



2022
IMPACT
REPORT
CHANGING THE TIDE

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Some 40% of the world's population live within 100km of the coast.

It's a source of inspiration, enjoyment and source of livelihood for many, but beyond this, it's a source of life for our planet and all who live on it.

This year's Impact Report, "Changing The Tide" will be our second report and one of many as we start to benchmark our progress. Changing The Tide provides a transparent way to do that and it's title represents the way in which we aspire to transform the offshore wind, coastal defence and aquaculture industries.

We're optimistic in our approach and we believe in creating an opportunity for everyone to make a difference. This is something we're doing with our low-carbon, 98% recycled and plastic free solutions for conventional marine industries.

This impact report puts ARC under the spotlight and helps to showcase the best of our achievements, and the issues that we face in our mission to repair the world's damaged marine ecosystems on an unprecedented scale.

- Tom Birbeck, Founder and CEO





WHO WE ARE

ARC Marine is an award-winning eco-engineering company that brings nature-inclusive solutions to traditional marine industries.

Based in the UK but delivering globally, the company specialises in designing, manufacturing, installing and monitoring subsea protection structures in order to enhance and study biodiversity.

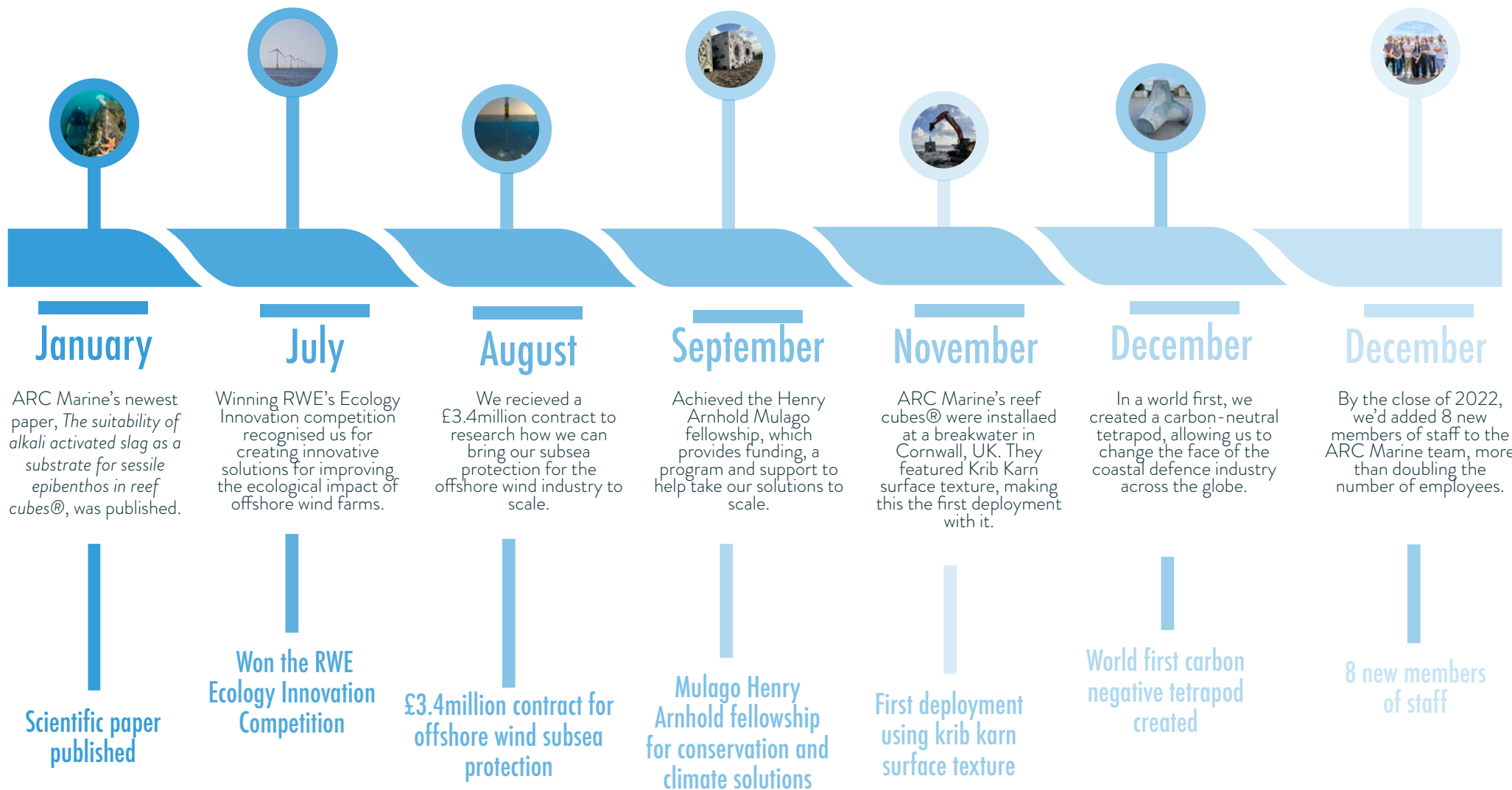


2022 TIMELINE

Investments, deployments and innovation, 2022 has seen it all. We've seen growth in the company across the board, with development across our products range, increased revenue and of course expansion in terms of team members.

As we look to 2023 there's massive potential and hope for ARC Marine and sustainability within the marine sector, and indeed across the globe.





2022 OVERVIEW

2022 has been a year of growth following the COVID-19 pandemic. As the world opened back up, we have made the most of this changing world in which shifting priorities have placed sustainability as an essential agenda for many.

Some of our key achievements are highlighted here, showing how we have gone about our business in the past year.



DEPLOYMENTS

