

Plastic Energy Sustainability Report

FOURTH EDITION - AUGUST 2024



COPYRIGHT © 2024 PLASTIC ENERGY LTD. ALL RIGHTS RESERVED.



Table of contents

OPENING MESSAGES	3
2023 SUSTAINABILITY PROGRESS	6
Company achievements and developments	7
Chemical recycling policy landscape	12
OUR SUSTAINABILITY STRATEGY	18
Our sustainability commitments	19
Safety	22
Planet	24
People	28
Governance	30
LOOKING AHEAD	33



Opening messages



Message from our Founder and Chairman

Each year a handful of technical terms, previously only used by specific industries, make their way into the mainstream. This transition usually signifies the growth of the industry, or increased interest in a topic. Think 'net zero', or 'greenhouse gases (GHG)' - two terms once used only by experts.

We hope 2024 will be the year support for the 'circular economy' grows to such a level that we see both the term and the concept reach mainstream audiences.

A circular economy is one where materials never become waste and nature is regenerated, keeping resources in circulation through solutions like our chemical recycling process. This term is particularly powerful as it represents more than just a problem or solution - but a way of rethinking how our systems operate.

Recently, momentum behind this vision has been building. European policymakers have taken significant strides towards supporting a circular economy, in the context of plastics recycling, and reuse of materials. Globally the UN plastics treaty process has been working to address plastic pollution, as currently only 9% of plastics are recycled.

At Plastic Energy, we are proud to provide technology which supports a circular system, and we are committed to continually improving the sustainability of this solution. As part of our commitment to communicate openly and transparently, this is our fourth edition of our annual sustainability report. It covers the steps we are taking to improve our environmental credentials year-on-year.



Carlos Monreal

Founder and Chairman, Plastic Energy



Message from our Interim CEO

The last twelve months have seen steady, solid progress, the most visible of which are the developments made across our two European joint ventures in France and the Netherlands, both now approaching completion.

We have also made inroads in Asia, signing licensing agreements with Petronas for an advanced recycling plant in Malaysia, and with SK Geo Centric to develop an advanced recycling plant in Ulsan, South Korea.

All of this is made possible by the teams further advancing our technology through dedicated research and development. A boost to this work, which opened in 2023, is our new pilot plant in Loughborough. The site is instrumental in optimising our chemical recycling technology.

Sustainability is fundamental to our mission at Plastic Energy. It is at the heart of what we do and the value we offer. As we seek to deploy and to continuously improve our technology, our focus is on optimising performance while minimising our environmental footprint.

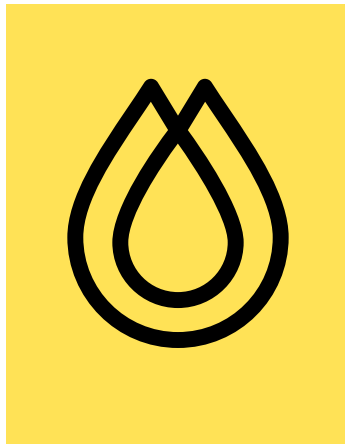
Within our existing operations, we put Safety First as a fundamental principle, and will carry this through to our joint venture facilities as they enter commissioning and operations.

We are grateful to our partners and especially to everyone in our dedicated team for their contributions.



Ian Temperton

Interim CEO, Plastic Energy



2023 Sustainability Progress



Company Achievements and Developments

Plastic Energy & the Plastics Circular Economy

There is no denying that plastic has become an indispensable part of our modern lifestyles. Its lightweight and durable qualities are ideal for creating single-use packaging to keep food, cosmetic, and medical products fresh and sanitary.

However, the price of this convenience is a hefty one. Around 350 million tonnes of plastic waste is produced globally every year, and only a fraction (~9%) of this is recycled. The remaining plastic waste is incinerated, landfilled, or ends up as pollution in the environment.

We are a recycling technology company transforming the global landscape of plastic waste. Our patented TAC™ recycling process converts end-of-life plastic into TACOIL™, which replaces fossil oils in the production of new plastics, while diverting plastic waste from landfill and incineration.

Since 2015, TACOIL™, produced from our two operational chemical recycling plants in Spain, has been used to increase the amount of recycled content in plastic packaging products, contributing to a circular economy of plastics.

Chemical recycling is becoming globally recognised as an important factor towards achieving plastics circularity. In 2023, there were almost 180 chemical recycling projects in various stages of development around the world. Of these, 37 plants are operational, with a combined capacity to treat 145,000 tonnes of waste plastic per year.





TACOIL™: Plastic Energy's recycled feedstock

Our Technology

We use our patented TAC™ process to recycle mixed post-consumer flexible plastic waste into a recycled feedstock, called TACOIL™, which is then used for plastics manufacturing.

