

Planet Warriors – Energy Storage

Bryce: Welcome back to Planet Warriors, the podcast where we power up our brains and plug into the truth about energy and the clever ways that kids like you are helping to save the planet. I'm Bryce Corbett, and today we're diving into a topic that's electric, literally. It's what keeps your tablet running, your scooter zooming, and your Christmas toys from staying in the box with the tag 'batteries not included'.

Let's play a game. Now, what do a ripe banana, a fat bear, and an e-bike battery all have in common? They store energy! Whether it's food for your tummy or electricity packed into a battery. Storing energy is what helps things work when we need them. Even if the sun is not shining or the wind's not blowing, and as we move to cleaner energy like solar and wind, storage becomes more important than ever. So, charge up your curiosity and let's welcome a bright spark who's going to help us find out what the future of energy storage looks like.

Buzz: Yep. That's me, Buzz. Your friendly bolt of energy. Here to break down energy storage and electrification. You might not see me, but I'm working behind the scenes in batteries, buses, bikes, and even backup systems for hospitals. Because energy isn't just about making it. It's about keeping it until we need it. And trust me, with renewables like sunshine and wind, we need clever ways to store power for cloudy, calm days.

Bryce: Right. So, let's get into the nuts and 'volts'... I mean bolts, of how this all works. Buzz, you've been charging forth with some pretty big questions. What have you heard?

Buzz: People are full of shocking opinions.

Bryce: I see what you've done there.

Buzz: I've heard some people say the batteries are actually worse for the planet than fossil fuels, that electric vehicles don't really reduce emissions, and that battery technology is way too expensive and not ready yet. Others reckon that switching everything to electric will crash the power grid, and this one really gets my wires in a twist... that batteries can't be recycled at all!

Bryce: Whoa, that's a lot of volts flying around. Sounds like we need someone to help separate the facts from the fiction.

Buzz: Yes, please. Let's plug into someone who really knows their stuff.

Bryce: Joining us now is Rusty Langdon, an energy expert who works on powering up Australia's renewable future. Rusty Langdon, welcome to Planet Warriors.

Rusty Langdon: Thanks, Bryce.

Bryce: Can you first of all, start by telling us what your job is and how it relates to energy storage.

Rusty Langdon: Well, I'm a senior researcher at the Institute for Sustainable Futures. We're part of the University of Technology in Sydney, and I study how we make clean energy, like batteries, better for the planet and people. So, I look at where materials come from and how things are made, and how energy transition will impact the types of jobs and skills we might need in the future.

Bryce: Fantastic. Now, a lot of kids use electric scooters or see electric vehicles on the road. How are batteries used in electric transport and do EVs really reduce emissions even if the electricity is coming from fossil fuels?

Rusty Langdon: Yeah that's right Bryce. Batteries are used in so many different things in electric transport. They provide the energy to make motors and wheels spin, and you'll find them in e-scooters, e-bicycles, e-skateboards, or in your electric car if you're lucky enough to have one. And the short answer to your question, Bryce, is yes, electric vehicles do reduce emissions compared to combustion vehicles that use petrol or Diesel. As a researcher, we use a method called lifecycle assessment to understand this question. We look at the impacts across three stages of a car's life. So, the first stage is production and that includes all the steps involved in making the car. Second stage is the use phase. So we look at the energy needed and the emissions created when we're driving the vehicle. And this is where the biggest impacts for cars can occur.

That's during the use phase. And so when we're charging our electric vehicle or refuelling our petrol or diesel vehicle, this is where the potential for emissions can happen. But, even if electric vehicles are charged with electricity from fossil fuels, the impact is still much smaller than a vehicle that uses petrol or Diesel.

Bryce: But some people worry that switching everything to electric cars, heaters, even factories will overload the grid. Is that something we need to worry about? Yeah, that's a challenge, but it's not something that we have to worry about. There are experts in the energy sector that are working really hard to solve this challenge. And batteries are really important solution because they can store excess energy from solar and wind that's not being used in the middle of the day, for example, and then make this available to people when they need it most, like in the evening. And there are already really large batteries about the size of a football field, playing a role in managing electricity demand.