A key deployment in 2022 saw the first batch of our reef cubes® with a Krib Karn enhanced surface texture installed at a breakwater in Newlyn, Cornwall as part of an Environment Agency trial project. The cubes were deployed to protect the coastline and local community from powerful breaking waves whilst providing habitat for marine life in the intertidal zone with a design that mimics the natural complexities found at the shoreline, like rockpools and crevices. They'll be monitored regularly by the Environment Agency alongside other 'eco-blocks' as part of the national strategy for Flood and Coastal Erosion Risk Management's (FCERM), which has an overarching principle of moving away from the narrow concept of protection to a broader one of resilience.

PUBLICATIONS

This year saw the publishing of our newest peer reviewed paper, *The suitability of alkali activated slag as a substrate for sessile epibenthos in reef cubes®*. It was published in Ecological Engineering and it evaluates the effect of replacing Portland Cement with an Alkali Activated Material (AAM) binder on the development of macrofouling communities on reef cubes®. The results showed there was no significant difference between the species growing on the AAM and Portland Cement, proving our Marine Crete as a quality substrate for marine life which provides greater potential for biodiversity net gain, as well as decarbonisation opportunities. Our dedicated team of scientists continue their work behind the scenes, ensuring we maintain the highest standards across our solutions.

CONTRACTS

2022 saw us secure £3.4million in funding as part of our Reef Enhanced Scour Protection (RESP) project. The funding was provided by European Innovation Council (EIC) and will allow us to research and take to scale our low carbon, biodiversity enhancing subsea protection for the offshore wind industry.

KEY STATISTICS: 2022



719 REEF CUBES
installed



48 MARINE SPECIES
found on reef cubes®



65.1 TONNES
of CO₂ saved



85 TONNES
of recycled materials utilised

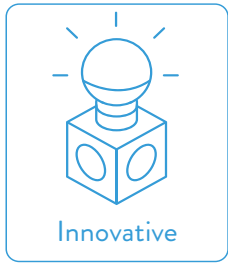
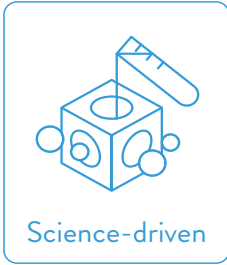


OUR CORE VALUES

ARC Marine specialises in designing, manufacturing, deploying, and monitoring nature-based solutions and their mission is to accelerate reef creation around the world.

We believe that building with nature-inclusive designs in mind is one of the most powerful ways that we can enrich marine biodiversity. We're working toward that as a company and we wouldn't be where we are today without our teams of dedicated scientists, engineers, conservationists and all-round ocean-lovers.