During this process, plastics are heated in the absence of oxygen to produce hydrocarbon vapours. These are condensed to make TACOIL™. This TACOIL™ is used by our petrochemical partners as a replacement for fossil feedstock in the production of new plastics.

As part of our commitment to circularity and transparency, our operational facilities in Spain received ISCC PLUS certification in 2019, becoming the first waste plastic conversion facilities in the world to receive this. The production line, certified according to the ISCC PLUS Standard, recycles plastic waste into a valuable product which contributes to reduced virgin feedstock consumption. This is verified and confirmed by third party auditing.

The feedstock, or material we usually recycle, is flexible post-consumer mixed plastic waste which would otherwise be incinerated or landfilled. Since most of this material is not currently recycled, there is a gap in the market for high-quality recycled content for food-contact sensitive plastic packaging.

This is where we come in. Our technology is complementary to mechanical recycling, as chemical recycling can recycle plastics into food-grade packaging, while mechanical recycling can recycle polyolefin plastic waste into non-food contact materials. Both technologies need to work alongside each other to continue to divert plastic waste from landfill and incineration, and to achieve higher rates of plastic recycling.



2023 Highlights

Project updates

Jan 2023Mar 2023Jul 2023Aug 2023Oct 2023Nov 2023Dec 2023



We signed a licensing agreement with SK Geo Centric to build an advanced recycling plant in Ulsan, South Korea, using our technology.



Spring saw Plastic Energy take part in a Groundbreaking ceremony for our Grandpuits plant in France.



Together with SABIC, Siemer and Landbell, we signed a feedstock agreement for the SABIC Plastic Energy Advanced Recycling Unit in Geleen, the Netherlands.



In August, we commissioned a new pilot plant at our Research & Development lab in Loughborough University, UK.



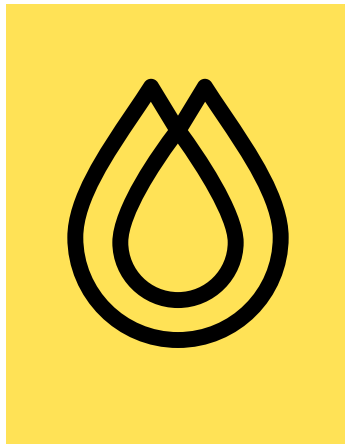
A licensing agreement with Petronas will see them use our patented technology at Asia's largest chemical recycling plant in Pengerang, Johor.



Plastic Energy signs a Memorandum of Understanding with SK Geo Centric for an advanced recycling plant project in South Korea.



Plastic Energy ends the year with a groundbreaking ceremony alongside SK Geo Centric for a recycling plant in Ulsan, South Korea.



Plastic Energy at events

JAN 2023

Brussels

Cleantech for Europe Summit

MAY 2023

Amsterdam

Plastics Recycling Show Europe in Amsterdam

SEP 2023

Brussels

Chemical Recycling Europe conference in Brussels

OCT 2023

Jakarta

ASEAN Flexible Packaging Summit in Indonesia



Plastic Energy in the Press

We were mentioned in 204 pieces of news coverage during 2023.

Key highlights:



Plastic Energy Awards

Plastic Energy won several awards in 2023, including:

- The Leicestershire Live Innovation Awards (in the sustainability category)
- We also won the Environmental Packaging Awards, as well as the Dow Packaging Awards, alongside Heinz for a sustainable packaging collaboration.



Chemical Recycling Policy Landscape

Mass Balance

Mass balance accounting for chemical recycling expected to be agreed.

The EU is expected to adopt mass balance accounting for chemical recycling in 2024. The plastics supply chain at European level has coalesced around a consensus on the fuel-use exempt mass balance model. This option is in line with the EU's recycling definition and will help scale up the supply of chemically recycled plastics to reach the 2030 recycled content targets which are mandatory at EU level for all types of plastic packaging.

An EU wide mass balance accounting framework will have a positive influence on the long-term possibilities of chemical recycling in Europe by further unlocking investment potential. The EU has a unique opportunity to lead the world in chemical recycling and innovation, and to implement the first global mass balance accounting in legislation. The UK and other countries are also considering adopting similar legislation in a bid to scale up chemical recycling, alongside established technologies like mechanical recycling.



Recycled Content Targets

EU adopts mandatory recycled content targets for plastic packaging

In April 2024, the EU reached an agreement to adopt the Packaging and Packaging Waste Regulation (PPWR). This is a large and complex legislative file with a significant impact on the EU packaging market. It contains ambitious provisions aimed at both countries and companies that will reform the plastic packaging market and incentivise more recycling, including through chemical recycling. The measures are focused on reducing the amount of packaging waste produced and setting re-use provisions. It also includes restrictions for certain types of packaging applications, rules for mandatory recycling design, as well as recycled content targets for plastic packaging for 2030 and 2040. These will further stimulate demand for chemical recycling alongside mechanical recycling.

