systems that produce power without making by-products that are harmful to people and the environment. Most renewable energy sources are very clean. Biomass (burning plant matter like straw and wood) and Biogas (burning gas made from waste) do give off some harmful by-products, but they are far less harmful than those from burning coal, natural gas or general waste.

Renewable energy is definitely the way to go, and there is plenty of renewable energy in almost every country and region around the world. All this means they could aim towards Energy independence – a situation where they do not need to get their energy from other countries. It means they will have control over the energy they make. And the energy should also get cheaper over time.

Experts think that with new energy systems, almost every country will be able to harness renewable energy. There is a lot of renewable energy all around us and if we can all move towards a world that uses only renewable energy there will be many benefits for us, and for all living things in the world.

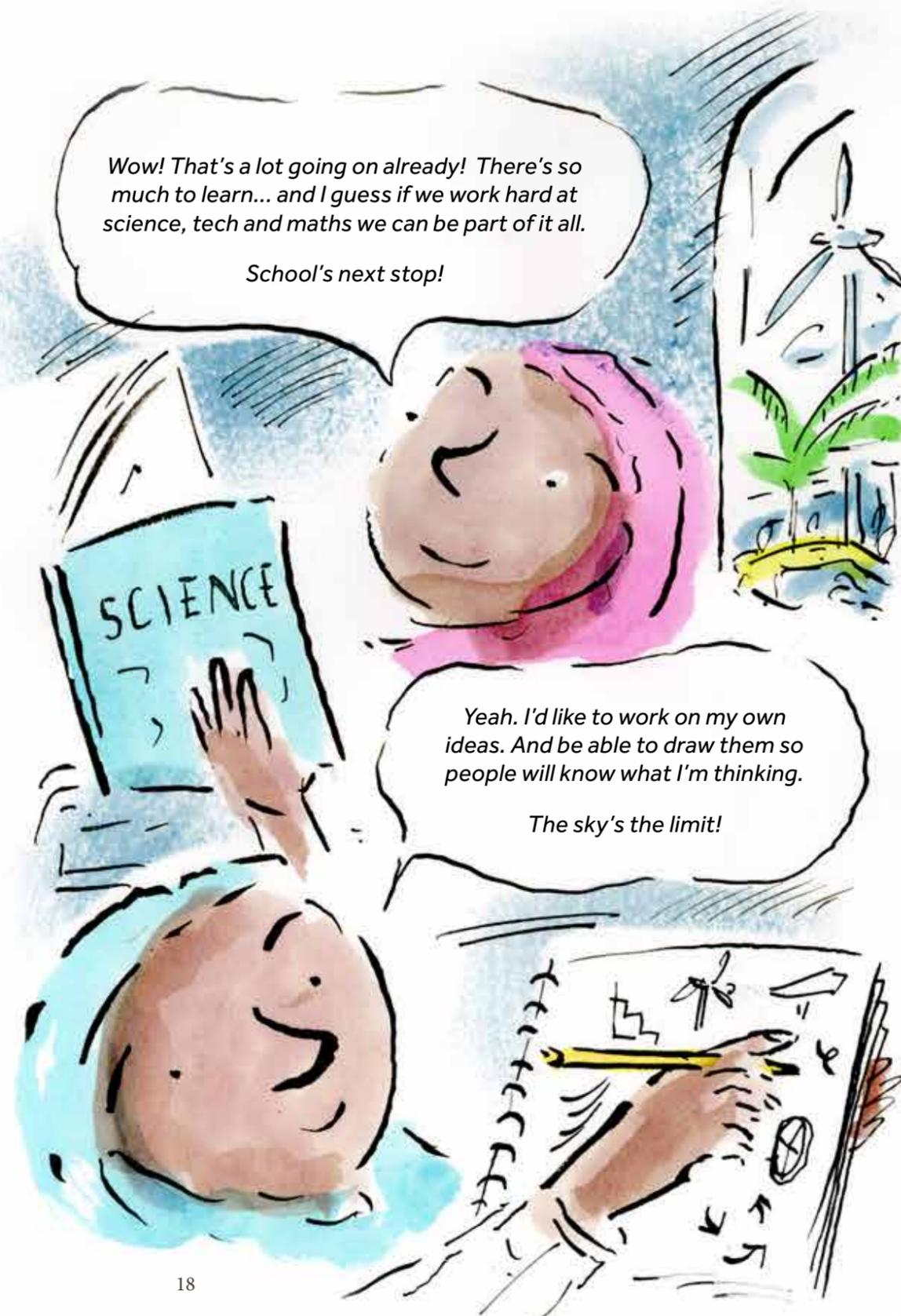
## The journey and the destination.

