# ELLEN'S ENERGY ADVENTURE

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# ELLEN'S ENERGY ADVENTURE

**Leandro Righini & Mick Scheinin** Illustrations **Eveliina Saarentaus** 

## There once was a girl named Ellen.

She lived in a cosy, warm home on the edge of town where the lights were on day and night.





#### One morning Ellen woke up to a strange buzzing sound.

She looked around and there in the corner of the room were two tiny glowing orbs of light hiding in the shadows.

"Who are you?" she asked, leaning in to take a closer look.

The bright yellow orb floated up to her.

"I'm Posi and that's Neg. He didn't want to talk to you but I thought maybe you could help us get back home to the electrical grid!"

"What are you?" asked Ellen, puzzled. "We're lost energy," said Posi.

"Lost energy?" asked Ellen.

"Well," began Posi, "Everything needs energy!"

"Children need food to keep them healthy and full of energy. Your home needs energy to heat it up and keep you warm in winter!"

"Your lights and phones, oven and TV need electricity to make them work! Electricity is energy too, you know."

"But if you waste electricity, it can get lost! Like us!"

"Well," said Ellen, "Let's go see if the windmills can help get you back onto the grid. I've heard they make electricity."

"She'll never get us back to the grid; she doesn't even know what it is!" grumbled Neg.

After a quick breakfast, Ellen waved goodbye to her mum and dad and set off to take Posi and Neg home.

They travelled all the way up the hill to the windiest place in the whole valley.

The windmills stood tall with their blades spinning gently in the breeze.

Posi and Neg floated up to take a closer look.

"Hello!" said Wind Power, whooshing and whispering in the breeze.

"Hello," replied Ellen. "Can you help us?"

"Of course," said Wind Power breezing down from its lofty perch.

"I have been helping people harness the power of the wind for thousands of years!" "Can you help Posi and Neg get back home to the electrical grid?" asked Ellen.

"I make electricity from the wind and send it to the grid but I don't manage it. I just wait for the wind to blow and send all the power I get down those cables! In fact, I'm pretty important nowadays; everyone wants my power because my energy is renewable."

"That means that the source doesn't get used up and it never runs out, at least not as long as the wind blows."

"What happens when there's no wind?" asked Neg.

"Well... I don't know! Maybe you should ask Solar power." Ellen was getting quite hot and sweaty by the time they arrived at a field of dazzling mirrors facing the sky.

"Hello," said Solar Power leaning down from the big blue sky.

"Hello," replied Ellen. "Wow, you sure are bright!"

"Well solar power is the power gotten from the sun and there's nothing brighter than that! The sun powers all life on earth. Virtually nothing would grow without it!"

Posi looked up at Solar Power and asked: "We got lost and Ellen is helping us. Do you know how we could get back onto the electrical grid?"

Solar Power stopped smiling for a moment and the day went dull as he thought about it. "I don't know," he said. "I make a lot of power with those sun panels that look like mirrors. My solar panels can be in big solar farms like this one or even small spaces and rooftops. I send all the energy I get down that cable; I'm not sure what happens after that!"

"Are you renewable?" Neg asked from the shade of a solar panel.

"You bet," said Solar Power, "renewable and practically unlimited!"

"Even when the sun doesn't shine?" asked Neg with a sly smile.

Solar Power looked offended for a moment. "Well I don't actually need that much sun to make energy, just a bit will do! And no one can work all the time anyway!" he exclaimed!

"Why don't you head over to the dam and ask Water Power, maybe she will know how to get these two home!"



### Ellen followed the river until they reached a big dam.

In the dam swimming slowly on her back was Water Power. "Hello!" called Water Power, her voice rippling across the water. "Hello!" Ellen called back from the shore.

"You're really big! I bet you make a lot of power!" said Ellen.

"I can be any shape I want to be," said Water Power. "Sometimes I am big and powerful, sometimes small and gentle. My water can be used to produce electricity or store energy."

> "Water is one of our most important resources, so we have to manage it carefully!"

"Are you renewable?" asked Ellen.

"Yep!" replied Water Power proudly. "As long as there is water flowing, I can make electricity and send it down those cables!"

Neg floated up to Water Power and asked, "I don't suppose you would know how to get us into that cable? We are trying to find our way back onto the power grid."

Water Power thought for a moment. "I don't know, I just make electricity, no one's ever asked me that before! Why don't you ask Nuclear, he's small but very powerful and pretty smart!"





Ellen, Posi and Neg rowed across the lake and then walked over the hills. Soon, they came across a building with lots of pipes.

