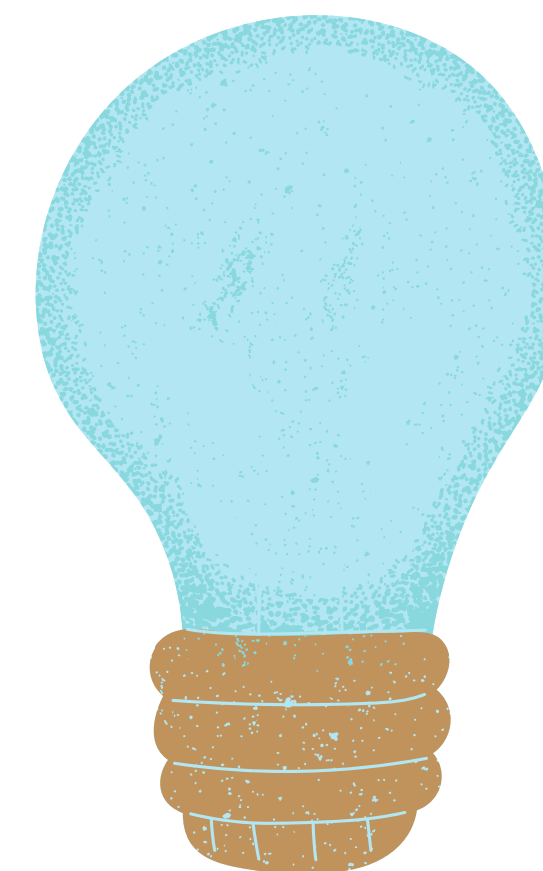
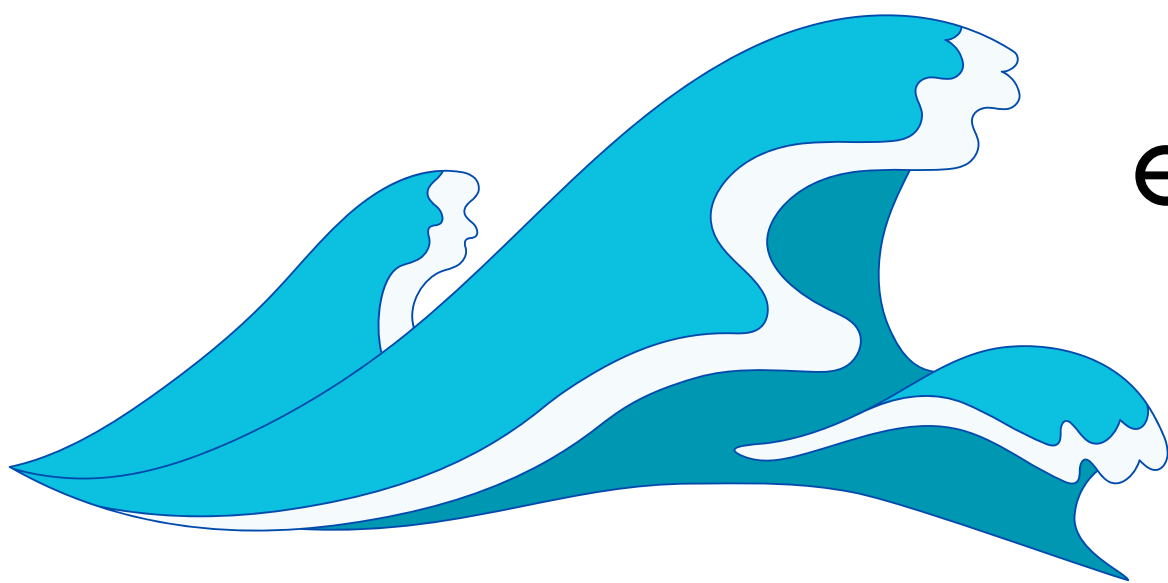


LEGO LEAGUE

INNOVATION PROJECT

Ways of harnessing
electricity from tidal and
wave power.





PROBLEM:



Although they are good for the environment, a lot of sustainable energy sources are not easily accessible to all rural communities.