The PPWR file will begin its implementation and enforcement gradually from next year after the new EU Parliament is invested. A vote, that is largely expected to greenlight PPWR's entry into force,

will take place towards the end of 2024 by the new EU Parliament. Other more detailed implementation steps, needed to enact the rules agreed in the regulation, will be decided in the coming years by the EU institutions through secondary legislation.

As part of the PPWR, mandatory recycled content targets have been set across all plastic packaging types. These include contact-sensitive packaging, which has targets of 10% by 2030 and 25% by 2040. This category is especially salient for chemical recycling, as currently it is not possible for mechanical recycling to meet the requirements for recycled polyolefins for contact sensitive applications due to contamination issues and the quality needed for recycled plastics. The targets are a mandatory minimum for all plastic packaging placed on the EU market and will drive demand for chemical recycled content in plastic packaging.





The Global Plastics Treaty

A global plastics treaty is shaping up at the United Nations level

The UN mandate to reach consensus on the scope of the global plastics treaty is nearing its deadline this year. Countries have until the end of 2024 to agree on a common approach for how the treaty will seek to address plastic pollution across the world. This is a unique opportunity to harmonise rules at a global level and strengthen countries' efforts on plastic pollution alongside already existing national measures. An ambitious framework of measures at a global level combines voluntary and mandatory rules alongside plastics lifecycle according to the different capabilities and needs that countries have.

When it comes to end-of-life management, a technology neutral framework with a level playing field to accommodate all recycling technologies will be crucial to unlock the technical capabilities needed to scale up recycling globally. Currently, only 9% of plastics worldwide are being recycled and this needs to dramatically change if we are to keep in line with the Paris Agreement goal to limit global warming to 1.5 °C. Other measures will also be needed, including provisions to incentivize re-use, adopt recycled content targets, and implement extended producer responsibility schemes.



Plastic Energy Industry Participation



We are a founding member of Chemical Recycling Europe, an association of chemical recycling providers. Our Founder and Chairman, Carlos Monreal, is the President of CRE, and our Head of Policy and Sustainability, Adela Putinelu, is the association's Policy Lead.



We are a founding member of Cleantech for Europe, a European coalition of cleantech scale-up companies operating critical decarbonisation technologies. Cleantech for Europe is also part of Breakthrough Energy, a group of clean energy organisations, supported by philanthropist Bill Gates.



We are part of the British Plastics Federation's Recycling Group. BPF is the UK's largest plastics trade association.



We are signatories of:

WE SUPPORT



*Global
Commitment*

UN Global Compact and Ellen MacArthur Foundation

We are a signatory to the Ellen MacArthur Foundation's (EMF) Global Commitment, and the UN Global Compact (UNGC).



Plastic Energy's locations

1. United Kingdom
2. Spain
3. France
4. Netherlands
5. Malaysia
6. Singapore
7. South Korea



Our Sustainability Strategy



Our sustainability commitments

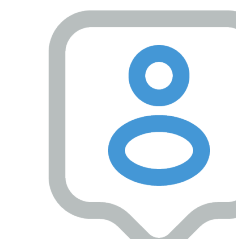
Sustainability is at the heart of what we do. We are committed to integrating ESG principles throughout our company and seek to apply these principles across our operations by:



Acting responsibly, with respect for the environment and decarbonising the plastics value chain



Complying with the law, wherever it applies, including health, safety, environmental and social legislation, plus aligning with industry best practice



Respecting human rights, enforcing the prohibition of slavery and child labour



Providing a safe and healthy work environment



Acting with integrity, transparency, and accountability in our management structures, policies and processes



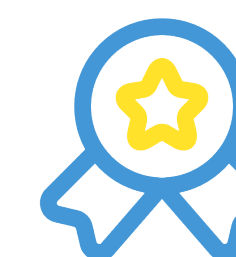
Promoting diversity and inclusion, and practising non-discrimination in the recruitment process, and at all levels of the organisation (employees, boards, committees, etc.)



Taking into account ESG risks when evaluating potential stakeholders or business partners



Conducting business in an ethical and socially responsible manner



Being a responsible member of the communities in which we operate





Our Vision

- Contribute to the creation of a circular economy for plastic by diverting plastic waste away from landfills, incineration and our oceans
- Reduce the dependence of countries on fossil fuels
- Support countries to reach recycling targets, reduce the CO2 footprint of plastic production and end-of-life, and reach international sustainability goals
- Boost local economies and communities through the creation of new jobs

Our Mission

- Play a significant role in solving the global plastic problem
- Be world leaders in chemical recycling
- Scale up our technology globally



UN Sustainable Development Goals (SDGs)

Plastic Energy supports the UN SDGs.