We can probably all mention some of the obvious benefits of the Transition to Clean Energy. Most people realise that this will mean less pollution in the world, and hopefully will have a positive effect on world climate. It will mean that we don't run out of non-renewable energy sources.

Countries, regions, and even local places will be generating a lot of their own energy. Our cars and homes can even be part of the gathering and storage of energy.

Knowing that we can generate our own energy – Energy Independence – will have a big future benefit. Energy Independence gives us security and peace of mind. Many experts say that the Global Energy Transition could help the world become a more peaceful place, with fewer conflicts and wars.

Let's hope so!

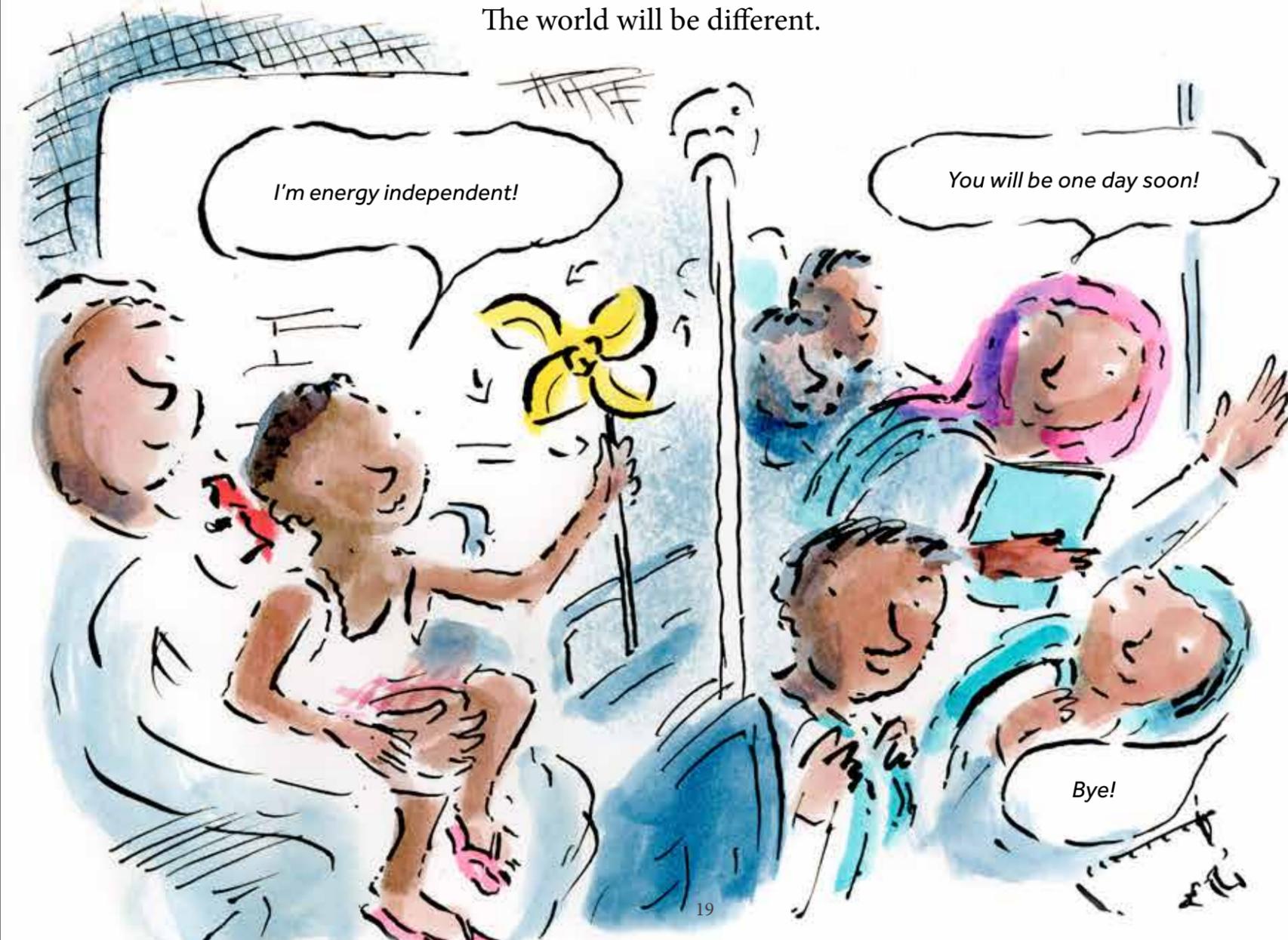


In the future, with new clean energy systems, most countries in the world will be able to make their own energy.

They won't have to rely on other countries.

That will make them energy independent. It will give peace of mind – and hopefully more peace all-round.

The world will be different.



## Some questions for you

Are any of these changes happening near you?

How might they affect you?

Do you see any of the effects of burning fossil fuels?

What waste, including gases, does your family make?

And what happens to that waste?

How could you save energy?

Does everyone have electricity near you?

How much does your family spend on energy?

What might change in your area?

What is energy independence?

What benefits could more energy independence bring?

There are many roads to clean energy. Which one are you on?



#### AUTHOR'S NOTE

Our energy, where it comes from, and how we use it plays a big part in how we live our lives. It always has done. Today more than ever it is important for teachers and students to consider the big picture... how the emerging new energy systems impact people's lives, and the exciting opportunities that this transition offers to everyone in the world. A massive movement is happening all around us. And it has the potential to benefit everyone equally.