As we continue to push forward in our mission, our core values represent the pillars the we use to guide us in how we go about this. They are: Hands-on, Eco-centric, Science-driven and Innovative.



OUR VISION

We want to repair the world's damaged marine ecosystems on an unprecedented scale.

We're doing this by incorporating eco-friendly artificial reefs across the globe where they not only enhance biodiversity, but they serve as subsea protection, coastal defences, moorings, marine foundations and more.

We are optimistic and believe that by solving conventional marine problems with our plastic-free, low-carbon technologies, we allow a variety of industries to leave a lasting positive impact on the marine environment.

A key sector that provides unprecedented opportunities to leave a positive sustainable impact is in offshore construction. As offshore wind sees an intense and rapid scaleup, we see the chance for a thriving reef at the base of every turbine, which can be achieved with our nature inclusively designed scour and cable protection.



**IMPROVING THE
WELL-BEING OF
OUR OCEANS, NOW
AND FOR FUTURE
GENERATIONS**





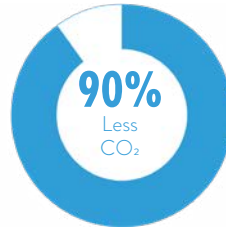
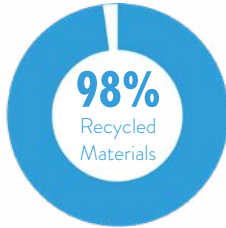
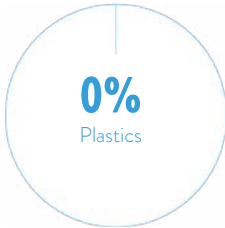
MATERIALITY

Materiality has been and continues to be hugely important to us on our journey to carbon neutrality. Our materials are largely recycled and we're always looking for ways to increase this percentage, utilising local supply chains, economies and innovative techniques.

“Our recycled aggregates allow us to reduce our carbon footprint dramatically and the location of our manufacturing facility in Cornwall allows us to make use of waste products from local clay pits. This allows us to reduce emissions further due to the decrease in transport required.”

“Our Cornwall site represents a roadmap for sustainable manufacturing that can be replicated on a global scale. By making use of local supply chains and regional features, we're able to take our manufacturing worldwide whilst ensuring the lowest possible emissions.”

- Julian Chenoweth, Chief Manufacturing Officer (CMO), ARC Marine



NET ZERO

The climate crisis and biodiversity loss go hand in hand, with rising sea levels, surface temperatures and increasing acidification just some of the impacts the world is currently facing.

While the Paris Agreement has set a goal of stabilising temperature rises to 1.5°C, and the EU target to be climate neutral by 2050, we believe that more action is required in order to achieve net zero and stall the decline in biodiversity.

2022 saw a big step forward in protecting the world's biodiversity on a global scale, with the COP15 agreement for the Global Biodiversity Framework, which amongst other things protects at least 30% of the world's land, coastal areas and oceans.

We believe that it's the responsibility of companies like ARC to push forward and to set an example by achieving carbon neutrality within our products as soon as possible. This year we saw a big step forward with advancements made to our carbon-neutral Marine Crete mix, and the creation of our world-first carbon-neutral tetrapod.

Beyond this, all our products can be left in situ beyond their lifetime, enabling ecosystems to become long term carbon stores which can be left to evolve naturally.

In time, we hope to create our own viable offsetting projects below the surface, protecting the sea floor and creating valuable seagrass beds to act as carbon sinks, habitats and hopefully Marine Protected Areas.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

At ARC Marine we anchor our sustainability strategy to the UN Sustainable Development Goals (SDG), with UN SDG-14, Life Below Water, as the mainstay.

With a rapid scaleup occurring, the offshore wind sector is one of our most crucial markets and its growth allows us to help the world manage its growing need for renewable energy with our responsibility for our marine environment.

Our subsea protection for offshore energy includes cable and pipeline protection, as well as scour protection for the turbines' monopiles – all of which can stay in situ indefinitely, unlike conventional protection which is required to be removed via a costly, timely and CO₂-intensive process.

We're creating solutions that can enhance not only the sustainability of every marine project but also biodiversity through our nature-inclusive designs which protect assets while creating a sustainable eco-friendly habitat for an abundance of marine life. Our long-term eco-system impact monitoring will allow informed decision-making and a science-led approach to healthier and sustainably productive oceans.