SDG 13 – Climate Action

Chemical recycling supports climate action goals by reducing GHG emissions when compared to current disposal alternatives, such as incineration. It also reduces the high risk of environmental leakage and unsustainable approaches associated with landfills and dumpsites.



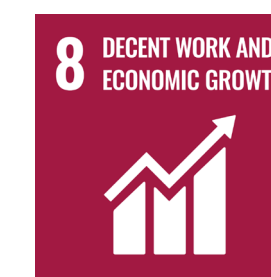
SDG 12 – Responsible Production and Consumption

We have supported education on the power of circularity and the need to make the most out of our planet's resources through promoting a circular economy of plastics.



SDG 9 – Industry, Innovation, and Infrastructure

We are demonstrating how the power of technology can contribute to solving the plastic waste problem through local recycling solutions.



SDG 8 – Decent Work and Economic Growth

The development of each plant directly creates local jobs, as well as indirectly creating jobs in the surrounding areas (logistics, construction, transport etc.). This will bring social and economic benefits to society.



SDG 14 & 15 – Life Below Water and on Land

Through the implementation of chemical recycling and the reduction of plastics entering the sea and land, we aim to help keep natural habitats clean and pristine.



SDG 3 – Good Health and Well-Being

Reducing plastic mismanagement and land/water pollution leads to improved well-being and health, giving greater access to clean water and natural environments. As we develop plants in emerging markets, notable social benefits will include the formalisation of the waste management sector and the associated social, economic, and health benefits.



Safety

Health and safety at our plants

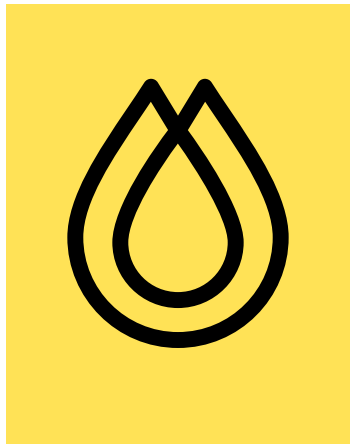
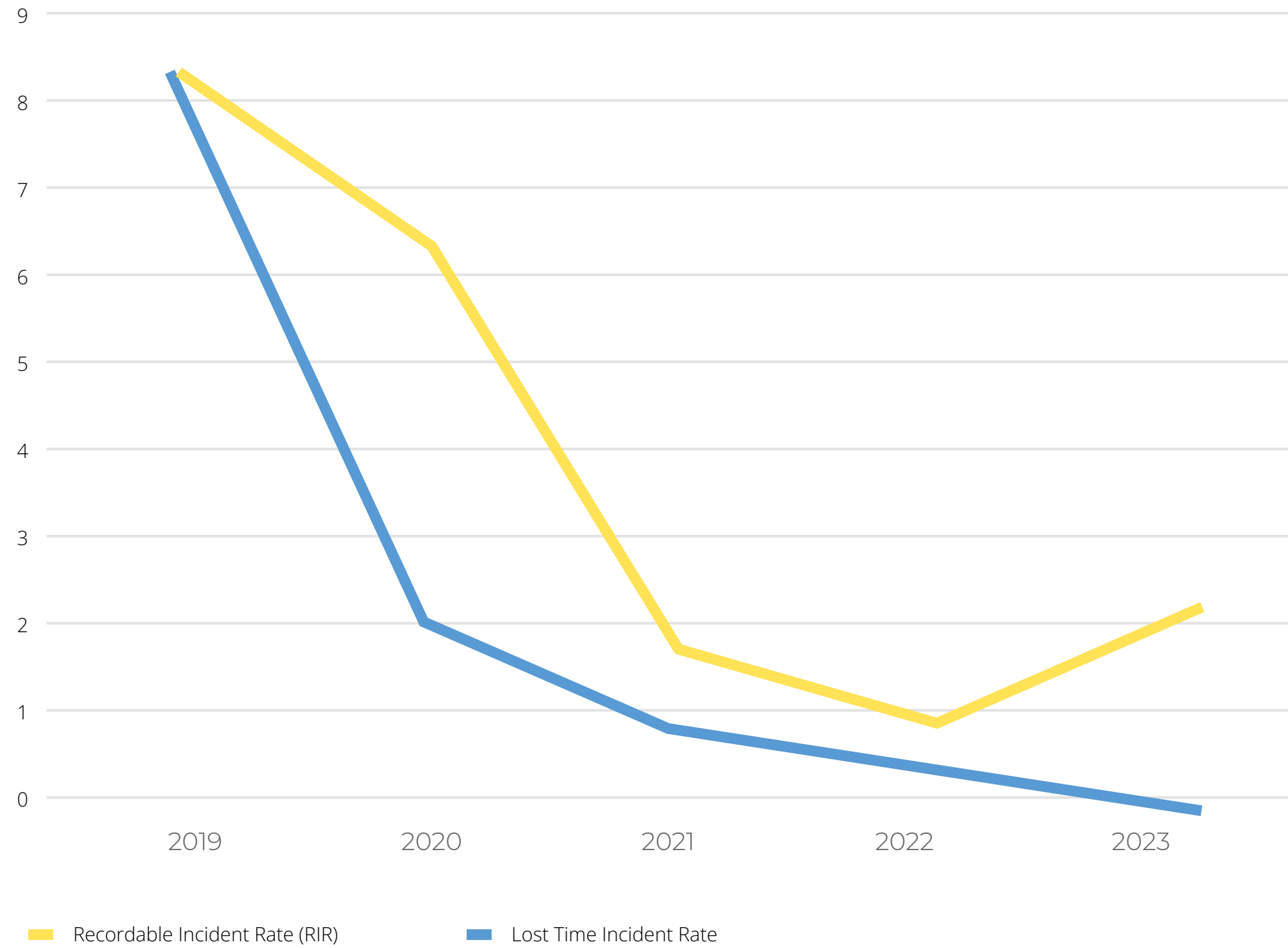
Our Health and Safety performance continued to improve throughout 2023. In 2022, the *Plan Engage* programme was introduced to reinforce safety awareness, and to anticipate and mitigate potential risks at our plants.