Bryce: That's amazing.

Rusty Langdon: It is. It's crazy. So we're expecting a lot more of these to be installed around Australia in the years to come. And so yeah, next time when you're turning on a light at home, there may just be a battery providing that electricity.

Bryce: And increasingly lots of homes are having batteries attached to them as well. And if they've got solar panels on the roof, then the sun is creating electricity, which can then be stored in the battery and then used to run the fridge, the telly. Keep your PlayStation going.

Rusty Langdon: That's right.

Bryce: It's an exciting time, but let me quickly just bust one big myth if we can. And that is our batteries worse for the environment than fossil fuels.

Rusty Langdon: Well, the short answer is no. Batteries are not worse for the environment than fossil fuels. We need to stop using fossil fuels as soon as possible to reduce the impact of climate change. And batteries are a really important part of the solution. But, there are also some complications to think about with batteries. For

example, batteries, like many products that we use today, are made using materials sourced from mining. And because we need so many batteries, we need to think carefully about where these materials come from in the future. We also need to make sure that batteries are disposed of properly. They don't go in our regular household bins, so it's really important to drop these at specific battery collection points.

Bryce: So it sounds like lots of lots of challenges for smart squiz kids and maybe some battery engineers of the future to solve.

Rusty Langdon: Yeah, totally. That would be amazing if we could get more battery engineers of the future.

Bryce: Well, let's hope that after this podcast we do now. Tell us what happens when batteries get old. Can they be recycled or reused in homes?

Rusty Langdon: That's a good question. Yes, batteries can be recycled. Currently, we're not recycling all of the batteries that we could be, but we're getting better at collecting old batteries and recycling them. And we do this to extract all of those valuable materials inside the battery like the lithium, cobalt, nickel, copper, aluminium. But before batteries do go to the recycler, there's an opportunity to use second hand electric vehicle batteries, for example, in energy storage for the home.

Bryce: And then finally, what are some of the coolest energy storage ideas being developed for the future?

Rusty Langdon: Well, have you heard about the big Iron Air battery proposed in the United States that relies on rust for energy storage.

Bryce: How does that work?

Rusty Langdon: Well, this battery breathes in oxygen from the air and converts the iron metal to rust, and then goes through a process called reversible rusting to convert rust back to iron. And through this process, it stores energy.

Bryce: Wow.

Rusty Langdon: Yeah. Pretty cool.

Bryce: That's remarkable.

Rusty Langdon: Yeah. Another cool thing is that electric vehicles can be plugged into our homes and provide energy. So in this way, they're doubly useful.

Bryce: So, you could have an electric vehicle and a battery attached to your home and solar panels on the roof, and you could use the solar panels to charge your battery to power the things in your house at night. But also, your electric vehicle could power your house as well.

Rusty Langdon: Yeah, that's right. And you could use your electric vehicle, you know, without a battery for the home. So you could use electric vehicle to instead of having a battery.

Bryce: So many amazing possibilities. Rusty Langdon, thank you so much for joining us on Planet Warriors.

Rusty Langdon: Thank you. Bryce.

Buzz: Phew! That was one power packed episode.

Bryce: Absolutely. From bananas to batteries, bears to buses, we've learned that storing energy is just as important as making it.

Buzz: Because if we want a future where the lights stay on, the cars stay quiet, and the planet stays cool. Energy storage is the spark that makes it all possible.

Bryce: And that's a wrap on our Planet Warriors adventure. From sunshine to cow poo. From wind gusts to ocean waves, we've explored the wild and wonderful ways the world is powering-up for a cleaner future. Whether you're turning off lights, riding your bike, or dreaming up new inventions, every action helps. And remember, you're never too small to make a big difference.