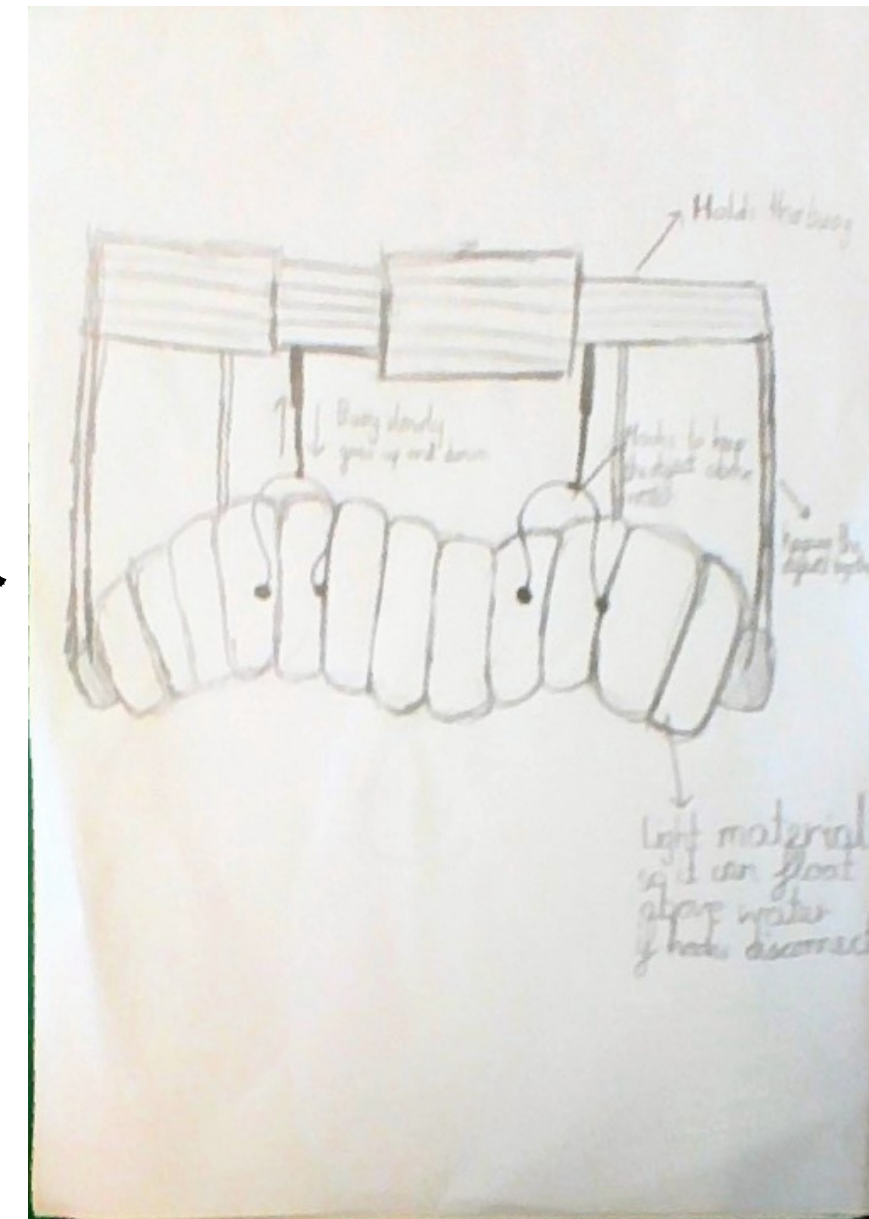
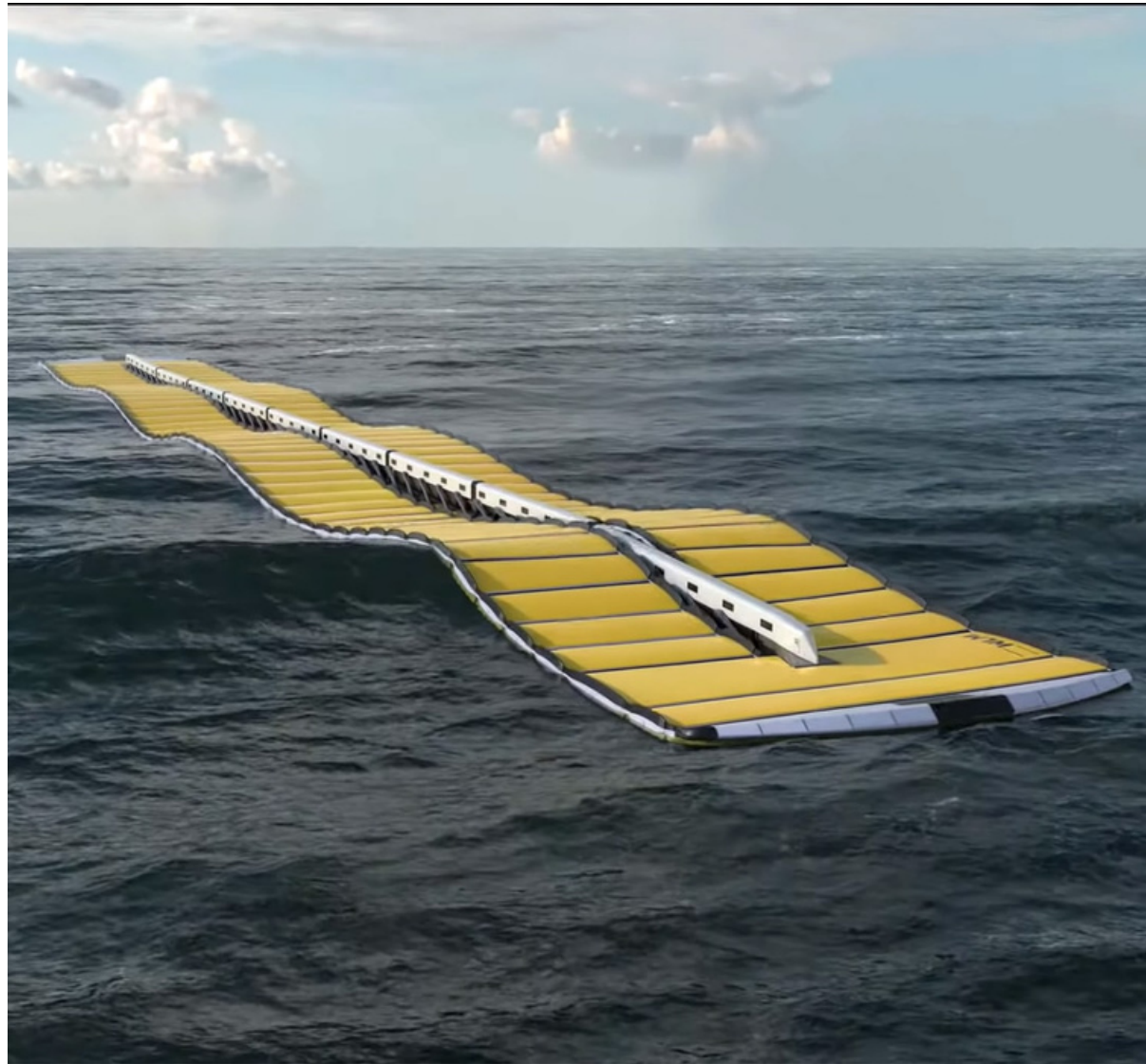
WHERE WE STARTED

