

Planet Warriors – Tidal and Hydro Energy

Bryce: Welcome back to Planet Warriors, the podcast where we power up our brains and plug into the facts about energy and the amazing ways kids like you can help our planet thrive. And along the way, get to meet the band of super connected superheroes powering the path to a brighter future. I'm Bryce Corbett, and today we're going with the flow... from waterfalls to waves, rivers to tides. This episode is all about the power of moving water.

Have you ever pulled the plug in the bath and watched the water whirl down the drain? Or stood on a beach as the waves crashed around your ankles? What if I told you that same watery whoosh could power your school, your TV, or even your electric scooter? Well, hold on to your raincoats because it's time to dive in with today's energy expert. Please welcome the next member of the Planet Warriors super connected superhero crew.

Flo: Whoosh! I'm Flo, and I'm here to make waves. From rivers that roar to oceans that rise. Water's got power. And I'm here to show you how we catch it.

Bryce: Let's start with the basics, Flo. What actually is hydropower?

Flo: It's water on a mission. Hydropower is what happens when moving water, like a river or waterfall, is used to spin big machines called turbines. That spinning creates electricity. It's clean, it's clever, and it's been around for centuries.

Bryce: And it's not just rivers, right? Flo, tides can do it too.

Flo: Oh yes, tides are super regular. They rise and fall like clockwork thanks to the moon's gravity. We can use special underwater turbines to catch that energy as the ocean moves in and out. It's called tidal energy. And it's as predictable as bedtime on a school night.

Bryce: So how do we actually catch all of that watery power?

Flo: Let's break it down. Hydropower usually means building a big dam across a river. Behind the dam is a reservoir, a giant man-made lake. When we're ready to make power, we open gates and water rushes through tubes called penstocks, that water spins turbines kind of like underwater pinwheels. And those turbines, power generators and those generators, they make electricity.

Bryce: Got it. So, a big rush of water, spinning blades. Boom. Electricity?

Flo: Exactly. And with tidal energy, we put special turbines underwater in places where the tides are strong. When the tide comes in or goes out, it moves the water, and the water moves the blades. Just like wind turbines, but 'wetter'.

Bryce: Now Flo, I've heard a few things about hydropower and tidal energy that made me go, hmm, is that really true? Like someone said, tidal turbines are dangerous for sea life.

Flo: Yeah, I've heard stuff like that too. And when I first read it, I felt a bit uneasy. Big emotions. Right? Like, wait, is this clean energy actually doing harm?

Bryce: Exactly. And here at Planet Warriors, we know that when something online makes us feel shocked or worried, it's time to check the facts.

Flo: That's why we've brought in someone who really knows their stuff. An expert who can help us sort science from scare stories.

Bryce: Joining us now is Douglas Hunt from Marine Renewable Energy or MAREN for short, who works on building tidal turbines. Now, Douglas knows exactly how moving water becomes moving electrons. Welcome to Planet warriors, Douglas.

Douglas: Thanks very much for having me.

Bryce: You're very welcome. Now, can you start by telling us what your job is and how you help bring water into people's lives?

Douglas: Sure. I lead a team of people engineers, scientists and mechanics and engineers that build turbines to convert flowing water into electricity.

Bryce: Amazing. And how do you help bring that water power into people's lives?

Douglas: In lots of places around the world. The sun doesn't shine all the time. The wind doesn't always blow, but there's lots of flowing water. Might be a river, might be a canal, could be the tides. But all of that to me, is energy, which we can turn into electricity reliably and cleanly.

Bryce: Amazing. Now let's start with rivers, Douglas. How do dams work? And are they always the best choice for making hydropower?

Douglas: Dams are good, but they don't really are friendly to the environment. They block the river. They block salmon migrating, they interfere with fish and birds and so on. Instead, the turbines that we build at MAREN are designed to go in the water and extract a little bit of energy out of the river or the canal flow and leave the rest to freely flow on down through the river.

Bryce: So what are some of the environmental concerns with hydropower, and how are engineers like yourself cleverly working to solve them?

Bryce: Turbines do spin in the water a bit like a boat propeller, but they're stationary and although it might be something you would think a fish might bump

into or be hit by. The reality is that fish are very good at getting out of the way of stuff in their environment, which is sharp, noisy and dangerous. And in fact, as far as we're concerned, in the industry, there's never been a strike of a fish by a tidal turbine anywhere in the world.

Bryce: Wow.

Douglas: But just in case we've developed a system using underwater video cameras and the same technology as a fishing boat to detect fish under the water. And if any blobs are nearby, that might be a fish or a marine mammal. Our turbines are able to stop within one second. Wait a minute or so and start generating again when the coast is clear.

Bryce: That's amazing. So these tidal turbines are super safe for whales, for example, that might be swimming past.

Douglas: That's another thing about our tidal turbines as well. Wind turbines are getting bigger and bigger, and there are one hundred meters in diameter or even bigger than that. But in the water, that doesn't make any sense. Rivers aren't that deep, and you have to be way, way out to sea in order to fit a great big turbine. Instead, we followed the lead of the solar panel industry, where a solar panel is as big as one person can carry it up a step ladder and install it. And our turbines are as small as will fit into the back of a utility vehicle, be carried along by a small davit, crane or a forklift. They're smaller devices, and they therefore don't present nearly as much of a risk to marine mammals, even whales.

Bryce: Unbelievable. Now tidal energy is still relatively new here in Australia. How has it been progressing?

Douglas: It's been progressing very well in Australia, where we develop our turbines, but particularly well in Southeast Asia, where, as I said before, the sun isn't always clear.. blue skies. There may be cloud a long rainy season each year

down near the equator in the middle of the Earth. The wind doesn't really blow very much. Sailors refer to it as the doldrums. In the olden days of sailing ships, because there was no wind around the equator. So with all of that, they don't have the same renewable energy resources that we have in some places of Australia. But they do have lots and lots of tidal flows and lots and lots of rivers. And what we aim to do is to broaden and improve the energy mix.

Solar is our friend and we work alongside wind. Our common enemy is diesel fuel in noisy, dirty generators.

Bryce: And this is the exciting thing, isn't it, with all renewable energies, is that it's slowly starting to phase out our reliance on fossil fuels.

Douglas: Yes, that's right. And that's all of our objective is to reduce the amount of diesel or oil or coal that's burned to produce electricity. Ideally in the world that should be zero. And tidal energy is doing its bit in particular locations to add to that energy mix and work alongside other renewables to dislodge the amount of diesel that's burned, coal that's burned, and oil that's burned to make electricity.

Bryce: Douglas, thank you so much for joining Planet Warriors.

Douglas: Thank you very much for the opportunity to talk about tidal energy, the next wave of renewables.

Bryce: Oh, I see what you've done there.

Thank you to our expert. And thank you to Flo. Whether it's a waterfall thundering down a mountain or the quiet pull of the ocean, tide moving water is more than just powerful. It's a clean, clever way to keep the lights on.

Flo: And now, next time you see the bath water drain or the tide roll in, remember what is not just for swimming. It's working hard behind the scenes.

Bryce: We'll be back next time with an episode that might make the ground beneath your feet feel a little toasty. We're talking geothermal energy. Until then, stay curious, stay splashy, and keep on being planet warriors.