ARC Marine's other technology is focused on solutions for the marine environment, including coastal defence, aquaculture and eco-tourism.

Looking above the surface, other prominent SDGs we ensure are core to our thinking include:





HABITATS & ECOSYSTEMS

Sustainability is becoming a word without meaning. As the world becomes used for greenwashing and the same commitments and platitudes being made over and over, the ability to be credible and trustworthy is becoming harder and harder. Sustainability at ARC Marine is not something we really discuss, it's simply part and parcel of business as usual. By the very nature of why we started ARC Marine and the basis of our technology to our clients and our projects, we're simply passionate about doing our best for our environment.

Our core focus is on the following areas – aligned to the UN SDGs:

UN SDG 13 - CLIMATE ACTION

Human activity has been damaging our planet for decades, with the release of carbon into the atmosphere and the climate crisis being some of the biggest issues of our time. The impacts of this have been further environmental changes, with habitats being destroyed and species threatened. Our solutions are Carbon neutral, 98% recycled and plastic-free, helping us to mitigate the impact of climate change and start restoring that lost habitat.

UN SDG 14 - LIFE BELOW WATER

Coastal and marine construction has historically been one of the key drivers in biodiversity loss, with habitat's natural features being paved over and ecosystems forever changed. ARC Marine's solutions help to rebuild these lost habitats, enhancing the diversity of structures and biodiversity alike. They're also marine safe, adhering to strict leachate standards, and are totally plastic-free, ensuring we don't contribute to damaging marine plastic pollution.

UN SDG 15 - LIFE ON LAND

We ensure that life at our coastline is protected and restored through our coastal defence applications, which impact species at the coast both on land and in the ocean. It also helps ensure the protection of our coastlines from erosion and flooding, impacting many on land – around 40% of the world's population reside in coastal zones.

SECTORS & INDUSTRIES

Our solutions provide numerous environmental benefits designed to produce a positive impact above and below the surface. Aside from it being the right thing to do, creating products that are safe for the environment is paramount for us. Across our key sectors, we look to be a point of environmental difference in the following key industries:

Our core focus is on the following areas:



AQUACULTURE

Our planet requires more sustainable sources of food to feed a growing population – our oceans are currently over-exploited and, in some areas, fished out. Aquaculture is the controlled production of marine species, with the aim of providing managed food stocks

In supporting aquaculture, we provide solutions that create, support, improve or restore habitats. Particularly suited to Brown Crab, Native Oysters and European Lobsters, fin fish and sessile organisms our reef cubes® have proven to be an effective ally in sustainable marine farming, with deployments such as REFAS 2 exceeding expectations and having the added bonus of creating an defacto marine protected area, with the size of the cubes deployed rendering the area untrawlable.



HABITAT RESTORATION

As you may have guessed... we design in harmony with nature. This underpins our philosophy – all ARC solutions must be nature-inclusive, bring about positive impacts, do more good than harm and be able to be left indefinitely. We're proud that our technology meets this criteria (unless interfered with by human activity of course) and all future solutions will too – that's why we're a global pioneer in marine innovation. Our mission from day one is to accelerate reef creation (ARC) and this is still our focus. Through the improvement of habitats and ecosystems, we can deliver a breadth of benefits from biodiversity enhancement to sediment stabilisation.

Our solutions have proven highly adhesive for molluscs (which are often the first species to move into an area) and provide shelter for species to live safely and multiply. Using the latest in biomimicry, we can adapt our deployments to suit most environments and thus mirror most species' requirements.



OFFSHORE ENERGY

Protecting offshore wind installations from scour and erosion, providing eco-friendly moorings, protecting cables and pipelines – our benthic solutions are the most efficient in the world for subsea support. Being 90% lower carbon footprint*, plastic free and comprised of 98% recycled materials, we can support any subsea infrastructure, globally.

Once deployed, our solutions can be left indefinitely – a major win for us is to let nature take its course. Once deployed, our Marine Crete® will not leach toxins, meaning our solutions are a great option for subsea infrastructure which instead of being recovered via a costly and damaging decommissioning process, can simply be left to be taken over by various species – leaving a living legacy, owned by nature. Subsea infrastructure can also be left with regulator consent.