At the beginning the researchers and communicators worked together to come up with a problem and a potential solution. Though we soon realised that this idea (how to reduce the cost of sustainable energy sources) was not going to be as ideal in our local area because renewable energy was difficult to get in the first place. So we came up with a new solution...

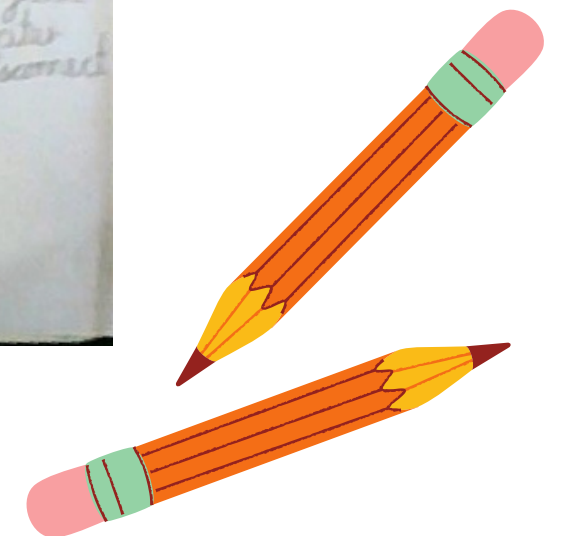


Our idea, is to use our variation of the renewable Waveline Magnet (WM), originally designed by SWEL, to stay submerged under the ocean using the power of the current to generate electricity. This directly contributes to our local area as we are close to the sea. We feel that rural communities all across the country do not have access to these sustainable energy sources and that is something that we **want** to change.

As you can see our design is inspired by the SWEL's original Wave line magnet but we have added different aspects instead of the WM being on top of the water it is on the sea bed.



