



OUR ONGOING JOURNEY TO NET ZERO WHITE PAPER

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INTRODUCTION

“Human-induced climate change is causing dangerous and widespread disruption in nature and affecting the lives of billions of people worldwide, despite efforts to reduce the risks. People and ecosystems least able to cope are being hit the hardest”, a statement in the Intergovernmental Panel on Climate Change (IPCC) report, released 28th February 2022.



Satellite images showing the UK one year apart, demonstrating how drought has effected our enviroment

Over 1,000,000 species are at threat of extinction due to human activities. As the planet warms, weather patterns have become more extreme. Increased heatwaves, droughts and floods are already threatening the tolerance threshold of plants and animals around the world. Weather extremes are occurring simultaneously, causing immense damage, while leaving behind an environment that has become increasingly difficult to manage. This has exposed millions of people to acute food and water insecurity, especially in Africa, Asia, Central and South America, on Small Islands and in the Arctic.

Accelerated action is required to adapt to climate change and avoid mounting loss of life, biodiversity, and infrastructure, at the same time as making rapid, deep cuts in greenhouse gas emissions. In 2015, the Paris Agreement was drafted as legally binding legislation adopted by 196 countries, to limit global temperature rises to below 2 degrees Celsius compared to pre-industrial levels. Recent investigations, detailed in the 2021 IPCC report, identified widespread disruption as already commonplace; as a result, the IPCC has since reiterated the importance

of keeping 1.5 degrees as the key target.

To achieve this, co-operation is required across borders and throughout industries. Intergovernmental policies must align with global business plans to deliver the reductions needed to perform these commitments. The international scientific consensus indicates that to prevent the most severe climate crisis scenarios, global net carbon dioxide emissions (CO₂) need to fall by at least 45% from 2010 levels, by 2030, reaching Net Zero by 2050.

Companies of all sizes are adopting Net Zero targets at a rapid pace. The number of businesses committed to reaching Net Zero has increased significantly following COP 26. The growing interest represents an unparalleled opportunity to drive corporate climate action. However, the way in which these commitments will be implemented remains to be seen on a macro level.

In this whitepaper, we highlight and layout Bywaters' commitment to reaching Net Zero and the steps we will take to get there. We aim to operate in full transparency, independently certifying and publishing our carbon emissions on an annual basis, whilst adopting the principles laid out by the Science Based Targets initiative (SBTi).

Critically Endangered Species



African forest elephant



Black Rhino



Bornean Orangutan



Saola



Hawksbill Turtle



Vaquita



WHAT IS NET ZERO?

Net Zero is a term that describes both a goal and a process. As a goal, Net Zero refers to the point at which the emission of greenhouse gases is balanced by the removal of greenhouse gases from the atmosphere.

As a process, Net Zero refers to the ongoing effort to reduce greenhouse gas emissions, offsetting them with activities that remove greenhouse gases from the atmosphere. The ultimate goal is to stabilise the climate and prevent further damage to the environment. However, achieving Net Zero will require a concerted global effort, as well as significant changes in the way we all live and do business.

Before defining a strategy, a detailed understanding of what Net Zero is, and the principles that define it in a corporate setting is required. The term 'Net Zero' is important because this is the state at which global warming stops. The Paris Agreement underlines the need for Net Zero, and states to 'achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century'.

At Bywaters, we have adopted internationally recognised principles within our Net Zero strategy. These have been considered through the diligent lens of Planet Mark, as highlighted through our success in achieving ISO 50001 for Energy Management, and the principles laid out by The Science Based Targets Initiative.

The SBTi defines the key requirements of its Net Zero standard as:

1. Focus on rapid, deep emission cuts: Rapid, deep cuts to value-chain emissions are the most effective and scientifically proven way of limiting the global temperature rise to 1.5°C. This is the central focus of the Net Zero Standard and must be the overarching priority for companies. The Net Zero Standard covers a company's entire value chain emissions, including those produced by their own processes (scope 1), purchased electricity and heat (scope 2), and generated by suppliers and end-users (scope 3). Most companies will require deep decarbonisation of 90-95% to reach Net Zero under the Standard.

