The ocean engine that powers our planet

In this episode of Seas Of Opportunity, we were joined by physicist, oceanographer and BBC presenter Dr Helen Czerski to learn about the physics of the ocean and how this drives life on our planet. Here, we highlight some of the key insights that Helen had to share with us.

We know that the ocean is fundamental to life on Earth, but it's not just the species and ecosystems in the ocean that we depend on. The physics of the ocean is crucial to powering life in the ocean and on land. This is what Helen refers to as "the ocean engine":

> *"We talk about us being dependent on it quite a lot, but we don't ever talk about why. And the reason it matters is that the ocean is not just blue filler with fish in it, which is how it's normally presented. It is a 3-dimensional engine … and the way this engine turns is not only what sets the context for planet Earth, but it also affects the things that move around on Earth. It's the way it turns and the way it moves that allows life to exist in some places and not others."*

The influence of the ocean engine extends far beyond the ocean alone. In essence it is the functioning of this ocean engine that ensures that planet Earth itself remains habitable.

> *"The ocean is the big buffer. It's the big energy buffer, so that we can go overnight when we're facing away into space, away from the sun, and we've still got enough heat to keep warm. And equally, when we're facing the other way, we don't overheat. The water is absorbing energy. So it's smoothing out the peaks and troughs in energy that are coming from the sun. And so once you've got a big engine like that, we're all living in it's shadow and we're living within the environments it creates."*

As well as making the planet habitable in the first place, the ocean has been a huge ally in mitigating the effects of manmade climate change – absorbing over 90% of

the extra heat we have generated and large amount of our carbon dioxide emissions. Without this, we would already be well beyond our Paris climate targets and the world would already look very different. However, absorbing these changes is not without consequence for the ocean and how the ocean engine functions.

In discussing what we need to do to ensure that the ocean can continue to support life on Earth, Helen stresses the need for a change in attitude rather than specific actions alone. A better understanding of the ocean's life-defining role can help us to shape our relationship towards it for the better.

> *"The biggest thing we have to realise is that the ocean is already doing something. So if you put something in the ocean or take something from it, it's not a neutral act….The biggest thing is that change in attitude. You have to ask the question what was the thing of value that the ocean was already doing in that space?"*

The ocean is not out of sight and out of mind, nor can we interfere with it without consequence. It is this change of attitude that could define our future. By respecting the processes that support life on Earth, we can start to consider how to live within these planetary systems and not at their expense.

> *"The big challenge for our time is to stop fighting against our planet. We have to understand how this big engine is keeping everything going. We want to work with it, not against it. So we need to understand what it's already doing and find ways to engineer our world so it works with those things rather than fighting against them…So it's less about specific types of things and more about how we think about the things that we do."*

Considering reasons for optimism and areas of progress, Helen reflects on how much public awareness and interest in talking about the ocean has risen over the past decade along with a deeper understanding of the complexity of the marine environment. This has been accompanied with a shift in attitude, particularly from companies wanting to understanding how to manage their own impacts. The challenge now is how to quantify and acknowledge positive efforts that are being made to support ocean health.

> *"The only problem is that we haven't found a way of quantifying it. So at the moment a company can do a good thing… But we don't really have a way to measure that. We don't really have the way to say thank you…I think people are trying, but we need to find better ways to recognise when companies - especially companies - do the right thing"*

To learn more about the importance of the ocean engine and how the physics of the ocean shapes our lives, we can recommend reading Helen's book *Blue Machine: How The Ocean Shapes Our World.*