<https://interestingengineering.com/innovation/floating-device-generate-power-waves>



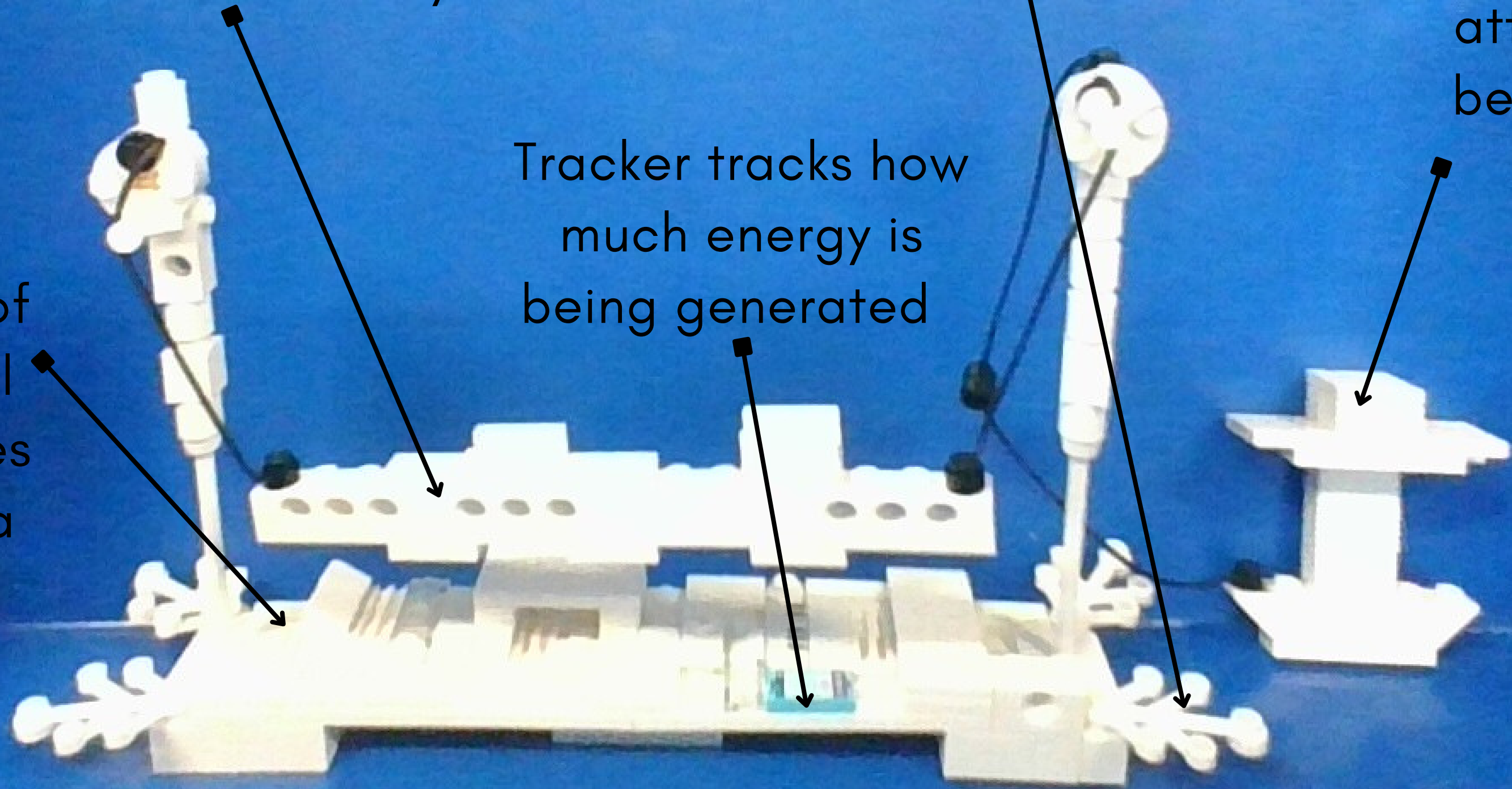
Atatchmet moves with current below surface level to generate electricity