Scope	Emission Type	Definition
Scope 1	Direct Emissions	GHG emissions directly from operations that are owned or controlled by the reporting company
Scope 2	Indirect Emissions	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and down stream emissions
Scope 3		

2. Set near- and long-term targets: Companies adopting the Net Zero Standard are required to set both near-term and long-term science-based targets. This requires rapid emissions cuts now, and by 2050, organisations must produce close to zero emissions, neutralising any residual emissions that are not possible to eliminate.

3. No Net Zero claims until long-term targets are met: A company is only considered to have reached Net Zero when it has achieved its long-term science-based target. Most companies are required to have long-term targets with emission reductions of at least 90-95% by 2050. At that point, a company must use carbon removals to neutralise any limited emissions that cannot yet be eliminated.

4. Go beyond the value chain: The SBTi recommends that companies go further by making investments outside their science-based targets to help mitigate climate change elsewhere. There is an urgent need to scale up near-term climate finance; however, these investments should be in addition to deep emission cuts, not instead of them. Companies should follow the mitigation hierarchy, committing to reduce their value chain emissions before investing to mitigate emissions outside their value chains.

It is with these principles, we have laid out our plans to reach Net Zero by 2030 within this document. These plans have been built around four key promises:

Reduce emissions across our operations:

We will further assess every element of our performance, identifying opportunities to reduce emissions across scope 1,2 and 3 wherever possible.

Utilise rigorous monitoring methods to track our performance:

We will continue to independently verify and track our performance to validate our progress along the SBTi pathway.



Continue increasing our use of renewable energy:

Following the installation of 4,000 solar panels on the roof of our Material Recycling Facility, we will also invest in new opportunities to self-derive sustainable energy to power our operations.

Invest in zero emissions technical innovations:

From zero-emission lorries to harvesting latent heat generated by our Material Recycling Facility; we will invest in our fleets and operations to reduce Bywaters' environmental impact.

UK RESOURCE MANAGEMENT RIGHT NOW

In 2019, the UK's carbon emissions were estimated to be roughly 350 million tonnes; that's over five tonnes of carbon per person annually. As the 18th largest CO2 producer in the world, this is far too high to avoid contributing to harmful impacts from climate change, and sweeping changes are required immediately if the UK is to achieve its own Net Zero ambitions.

Of course, it's not just about emissions. In 2016, the UK produced 221 million tonnes of waste. Just 48.5% of this was recycled. Similarly, in 2018 only 45% of household waste in the UK was recycled, down from 45.5% in 2017. Given the vast amounts of rubbish we produce, it is vital that we manage it responsibly while reusing or recycling as much as possible. Based on the statistics outlined, there is clearly scope for vast improvements, from both

businesses and consumers.

On 30th June 2021 the Environmental Services Association (ESA) set a target for the resource and waste management sector to reach Net Zero carbon emissions by 2040, a decade earlier than the government's deadline. It is imperative for all organisations within the sector to align with this target, otherwise it is sure to fail.

The resource and waste management sector is predicted to produce 8% of the UK's overall greenhouse gas emissions. Therefore, by reaching Net Zero, our industry will have a strong influence on the success of the UK's overarching goals. As part of its targets, the ESA outlined key projects to propel the industry toward its goals. These include:

DECARBONISING WASTE TREATMENT



Decarbonising non-recyclable waste treatment - by diverting organic waste from landfill to recycling and energy production by 2030

ZERO EMISSIONS COLLECTION VEHICLES



From 2030, members will pledge to buy only zero emissions collection vehicles, to help phase out petrol and diesel entirely by 2040.

CARBON CAPTURE TECHNOLOGY



Rolling out carbon capture technology across energy from waste facilities by 2040, "where feasible".

Businesses and consumers have the power to make a huge impact on the UK's sustainability practices, forging a pathway to Net Zero. The resource and waste management sector has led the way in this decarbonisation journey, and will continue to drive down emissions across its organisations as we push for a zero carbon future.