"Are you Nuclear Power?" Ellen asked.

"Nope!" bellowed a gravelly voice.

Ellen looked around.

"Down here!" said the voice. "I'm Geothermal!"

"Oh!" said Ellen. "Are you making renewable electricity too?"

"Nope, I don't make electricity at all, but I am renewable! I drill down to catch the earth's natural heat and send it through these pipes to warm people's homes!"

"It sounds like you must save a lot of energy!" said Posi happily.

"I do my bit," replied Geothermal humbly.

"We're never going to get home!" grumbled Neg.



The sun was high in the sky, the wind was blowing gently and Posi and Neg were playing tricks on Ellen, making her blue hair stand on end by giving it a little charge!

Suddenly they saw a funny little figure sitting on a rock.

"Hello," said Ellen.

"Hello," the figure replied in a calm voice, "I am Nuclear Power. People are pretty scared of me so I understand if you don't want to talk to me."

"Why would people be scared of you?" asked Ellen.

"You see, I get my power from splitting these little things called atoms. They are so small that you can't see them. Atoms contain the tiny, invisible building blocks for everything and when you split them it makes a reaction that can create a lot of energy. So much energy that people get scared!"

"Doesn't sound scary to me!" said Ellen.

"Well when I make energy, I use a special type of rock called Uranium and when I'm done it's all used up! The waste that it makes is toxic and needs to be stored really carefully," said Nuclear. "But if you handle me and my waste right, I'm safe!"

"I guess you're not a renewable then?" asked Ellen.

"No, I'm not renewable. But if we are careful, there's more than enough to last thousands of years! The good thing about me is that I can make electricity, day and night, rain or shine."

"People need a lot of energy and renewables can't do it alone! So I'm an important part of the energy supply," said Nuclear, with just a hint of pride.

Posi and Neg glanced meaningfully at Ellen.

"Can you help Posi and Neg get home to the grid?" asked Ellen hopefully.

"I can't," replied Nuclear, "But Smarti can. They're a really smart computer that helps run the show and you can find them if you head into town. They can get those guys back on the grid in no time!"

> "Thanks!" said Ellen and Posi, and even Neg looked hopeful!

#### They were on their way to the city to find Smarti when the landscape began to change.

They walked past mounds of black coal and there was the smell of smoke in the air.

Posi and Neg tucked in close to Ellen fearfully looking over her shoulder, when they heard quiet sniffling coming from behind one of the coal piles.

"Hello," sniffed Fossil Power. "Sorry about the mess!"

"That's OK," said Ellen. "Why are you sad?"

"Nobody likes me anymore! I burn fossil fuels to make power. Fossil fuels like coal, gas and oil.

For the last couple of hundred years, I've been powering the whole world by burning fossil fuels to supply everyone with heat and electricity. The world needed more and more energy, and soon it became too much! I'm not clean like a renewable energy. I make emissions... carbon dioxide emissions!" Fossil sniffled. "The problem is when you burn fuels, they emit a gas called carbon dioxide. Carbon dioxide traps heat in our atmosphere and that makes the world hotter. It's made Climate Crisis go a little crazy."

"People are learning to burn fuels with less carbon emissions."

Posi floated up to Fossil.

"People needed you and they didn't know better. It wasn't your fault," said Posi.

Ellen patted him on the back and Fossil perked up, looking a lot better.

"We're off to find Smarti!" said Ellen as they waved goodbye to Fossil and his troublesome carbon dioxide emissions! They hadn't got much further when they came across a horse farm. They watched as the farmer loaded horse manure into a truck.

"That's strange," said Ellen. "I wonder what they are doing with all that poo!"

"It's not just Poo!" said a huffy voice. "That's biowaste!"

"Oh Sorry!" said Ellen. "I thought it was poo!"

"Well it is poo, but it's also old food and other organic waste from farms, shops and factories. People send it in trucks to my plant and I store it in big tanks. It then makes gas that you can use to create energy. They call me Biogas and I'm renewable!" said Biogas. "Wow," said Ellen. "You sound like you're doing a lot of good!"

"Doesn't smell great though," whispered Neg to Posi. Ellen gave him a hard look and he went quiet.

Luckily, Bio didn't hear Neg and looked quite impressed with himself. As they were leaving the farm, they came across Wind and Solar Power searching around frantically.

"Have you seen a big baby with glowing green eyes?" Wind Power asked worriedly.

"I was looking after Green Baby Hydrogen but it's difficult to control him! He's still a baby but one day he's going to be a big part of the energy mix."