Sea weed provides a home for animals and absorbs carbon

Anchor keeps attachment below water

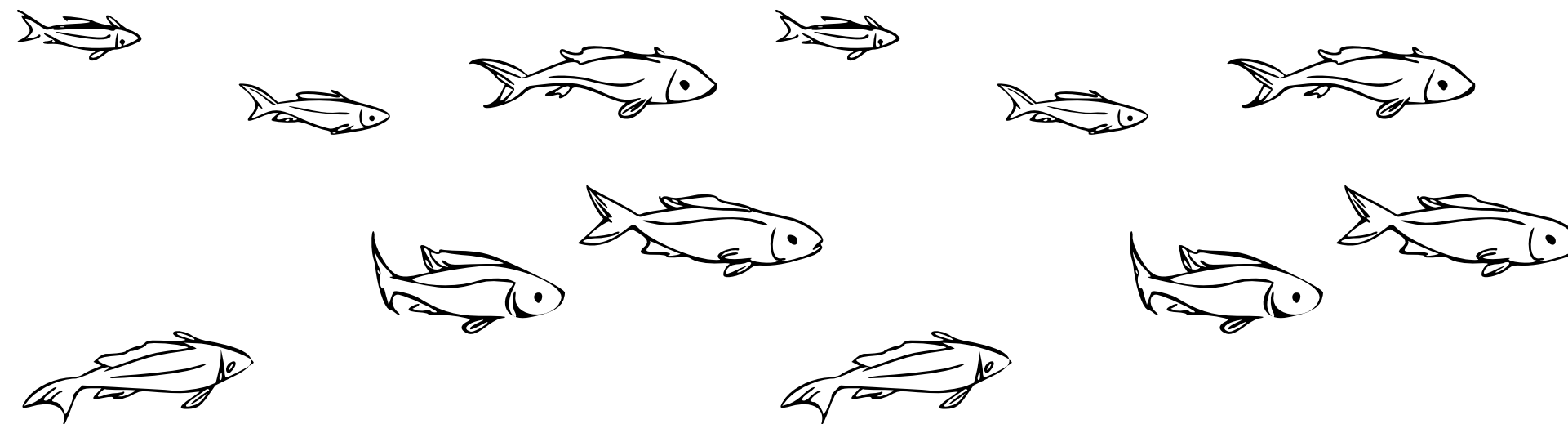
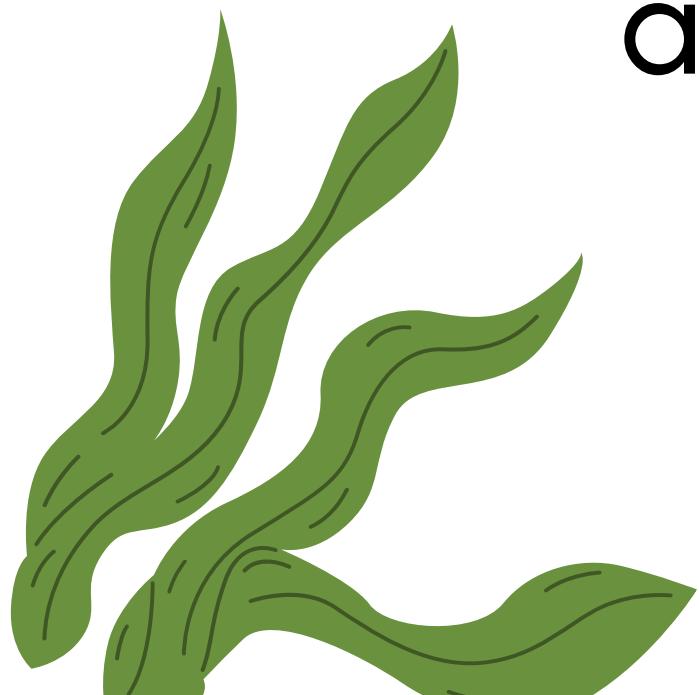
Tracker tracks how much energy is being generated

Base of model secures to sea bed



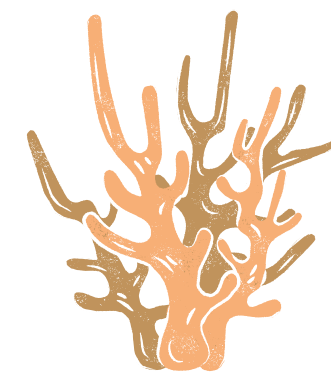
HOW IT WORKS

The WM moves with the current and tide under the water which means it can generate electricity in this way. It also has seaweed on the base as a home for animals and to help absorb carbon. The attachment would go up and across creating energy as it moves.





NEAR US



On Tuesday the 28th of February ,the government announced that they intent to designate the first three Highly Protected Marine Areas (HPMAs) in the north east of Farnes Deep, Allonby Bay and Dolphin Head, as the first of their kind in English waters.

HPMAs are exciting and extremely significant steps in delivering policies that will protect and enhance marine biodiversity, and promote the recovery of our seas.

What are Highly Protected Marine Areas?

HPMAs are areas of the sea that will have the highest level of protection for the full protection and recovery of the marine environment. To enable the ecosystem to recover as natural a state as possible, activities such as fishing, dredging, construction, and anchoring will be prohibited. HPMAs will complement our existing Marine Protected Area network and support the government commitment to 30 by 30 and the Global Biodiversity framework.