COASTAL PROTECTION

With a strong emphasis on climate, we're well aware of the dangers of aspects such as rising sea levels and extreme weather. Being a coastal business on an island nation, the necessity to protect our coastline is obvious to us and something we designed our solutions to support. If we can mitigate the impacts of climate change around our coast, we are giving the environment a chance to adapt to future state scenarios, as well as helping to stave off the potential costs to coastal towns, cities and infrastructure through nature-based protective barriers and mitigating the aforementioned dangers sufficiently to aid longer term solutions to provide longer term solutions that contribute to economic and societal benefits to be put in place, contributing to economic and societal benefits.

ENVIRONMENTAL PERFORMANCE

We enlisted the support of Devon's leading carbon footprinting and certification, Blue Marble. With their expertise, we have been able to determine our foundation carbon footprint based upon an assessment of our activity in 2022. This was important for us as it provides not only a baseline with which to demonstrate progress, but in using an independent, local business to conduct our assessment, we are playing our part in promoting regional leaders and providing income to our regional economy.

At a high level, Blue Marble has determined that ARC Marine greenhouse gas footprint comprises the following emissions:

(See Overall Emissions Chart)

- **Total Scope 1 emissions were calculated to be 7.2 tCO₂e. The major direct emission was the use of company vehicles;**
- **Total Scope 2 emissions were 4.8 tCO₂e. No heating or electric was directly purchased. Rental property energy is included in Scope 3;**
- **Total Scope 3 Emissions were 26.7 tCO₂e. The majority of Scope 3 emissions were from the energy associated with the warehouse and laboratory rented properties**

Total included emissions for the subject were 38.6 tonnes.



RESULTS



SUMMARY OF RESULTS IN GREEN HOUSE GAS PROTOCOL FORMAT

Activity	Scope 1				Scope 2				Scope 3	Outside of Scopes
	kg CO ₂ e	kg CO ₂	kg CH ₄	kg N ₂ O	kg CO ₂ e	kg CO ₂	kg CH ₄	kg N ₂ O	kg CO ₂ e	kg CO ₂ e
On-Site Activities										
On Site Liquid Fuels	1908	1885	2	22					478.3	60
Company Controlled Cars Mileage	60				0	0	0	0	16.0	0
Off site fuels										
Company Controlled Vans & Logistics	5197	5155	0	42	0	0	0	0	1323.3	227
Supplied Energy										
Provided Electrical, Heat or Steam Energy					4756	4709	26	21	1105.1	
Business Travel										
Hotels									1342.4	
Public Transport									7950.7	
Personal Car Mileage									2428.6	83
Freight and Logistics										
Upstream Delivery and Freight									5861.0	
Waste										
Waste Disposal									0.1	
Purchased goods & Services										
Water Usage									2.7	
Homeworking & Commuting										
Commuting									6173.1	
TOTAL GHG EMISSIONS kg CO₂e	7166	7100	2	64	4756	4709	26	21	26681.3	371
TOTAL GHG EMISSIONS tonnes CO₂e	7.2	7.10	0.00	0.06	4.8	4.71	0.03	0.02	26.7	0.37
TOTAL tCO₂e	38.60									

OUR CARBON NEUTRALITY DATA ACROSS SCOPE 1, 2 AND 3 (AS DEFINED IN PAS 2060)

Scoping Category		Assessment Emissions		Kg (CO2e)	
Scope 1	Company Controlled Vehicles, Fuel used			7166	
				0	
Scope 2	Location based Emissions from purchased energy - electricity			4756	
	1	Purchased goods and services	1a	Water	2.7
	3	Fuel and Energy related Activities	3a	Upstream emissions of purchased electricity and fuels	2923
			3b	Transmission and distribution losses	
	4	Upstream Transport and Distribution	4a	Outbound courier deliveries of packages	5861
			4b	Third party transportation and storage of inbound production related goods & outbound transport of sold goods	
	5	Waste Generated in Operations	5b	Other waste	0.1
	6	Business Travel	6a	All transportation by air, public transport, taxi or grey fleet	10379
			6b	Accommodation and hotels	1342
	7	Employee Commuting and Homeworking	7a	Employee transport between home and worksite	6173
			7b	Employee homeworking	0

WTT included for scope 3 activities within the relevant scope 3 Activity



GOALS ACHIEVED 2022

Reach £500k revenue

Exceeding £500k in revenue in 2022 has been an incredible achievement that has given us the means and motivation to continue to invest in the development of our low carbon solutions, ensuring that they are replicable at consistent levels of sustainability at a worldwide scale.