By 2023 further participation in the *Plan Engage* programme significantly increased the number of leading indicators being reported. These included *Plan Engage* 'Walks on Site' and 'Hazard Reporting'. The improved level of engagement with the programme has enhanced the safety culture in our plants. As a result, 2023 was the first year we achieved an OSHA lost time incident rate of zero.



OSHA statistics

	2019	2020	2021	2022	2023
Recordable Incident Rate (RIR)	8.29	6.36	1.71	0.95	2.16
Lost Time Incident Rate	8.29	2.12	0.85	0.47	0



Planet

Technology



TACFILLER

This year we brought TACFILLER to the market

As part of our TAC™ process, we recover fillers present in waste plastic. We have used these by-products to create a mixed mineral and carbonaceous product called TACFILLER.

It is now commercially available to rubber and plastic companies as a lightweight reinforcing filler for their products. Our tests have demonstrated it has the ability to act as a substitute for a portion of carbon black in rubber compounds.

TACFILLER creates a unique opportunity for rubber and plastic manufactures to replace fillers - made of virgin mineral and carbon black - with a recycled material.



Digital

Automation further optimising processes

Over the last decade, our in-house team of automation engineers have been meticulously developing a smart operating system to match our physical plants.

This helps to provide real-time insights, so operators can assess and improve the activity of their plants.

Part of this digital platform includes services to track waste plastic feedstock as it makes its way through the TAC™ process, to provide traceability for our final TACOIL™ product.



Water

Creating a plant with no liquid discharged

Our team of process engineers have been working on wastewater optimisation over the past year, with the goal of achieving a zero liquid discharge system.

This is particularly challenging as the water used throughout our process varies greatly in its composition.

We have been working with external partners to develop a flow scheme which is adaptable enough to handle these changes, while still meeting our zero liquid discharge goal.