North East of Farnes Deep



The Farnes Deep is 16 miles away from us so we feel linked in a way. The habitat in this offshore site in the Northern North sea and supports high levels of biodiversity, with at least 263 different species recorded. There are 10 nationally important seabirds species, as well as marine mammals, including the harbour porpoise and the white beak dolphin.

Information from Mrs Wort on DEFRA.

The Government has just created a new Department for Energy Security and Net Zero to ensure that the UK secures its long term energy supply so that we are not reliant on imported energy- link to war in Ukraine has played a big part in the huge rise in household energy bills and now we need to be better at making our own energy.

???

INTERVIEW

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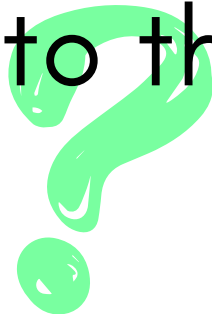
At our school we have a helpful team (which is voluntary) called **governors**. And one of our governors called Mrs Wort came in and we interviewed her on her job, Mrs Wort works in the environmental department at **DEFRA** and we thought it would be useful to talk to her.

Here are some of her questions:

How big would the WM be? The WM would be around 7 meters in length, 2 meters wide and 15cm in height.

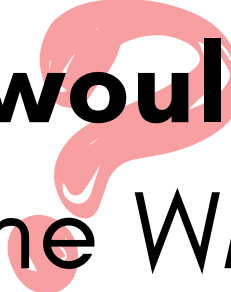

How would the WM stay in the same place? The WM would attach to the sea bed as well as using an anchor with a metal chain and have a weight at the bottom, this still provides the WM a range of movement.

Where would the WM be placed? The WM would be placed in a designated area so no people would be around it, we will also have buoys around it with rechargeable batteries (powering lights) in it so at night ships and boat can see that something is there.

 **Will the WM light up at night?** At night there will be buoys around the WM so ships will be able to see it (we considered also adding lights to the WM itself but refrained to minimise light pollution). 

Will the WM be around sea based wind turbines? Yes they will be, this is because it saves having to portion out another area of sea and it reduces light pollution from not having unnecessary lights.

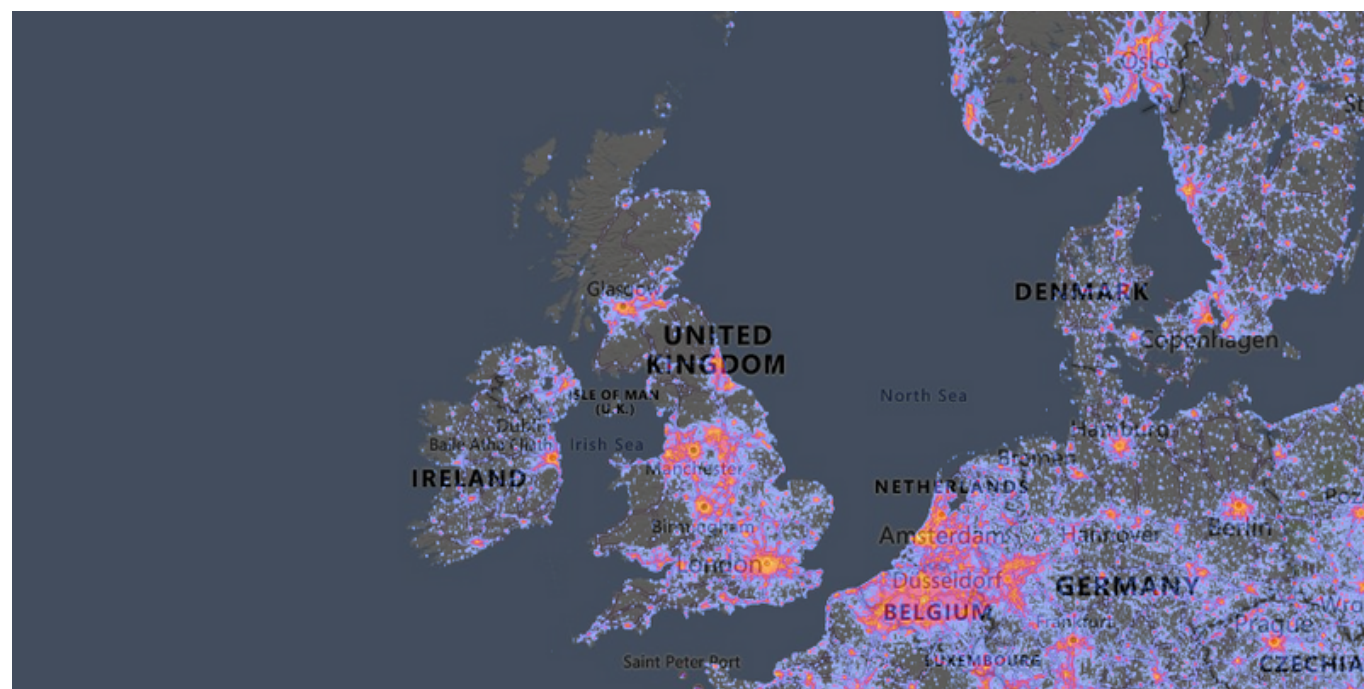
What colour would the WM be? The WM would be a bright red colour so it is noticeable (red is a warning colour too, so no ships could miss it).