Deliver a new manufacturing plant

We're proud to have opened a new manufacturing plant and have partnered with a haulage company that uses biofuels.

Assess the opportunities for 3D printing of our products

We have invested in 3D printers and have established their use across our business, finding them most useful for creating prototypes and trialing new concepts.

Build up our growing evidence database of flora and fauna that our structures support and help propagate in the subsea and intertidal zones

In January 2022 we published a peer reviewed paper: The suitability of alkali activated slag as a substrate for sessile epibenthos in reef cubes®.

Disclose our progress on a yearly basis

We've continued to report on our annual progress with the release of the 2022 Impact Report, which takes a quantifiable look at the impact ARC Marine makes.

Build up our growing evidence database of flora and fauna that our structures support and help propagate in the subsea and intertidal zones

In January 2022 we published a peer reviewed paper: The suitability of alkali activated slag as a substrate for sessile epibenthos in reef cubes®.

Develop and bring to market two new products – including our Habitiles, which are at prototype stage

We launched Habitiles and a new biodiversity enhancing texture, nicknamed Krib Karn, which is based on a rocky reef environment.

Make our products more suitable for seagrass and kelp adherence

Our Krib Karn surface texture means that all our products can now be made more suitable for seagrass and kelp adherence



CONTINUOUS GOALS 2023

Collaborate on projects with educational storyboards explaining what we are doing and why it's important

We've collaborated on coastal projects that use biomimicry to build biodiversity whilst protecting vulnerable coastal communities and valuable assets. Explaining the value of marine biodiversity to the public and how our projects help to promote ecosystems is incredibly valuable and is something we continue to work on.

Disclose our progress on a yearly basis

Looking toward 2023, we'll continue to report on our progress with next year's impact report.

Double the team size and aim for diversification

While we have doubled the team size and increased the ratio of the gender mix in the team, we still lack diversity across most metrics.

This is something that we continue to aim for in 2023.

Build upon our UK Net Zero commitment to halve our greenhouse gas emissions before 2030

With our new sustainable manufacturing facility, cycle to work scheme and world first carbon-neutral tetrapod, we continue to work towards reducing our greenhouse gas emissions.

Reduce carbon footprint by 20% across all GHG emissions / as a total percentage of our carbon footprint - move to EV's or at least, more economic fuel and decarbonise our commute to offices.

2022 saw the launch of our cycle and walk-to-work schemes, and while we have reduced our carbon footprint proportionately to the number of people working here, as the company grows so have the emissions associated with each employee. This is an issue we're continuing to explore in 2023.

Achieve net zero emissions before 2040 in line with our business growth plans

This is a goal we are making progress towards and something we continue to work towards in the coming years.

Deploy the world's first carbon neutral, plastic free Marine Matt for pipeline protection.

The first deployment of our Marine Matt is set for 2023 following rigorous testing and analysis in 2022.





LOOKING TOWARDS 2023

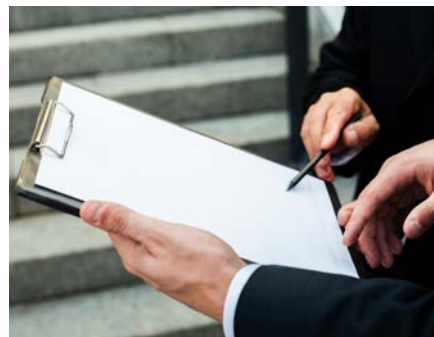
New standardised carbon-neutral mix for Marine Crete

We want to see a standardised mix that can be used across all our products going into 2023.



Investigating ethical and operational standard, such as B Corp and ISO certification

We think this will allow us to be more efficient, transparent as well giving us happier staff and customers.