OUR JOURNEY SO FAR

At Bywaters, we will always look to lead the UK to a more sustainable future. Almost two years prior to the Paris agreement, our own journey towards becoming a carbon-neutral company had already begun.

The steps we took included working with clients to increase recycling rates and enhancing our operations with zero emission technologies. Our business is built on the basis of responsible, sustainable and ethical resource and waste management practices. It was these principles which formed the basis of our decarbonisation journey in 2014.

Working with Planet Mark, we adopted short and long-term goals to deliver lasting carbon reductions throughout our operations. These plans have led to rapid emissions cuts, more than halving our carbon output over the past 8 years.

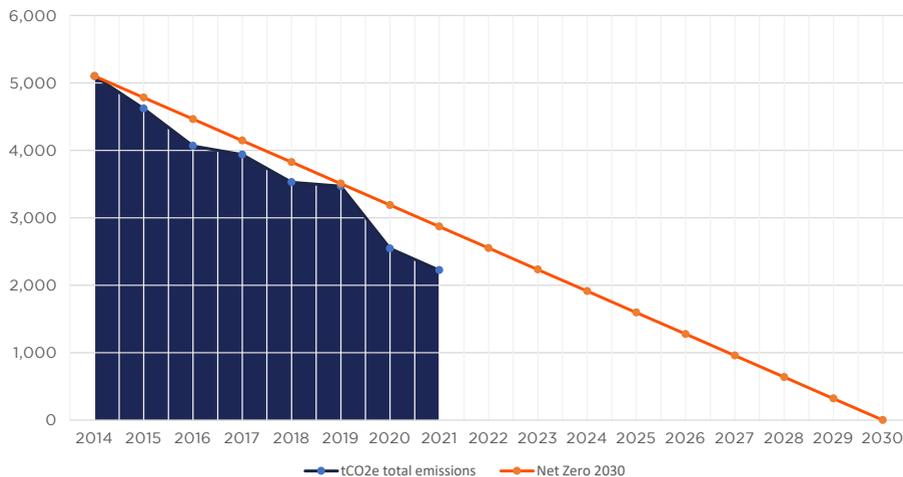
In 2014, Bywaters reported a total of 5111.8 tonnes CO2 equivalent – since then, we have openly reported emissions of 2543.5 tonnes in 2020 and 2,222.7 tonnes in 2021 – equating

to a scope 1 and scope 2 emissions reduction of 50.24% in 2020 and 56.52% in 2021.

The carbon intensity measures, which outline emissions per employee (total emissions in tonnes CO2 equivalent/number of Bywaters employees in that year) are just as impressive. In 2014, we generated 17.51 tonnes of CO2 equivalent per employee; by 2021 this figure had reduced to 11 tonnes - a 37.18% reduction.



OUR CARBON FOOTPRINT OVER THE YEARS



Embedding sustainable practices within our company ethos and staff culture has been supported by several key projects:



2016
INSTALLATION OF SOLAR PANELS: We installed 4000 solar panels to the roof of our Materials Recovery Facility (MRF). Generating up to 700MWh a year.



2018
EURO 6 AND ELECTRIC VEHICLES
We invested £7m to replace our fleet with Euro-6 vehicles, including two-caged 3.5-tonne tipper vehicles, 25 dustcarts, 5 tail-lift vehicles, 13 skip-loaders, and 17 hook-loaders. These were supported by introducing the first of our fully electric staff fleet.

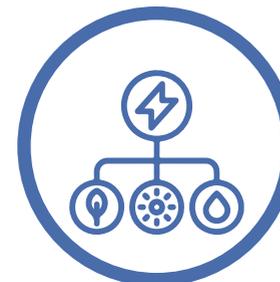


LIGHTING PROJECT
We surveyed lighting within our facilities with a view of replacing them with LED alternatives. 179 lights were identified as requiring replacement, and are being installed through a phased approach. There will be an estimated 31,053 kWh annual savings.

RAINWATER HARVESTING
We installed a 10,000-litre tank to reduce water consumption; we funnelled the guttering of our Lea Riverside MRF into the rainwater harvesting tank. Capturing water to wash our containers and vehicles saves the use of mains water.