 **What would happen if the anchor on the bottom of the WM came off?**  The WM would float back up to the surface and stay afloat so a maintenance team could go out to fix it.

From Mrs Wort at DEFRA.

LIGHT POLLUTION

Light pollution is a global issue, it can cause unimaginably bad things to our health and the climate if humans carry on using artificial light unnecessarily



How light pollution levels should be

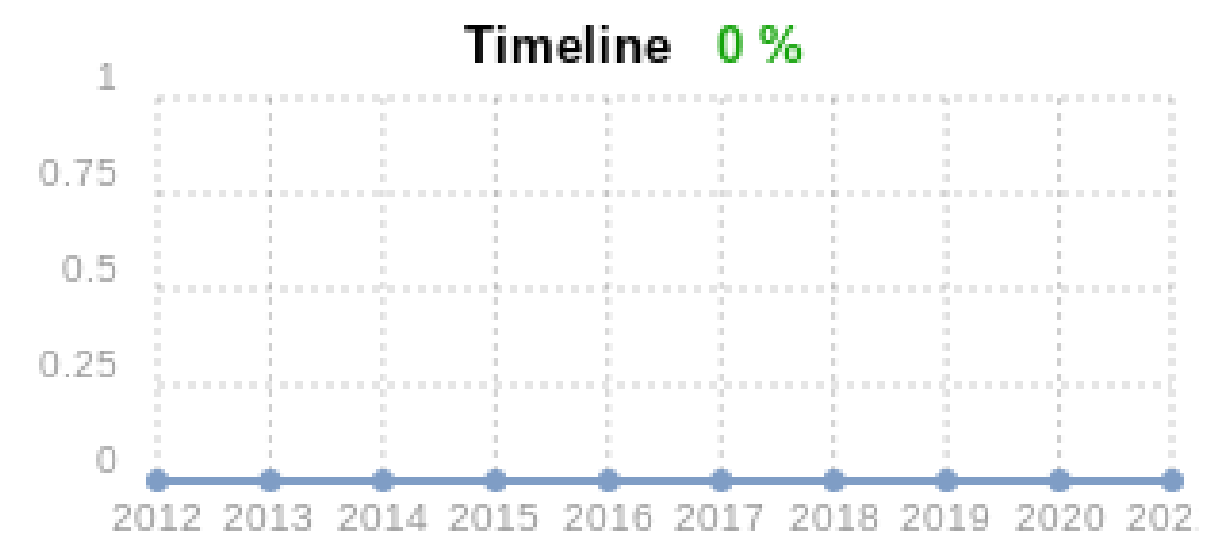


Radiance info (2021)

Coordinates: 55.68521, -2.20818

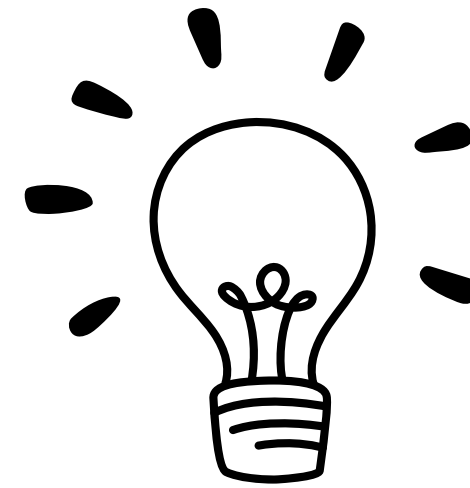
Value: 0.00

Elevation: 15 meters



THE INNOVATION TEAM.

The Innovation team have worked very hard over a long period of time- we all combined our ideas together and made a great team. We helped make models, did a lot of research and came up with a problem and a solution for Lego League.