I have visited several countries around the world and been into schools where students are learning about many aspects of Sustainability and the Transition to Clean Energy. I am always amazed to hear just how much children already know about the subject.

For this book I imagined just a few scenarios developed from personal experiences on my travels. My aim is to start discussions and to encourage students and teachers to think about the part they can play in the Transition to Clean Energy.

#### PUBLISHER'S NOTE

This book is published under the Commonwealth Sustainable Energy Transitions Agenda; a platform for collaboration amongst Commonwealth member countries to accelerate action in the transition to low carbon energy systems and towards achievement of SDG 7. With more than 60 per cent of the Commonwealth's population under the age of 30, the Commonwealth Secretariat is committed to investing in children and young people, placing them at the centre of sustainable and inclusive development. Please contact [sustainableenergy@commonwealth.int](mailto:sustainableenergy@commonwealth.int) to find out more about this exciting initiative to grow energy literacy and innovation amongst school age children across the Commonwealth.



A solar plant that uses large mirrors to catch solar energy.



Students walking to school near a large solar plant situated close to the Sahara Desert in Africa.

Photographs by Allan Drummond



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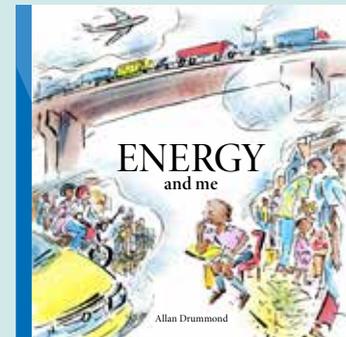
All around the world exciting things are happening when it comes to our energy, how we get it, and how it is used. This book looks at why these huge changes are happening, and why nobody must be left behind in the Global Transition to Clean Energy.

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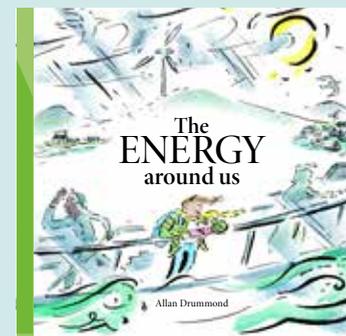


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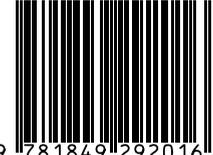


ENERGY AND ME  
By Allan Drummond



THE ENERGY AROUND US  
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