Provide employment opportunities for underrepresented groups

We believe that by providing opportunities for people, such as those from low-income areas, physical and neurological differences, spent criminal convictions and addiction issues, will create a fairer and more just society.



Continued research into the efficacy of our products

In 2023 our scientific team will continue research various aspects of our products across different industries, on both a peer reviewed and independent level.



PARTNERSHIPS

WE ARE PROUD TO WORK WITH VARIOUS COLLABORATORS AROUND THE WORLD - DELIVERING THE BEST POSSIBLE OUTCOMES USING THE LATEST IN SCIENCE, RESEARCH AND SUSTAINABLE THINKING.

OUR PARTNERSHIPS HAVE LED TO IMPROVED DESIGN, GREATER OPPORTUNITIES AND GLOBAL RECOGNITION FOR OUR SOLUTIONS. HOPEFULLY WE REPAY OUR PARTNERS IN KIND, HOWEVER WE WOULD LIKE TO THANK ALL THOSE WHO SUPPORT OUR WORK AND HOPE WE CAN DEVELOP THESE RELATIONSHIPS FURTHER THROUGHOUT 2023.

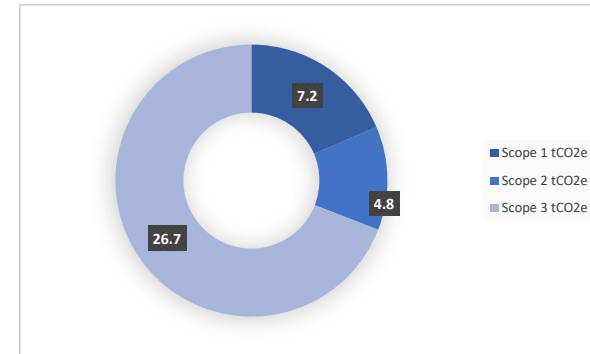


APPENDIX

GREEN HOUSE GAS INVENTORY SUMMARY

Name of the Entity making the declaration	Arc Marine Ltd.
Subject of the Declaration	Arc Marine Ltd. global operations, Scope 1, Scope 2, Selected Scope 3 emissions. Operational control.
Function of Subject	Arc Marine have invented & patented a concrete solution enabling them to create sustainable, recycled reef structures anywhere in the world. Anyone from scientists to remote fishers can contribute to rebuilding reef systems. From a private reef for a hotel to boost eco-tourism to an offshore turbine company protecting their investment from scour, ARC Marine works closely with environmentally-conscious companies, authorities, environmental agencies and others
Rationale for Selection of Subject	Subject selected based on the requirements under WRI Green House Gas Protocol Corporate Reporting and Accounting Standard to include all Scope 1 and 2 emissions and additional ambition to include Scope 3 emissions over which the company has the potential to influence, and measurement is feasible.
Process	Arc Marine has retained Blue Marble to compile and develop the GHG Inventory and corresponding GHG Report. The inventory has been compiled taking into account the requirements of ISO 14064-1 and the Green House Gas Protocol Corporate Reporting and Accounting Standard. Emissions factors utilised within the report have been supplied by the UK Government Department for Environment, Food and Rural Affairs unless otherwise specified.
Total Emissions	Blue Marble has determined that Arc Marine has directly or indirectly emitted the following GHGs: <ul style="list-style-type: none"> Total Scope 1 emissions were calculated to be 7.2tCO₂e predominantly from company owned vans Scope 2 emissions were 4.8 tCO₂e from facility energy supply Scope 3 Emissions were 26.7 tCO₂e. The majority of Scope 3 emissions were from the use of public transport
Offsetting Program	Total included emissions for the subject were 38.6 tonnes. Title: TBC Location: TBC Standard: VCS Volume: 2 Tonnes https://registry.verra.org/app/projectDetail/VCS/
Reporting period start	January 1st 2022
Reporting period end	December 31st 2022
Declaration of Achievement of Carbon Neutrality as Certified by Blue Marble	TBC
Individual responsible for the evaluation and provision of data necessary for the declaration of Carbon Neutrality	James Murphy

11.3. Carbon Footprint by Scope



11.4. Carbon Footprint by Scope and Activity