THE INNOVATION TEAM

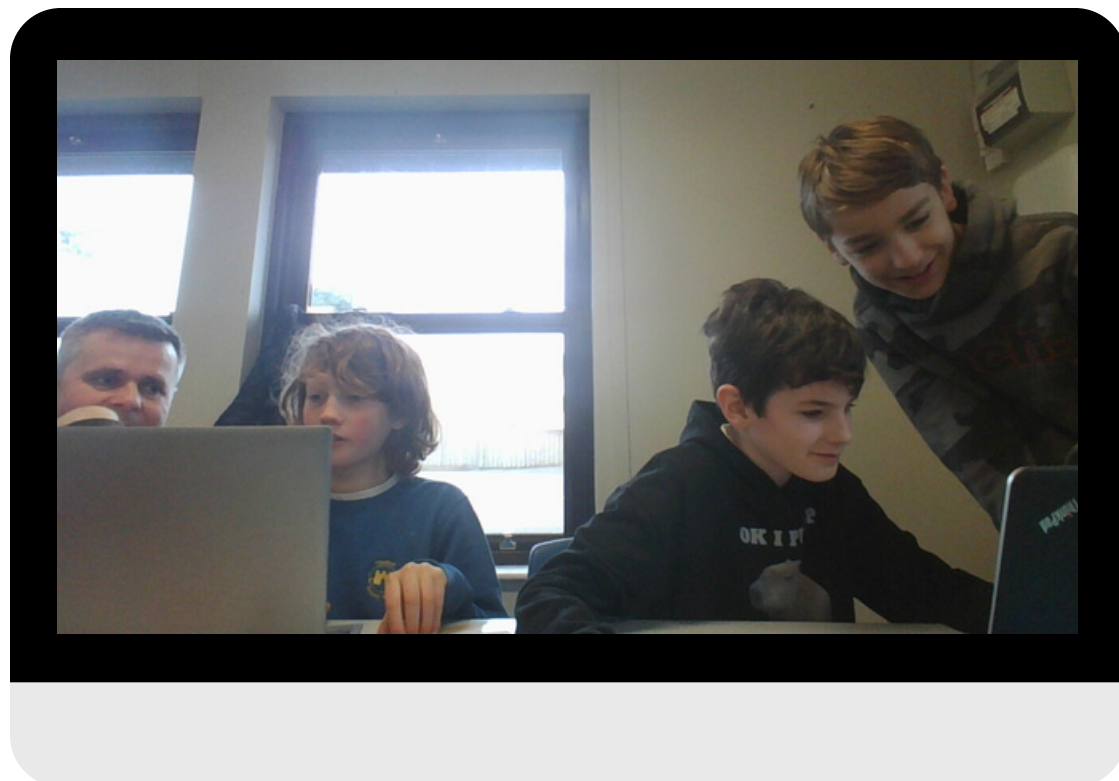
Anya
Erica
Connie
Isobel
Ana
Bethany



HOW THE CODERS HAVE HELPED.

The coders have helped in many ways; they have pointed out problems and have helped with finding the solution. As well as programming the robot for the robot

THE CODERS



games.



Jack
Heath
Joseph
Ethan

THE CODERS





SOLUTION:



By using our variation of SWEL's Wave line magnet, we hope to provide Britain's rural, coastal areas with sustainable energy.



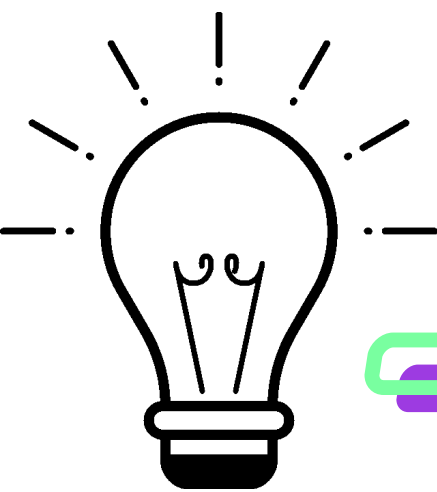
This brings us to the end of our presentation. We hope you have enjoyed it and take some of our ideas onboard. We will now summarise our key points.

1.) We don't think that rural communities get enough support on accessing sustainable energy sources, and we want to give these rural communities a chance to do their bit in saving the planet.

2.) We want all rural communities near the coast to have a WM to help generate some sustainable energy to power the village or town.

BY: CONNIE AND ISOBEL

THANK YOU



THANK YOU