"But he's still young and has a lot to learn!" added Solar Power. "We haven't seen him! But if you like, you can join us, we are going to see Smarti. Maybe they can help you!"

And off they went to find Smarti.



#### "Wow! It sure is getting hot," said Ellen sweating.

Neg looked up and frowned at the sun.

"It's not the sun's fault!" said Solar Power defensively.

"Look, that's Climate Crisis over there," Wind Power pointed out.

"Climate Crisis is getting worse! It's making temperatures rise and the weather everywhere go a bit nuts! This means our summers are getting hotter and winters stormier! It's not good for nature and not good for humans too!"

"Oh," said Ellen, looking a little afraid.

"That's why it's important for all of us to make the energy transition from Fossil Power to a nice mix of renewables and clean energy."

"Now it's raining!" exclaimed Ellen.

"Climate Crisis is really getting out of hand!" said Solar, fading. "I think I need to go back to my sunny valley; all these rain clouds are making me feel a little weak!" "Is there anything I can do to help?" Ellen offered.

"Lots," said Wind Power. "For starters, you can learn all you can about where our energy comes from. It helps if everyone understands how we need to balance the energy mix."

"You can also learn more about how we use energy and how to save it so you don't end up with wasted energy like Posi and Neg over here!"

"Maybe I can even help Smarti!" said Ellen thoughtfully, looking at her new friends.

They all stood and watched as Climate Crisis began to settle down and a rainbow began to slowly appear on the horizon.



#### It was early evening when they finally arrived in the city.

Smarti was there waiting for them.

"There you are! I've been looking everywhere for you!" they said with a hint of amusement.

"Hello," said Ellen. "You must be Smarti!"

"That's me!" said Smarti. "I have been busy all day keeping the grid nice and balanced!"

"What is the grid?" asked Ellen. "I've been trying to figure it out all day and no one could tell me!"

"The grid is how we move electricity from one place to another to make sure that we have enough electricity where it needs to be!" Smarti explained. "To generate enough electricity to power every home, shop, factory and farm, we need to make it in different places using different forms of energy."

"So when it's sunny, we may take power from Solar Power, but at night we can use power from Nuclear or Wind to balance out the supply of energy with how much is needed. Until we make a complete change to fully renewable energy, we will also use Fossil to help balance our power needs but as soon as we can, we will phase him out and put an end to carbon dioxide emissions."

"So how did Posi and Neg fall off the grid?" asked Ellen.

"I guess they got wasted," said Smarti.

"Energy can get lost or wasted really easily if the grid isn't smart. That's where I come in!"



### "I am an artificial intelligence or AI," said Smarti.

"That means that I am a computer program that learns and can keep getting smarter at solving problems. I can predict how much energy the renewables can make and the right time to use that energy, so very little is wasted."

"Since I am an AI, I can speak the same language as the electrical grid and can help make sure that all its parts of the network are operating exactly as it's supposed to."

"Every single piece of the grid feeds me some information which we call data. This data tells me which homes or factories need more energy and which energy sources are making the cheapest and cleanest energy. Then I send electricity through the grid to power their ice cream makers, charge their phones and heat their hot showers." "Every day, more homes and factories get solar panels to make their own energy and then they send me some energy back when they have extra. This makes them part of our energy supply."

"That's why it's important that an AI like me helps makes the grid smart."



#### "What can I do to help?" asked Ellen.

"Well, it takes all of us! All the power sources and people need to work together. So, keep on learning all you can about how energy works and maybe you can come join me in making sure that everyone has enough clean energy."

"I think you could be a big help!" said Posi supportively.

"Well, I think it's time for you two to get back home to the grid!" said Smarti looking at Posi and Neg.

"But what about Ellen?" asked Neg.

"We will make sure that Ellen's home is connected to the smart grid. So you can visit her anytime you like!"

"Time to say goodbye!" said Smarti.

Posi and Neg gave Ellen a last little zap and her hair stood on end!

"Ouch!" she said, smiling sadly. "I'll miss you two."

"I guess we'll miss you too," admitted Neg reluctantly.

With that Posi and Neg waved goodbye to Ellen and got back onto the electrical grid.