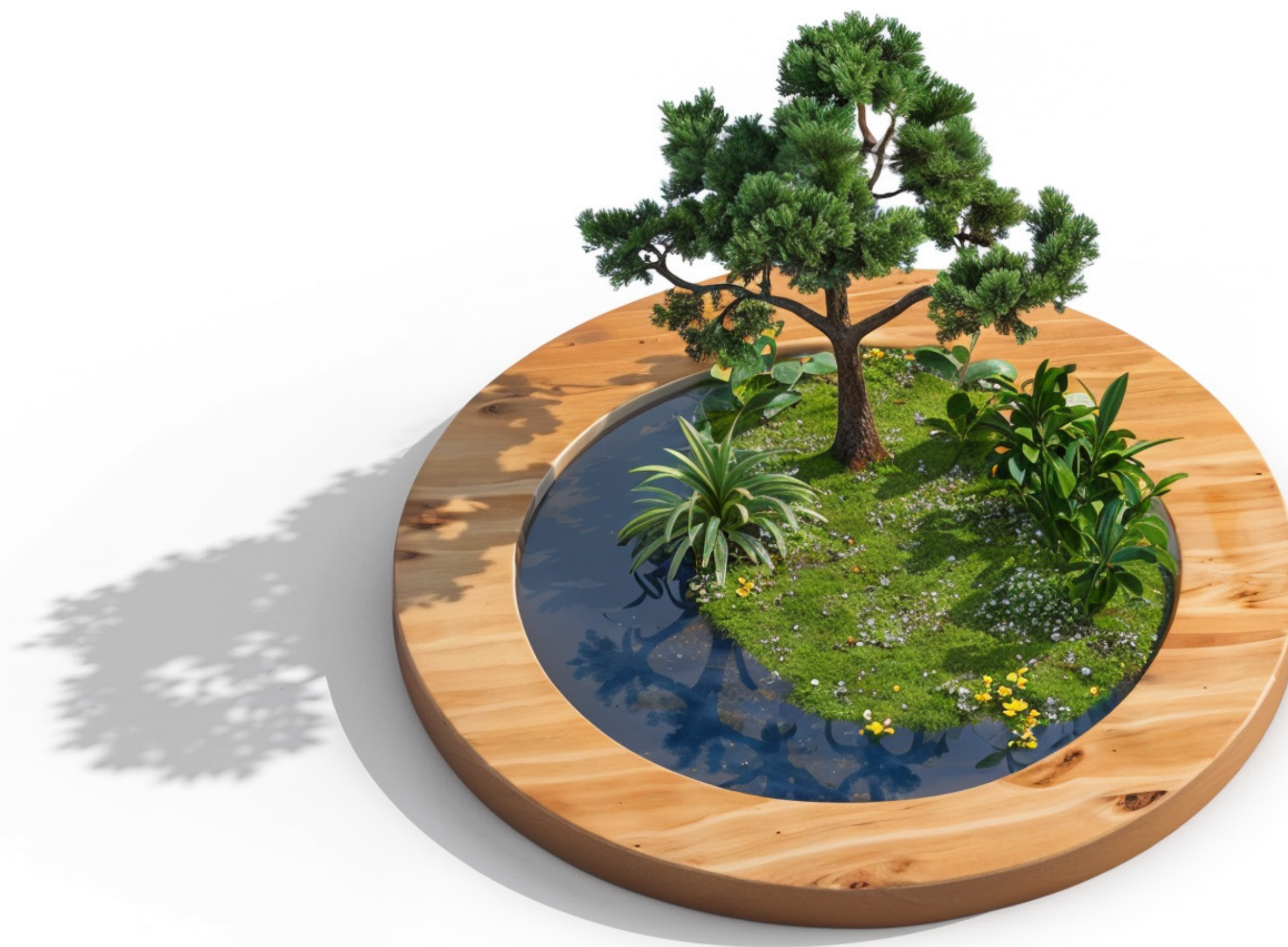
We are working on improving the cost and efficiency of methods to combine, treat and reuse the wastewater within the plant.



Environment

We are dedicated to the realisation of a circular economy. We want resources to remain in circulation, valorise plastic waste for the production of new plastics, and minimise the use of virgin resources. Ultimately, this will result in the reduction of both carbon emissions created by the plastic value chain, and physical leakage into the environment.

We process post-consumer plastic waste to produce a feedstock used by petrochemical companies to create plastics for food-contact plastic applications. We seek to continually lower the impacts from our operations related to natural resources, including energy use, water consumption, and waste generation.