2020
ISO 50001
We have achieved the rigorous ISO:50001 standard for our energy management system. This certification outlines our commitment to efficient energy management and continuous improvement.



NET ZERO BY 2030 - HOW WE WILL GET THERE

A significant energy use, or SEU, is an area of energy consumption that warrants special attention due to the high amount of energy required or the potential for energy performance improvement. As part of our decarbonisation plan, we have identified three significant energy usages (SEUs).



OUR FACILITIES



OUR FLEET



EVERYTHING ELSE

Each of these SEUs will require targeted actions to reduce emissions to Net Zero. The plans below outline our strategy for each element; however, we remain flexible - and will adapt, by exploring emerging technologies over the next eight years.

OUR FACILITIES - SCOPE 1 AND 2

Our facilities are the lifeblood of our operations, as such they generate almost 50% of our annual Co2 emissions. However, we have improved and reduced emissions significantly in recent years, to deliver operational efficiencies and reduce carbon production. To reach Net Zero by 2030, we can target further enhancements across our operations. We have broken these down into four separate areas as outlined below:

ELECTRICITY

Electricity from the National Grid makes up approximately 40% of Bywaters' energy use. This is factored into our scope 2 emissions. Switching to renewable energy sources is imperative to us achieving our goal, utilising the likes of Renewable Energy Guarantees of Origin (REGO), Electricity, or Renewable Gas Guarantees of Origin (RGGO) Gas.

However, moving to a renewable tariff is not our only route. As a business, we have invested heavily in self-derived renewable energy. This is a pathway we are committed to and one we will continue to explore - a small sample of the proposed projects we have identified are outlined below:

- **Enhanced cleaning of solar panels** - Already generating significant solar energy via our array (approximately 700,000 kWh per annum), we will improve performance via enhanced cleaning; this will help to achieve about 100,000 kWh additionally every year.
- **Harvesting latent MRF heat** - We will look to recycle the latent compressor heat generated within our MRF to help heat the sorting cabins through advanced ventilation systems. This will help us save approximately 160,000kWh every year.
- **Installing renewable energy generators** - We have identified additional space on site to increase our self-derived renewable energy produced. This could increase capacity by more than 20%.
- **Increasing use of skylights** - We have identified an energy saving of 87,000kWh per annum by increasing the use of skylights across our facilities, for better use of natural light.

NATURAL GAS

Natural gas is utilised sparingly across our operations, making up a very small portion of our emissions. However, we will review alternatives such as ground, or air-source heat pumps to reduce this further.



OTHER MACHINERY

Within our extensive operations, aside from our fleet, we utilise plant machinery in the various recycling processes. These machines are varied but include excavators, forklifts and grabs. As part of our decarbonisation strategy, we have already committed a seven-million-pound investment into electrifying our operations. This consists of a full complement of electric or hydrogen vehicles, alongside installations of high-powered charging points. This significant investment will cover the aforementioned plant, reducing our reliance on fossil fuels and the associated emissions.

WATER

We consume roughly 5,000 litres of water a month; our efforts to harvest rainwater to clean bins, vehicles and compactors have significantly reduced this volume. However, we are continuing to explore options to reduce this further. This includes, but is not limited to:

- Investment in more water capture opportunities, including capturing grey water.
- Staff training to improve behaviour around water usage.
- Exploring phytodepuration to help with water infiltration.

OUR FLEET - SCOPE 1 AND 2

Our second SEU is our prized fleet of Euro-6 vehicles. The entire fleet is ULEZ compliant, with each vehicle producing less than 0.08g/km of NOx; this accounts for 44% of our current GHG emissions. Our heavy goods vehicles (HGV) travel more than 1.5 million km annually. To reduce this, we have created a set of actionable short and long-term projects:

SHORT TERM PROJECTS



We conduct continual driver training and improvement to reduce engine idling and average driving conditions. We estimate a saving of 120,000kWh annually from improved training and knowledge.