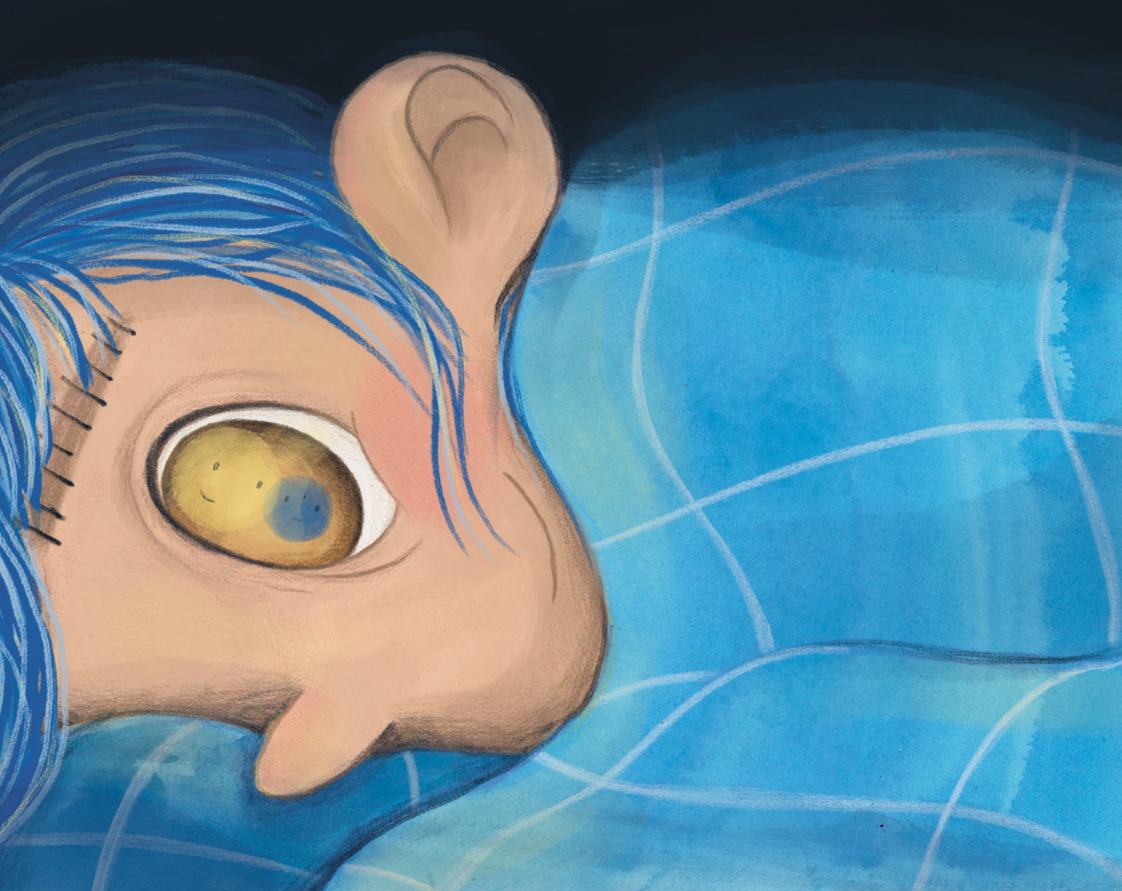
Smarti walked Ellen home, following the power lines and teaching her all the things she wanted to know about electricity, until they eventually came all the way back to Ellen's house.

That night before Ellen climbed into bed, she went around the house and turned off all the appliances in the house that they weren't using.

She turned off the running taps, the TV that nobody was watching, the lights in all the empty rooms and closed the windows to keep the heat from escaping.

She went to bed tired and happy. She even wanted to turn off her night light, but her Mum told her that it was OK to keep it on.

Posi and Neg liked that because then they could pop in and check on Ellen.



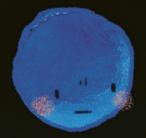
#### Here are some ways you can help Posi and Neg by saving energy around the house.



When you're not in a room, turn off the lights.



Unplug your phone or laptop when they're fully charged.



Only keep the TV on when you're watching it. Take shorter showers to save energy.





Turn off your computer when you're done using it.



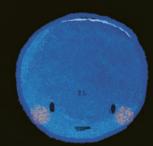
Turn off the water when you're brushing your teeth.



Remember to turn off the oven after baking.



Close the fridge and freezer doors properly after getting snacks or leftovers.





Remember, even small things can make a big difference, but it's okay to use it when you need it.



Energy is important to us at Helen. We learn new things about energy every day and we hope you have enjoyed yourself and learned something too.

Regards from Ellen's friends from Helen.





#### Follow the story of Ellen,

a young girl who helps lost energy, Posi and Neg, return to the grid. Along the way we explore all the energy sources and the smart grid, learn about the climate crisis, and find ways to conserve energy around the house.