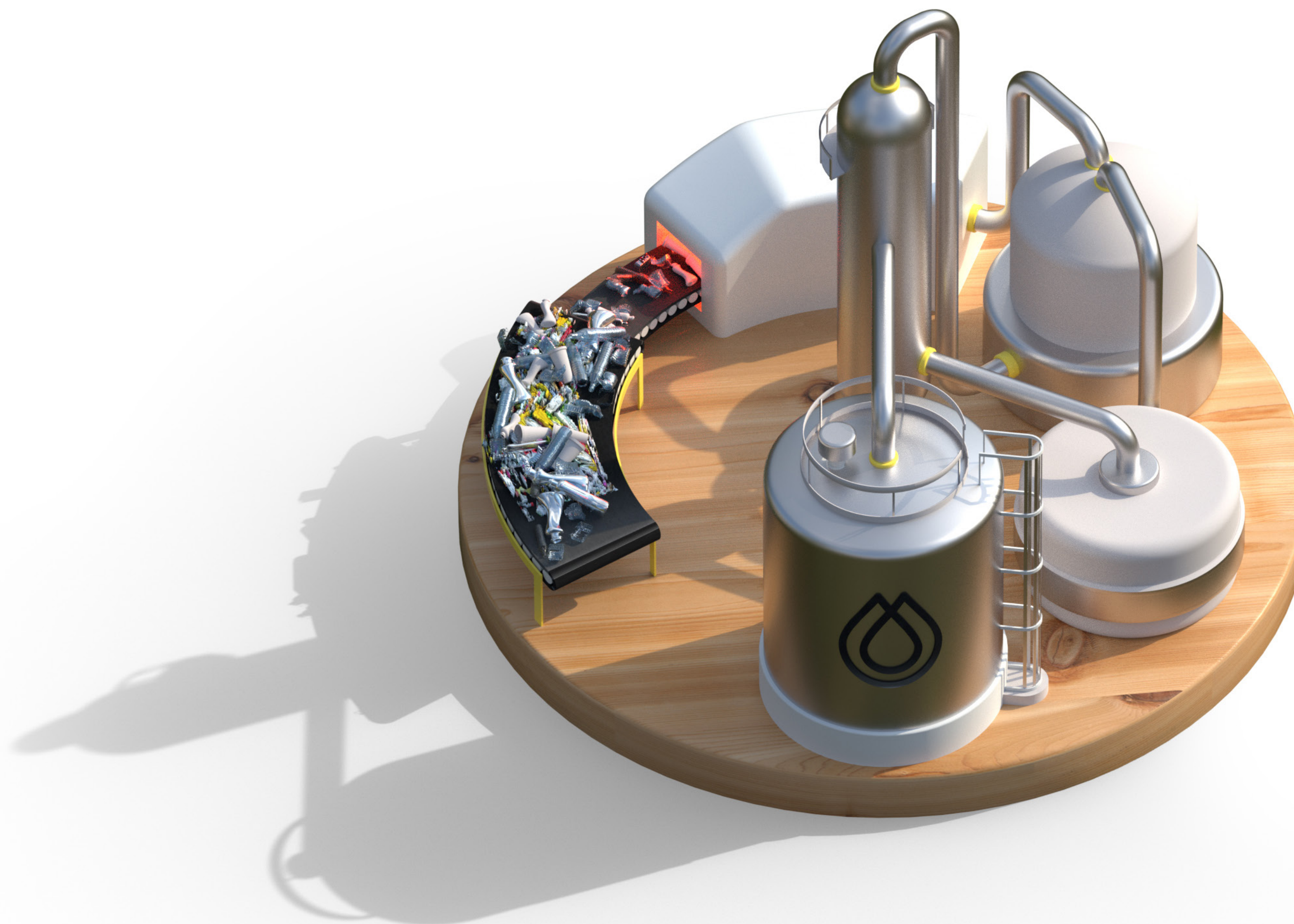
Life Cycle Assessment (LCA)

In 2020 we contracted the independent sustainability consultancy, Quantis, to undertake a full Life Cycle Assessment (LCA) of our recycling process. The report was critically reviewed and followed the ISO 14040/14044 standards.

The report found our technology's climate change impact was significantly lower than incineration with energy recovery when treating mixed plastic waste. The report showed that plastic manufactured with our TACOIL™ had a lower climate change impact compared to virgin plastic production.