We are committed to retendering our fleet to obtain best-in-class ultra-low emissions diesel vehicles until fully electric, and hydrogen RCVs are practical - including our skip and roll-on-off collection vehicles.



We are exploring options to substitute fossil fuel diesel with HVO (hydrotreated vegetable oil) diesel which could lead to a 90% reduction in emissions.

LONG TERM PROJECTS

ELECTRIFYING OUR OPERATIONS

As mentioned above, we have set out an ambitious electrification plan. We have already committed to invest £7 million in electric vehicles and high power charging points across our sites, starting with our first electric dustcart. This 100 percent electric vehicle is at the cutting edge of zero-emission waste collection logistics, providing all the standard features of equivalent fossil-fueled options – including bin lift and telematics technologies. In addition to eliminating emissions, the vehicle is

cheaper to maintain and reduces noise pollution significantly.

The fleet will be charged through on-site vehicle charging points, with electricity drawn from our retrofitted rooftop solar PV array. As part of the procurement process, we conducted trial runs on a number of its City of London collection routes to test functionality and battery life and, most importantly, ensure the fleet roll-out is seamless. We saw clear benefits from day one. This project will be expanded across our fleet to reduce our reliance on non-renewable fuel types.

STAFF VEHICLES

The electrification of our staff fleet is already well underway with over 50% of company cars electric already. We will continue to offer electric options for all staff vehicles, when lease agreements expire, with a view to achieving a fully electric complement of vehicles by 2030.



EVERYTHING ELSE

OFFSET PROJECTS – SCOPE 3



Although carbon offsetting does not form a significant part of our Net Zero strategy, we are still committed to investing in reforestation and restoration projects to restore natural habitats and increase GHG absorption across the globe.

The SBTi state that science-based Net Zero targets will require long-term deep decarbonisation targets of 90-95% across all scopes before 2050. When a company reaches its Net Zero target, only a very limited amount of residual emissions can be neutralised with high-quality carbon removals; this will be no more than 5-10%. We plan to offset less than this, mainly focusing our efforts on scope 1, 2 & 3 emissions.

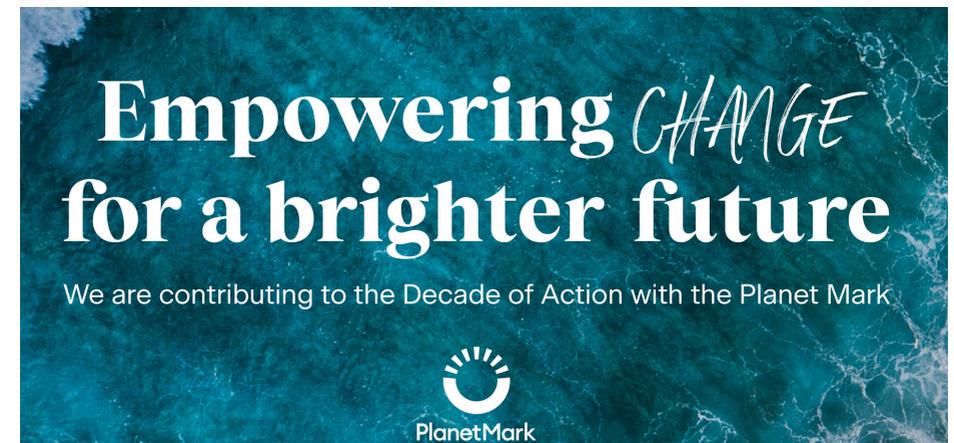
We will also strive to make additional investments in mitigation activities above and beyond our value chain, to increase likelihood of the world staying within a 1.5°C carbon budget.

At this stage, our efforts will be focused on a mix of offset opportunities. We have targeted several UK reforestation projects, planting native broadleaf trees, which are estimated to take up a tonne of carbon dioxide during their full lifetime of approximately 100 years. These local projects will be supported by our longstanding commitment of preserving the rainforest and planting indigenous tree species in developing countries. Our partnership with Green Pop has seen us plant over 4,000 trees to date, a project we are committed to supporting in the coming years. In addition, we are also now considering additional projects that combine both natural carbon capture with biodiversity restoration.



TRANSPARENT REPORTING

– SCOPE 1, 2 AND 3



At Bywaters, we are committed to open and transparent reporting of our progress - and have been since we established a baseline of energy usage back in 2014, when undertaking Planet First certification for the first time. Since this first certification, we have publicly reported our progress on an annual basis for nine consecutive years, sharing our Planet First report openly for public scrutiny. This level of openness is imperative, as we want to provide assurance that our commitments are supported by fact, rather than greenwashing.

Energy management is an area of key importance at Bywaters. We strive to operate at the pinnacle of the industry, which is reflected by our fantastic achievement of maintaining ISO:50001 Energy Management since 2019. As part of the ISO management system, we set, review, and publish appropriate energy targets, measure our annual carbon footprint, and take steps to reduce it year on year. The stringent review process surrounding this accreditation requires us to continuously improve our operations, ensuring that we don't rest on our laurels, finding efficiencies and improvements on an ongoing basis.

EDUCATION SCOPE – 1, 2 AND 3



At Bywaters, we believe the best way to encourage sustainable practice is focused education and knowledge sharing. Providing up-to-date and engaging information about resource and waste management and sustainability to our staff ensures that environmentalism is embedded in our company ethos.

As part of our mission to decarbonise our operations, we will be investing in our staff and leadership. Although not tangible, improving behaviour through targeted campaigns and training will lead to widespread awareness and habitual changes. It is through this shared drive, that we know our people will carry us toward our goal, improving and innovating beyond Net Zero.

SUPPLIERS ENGAGEMENT – SCOPE 3

Our suppliers are integral to our operations, ensuring alignment with our targets will be imperative to reducing our Scope 3 emissions. As part of our commitment to reducing these GHGs to their lowest possible value, we will be delivering a number of projects that will engage our supply chain, and encourage action:

- Ongoing engagement and advice throughout our supply chain, surrounding reduction of emissions and Net Zero (Scope 3)
- All suppliers are required to pass detailed onboarding which queries their carbon policies and targets.
- Encouraging our suppliers to achieve ISO:14001
- We will encourage discussions with all suppliers to confirm their Net Zero plan and commitment.
- We will carry out scope 3 emissions reduction and reporting wherever possible, asking all organisations to provide carbon reports per product line (where possible), so that we understand the embedded carbon.
- We will continue to carefully select our suppliers for quality, efficiency and alignment with our values.

WORKING WITH OUR CLIENTS

While Bywaters is moving on the path to Net Zero, so too are many of our clients. With our services forming a significant element of clients' Scope 3 emissions, we are a reliable partner in reducing this portion of their footprints. Our operational efficiency stands apart from others within the industry, and furthermore, our programs to increase recycling rates and waste reduction are beneficial to clients.

The Bywaters Green Gurus will continue to deliver a variety of projects, utilising our reporting systems, which monitor CO2 activities and provide quality data for clients. Continuous efforts to reduce vehicle movements and operational emissions for our clientele is also a priority.

SUMMARY

Within this document, we have laid out our plan, openly and transparently, as an outline of our strategy to reach Net Zero by 2030. We aim to continue the amazing work already conducted by the business, to reduce emissions by more than half over the past eight years.

Reduce emissions across our operations: We will assess every element of our performance, identifying opportunities to reduce emissions across scopes 1,2 and 3

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Utilise Science-Based Targets to track our performance:



We will independently verify and follow our performance to validate our commitments and progress.

Continue increasing our use of renewable energy:



Following the installation of 4,000 solar panels on the roof of our MRF, we will invest in new opportunities to self-derive sustainable energy to power our operations.

Invest in zero emissions technical innovations:



From harvesting latent heat generated by our MRF, to new sorting technology, we will invest in our operations to reduce our environmental impact.

Bywaters is more than just a recycling company. We aim to lead the UK towards a sustainable future, protecting it for generations. Our services are founded on our commitment to improving the environment, and this strategy supports this vision as we look to reach NetZero by 2030.

For more information about Bywaters services or our Net Zero strategy,
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