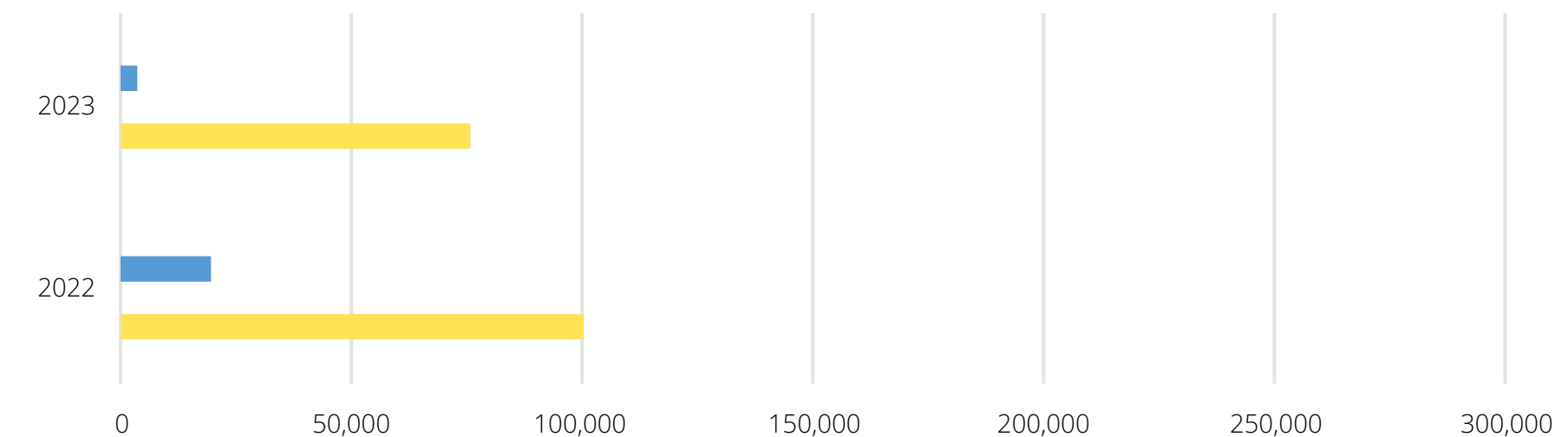
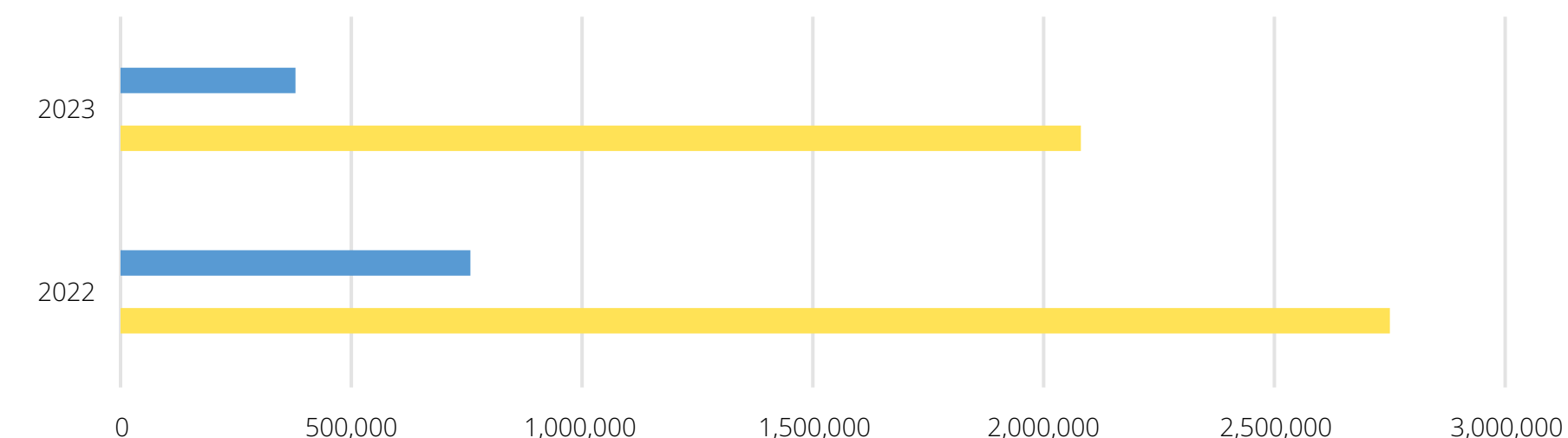
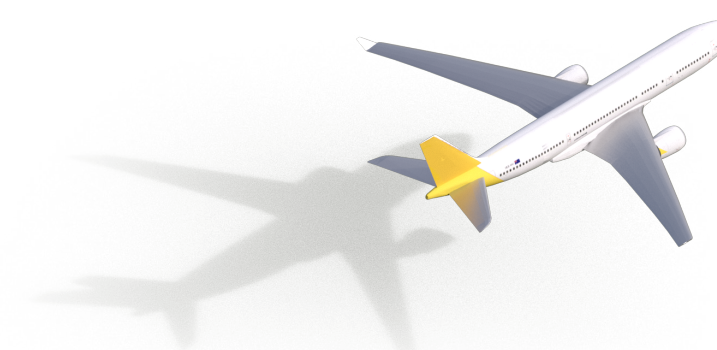
The report also found that additional GHG savings would be achieved with an increased shift towards more renewable energy options across the average European energy mix. As electricity grids will gradually decarbonise, our production footprint will decrease over time.

As our technology has scaled up and continued to evolve, we are undertaking a second Life Cycle Assessment using our latest technology data. This will assess the differences in environmental impact and help us to understand where and how we can reduce emissions further.



Employee travel emissions

We encourage our employees to opt for lower carbon travel options where possible – with incentives for upgraded class of travel if travelling by train – and to travel only where necessary. Compared to 2022, 2023 saw a general decline in distance travelled and carbon emissions from employee travel on airplanes and trains across the year.



Distance travelled (km) Carbon emissions (kgCO2e)



People

Employee engagement

We have continued to use our internal communications channels to share and celebrate employee news and achievements. Externally we have begun a “Meet the Team” series on our social media channels, which showcases the work of different employees across the company and highlights the valuable contribution each of their roles bring.

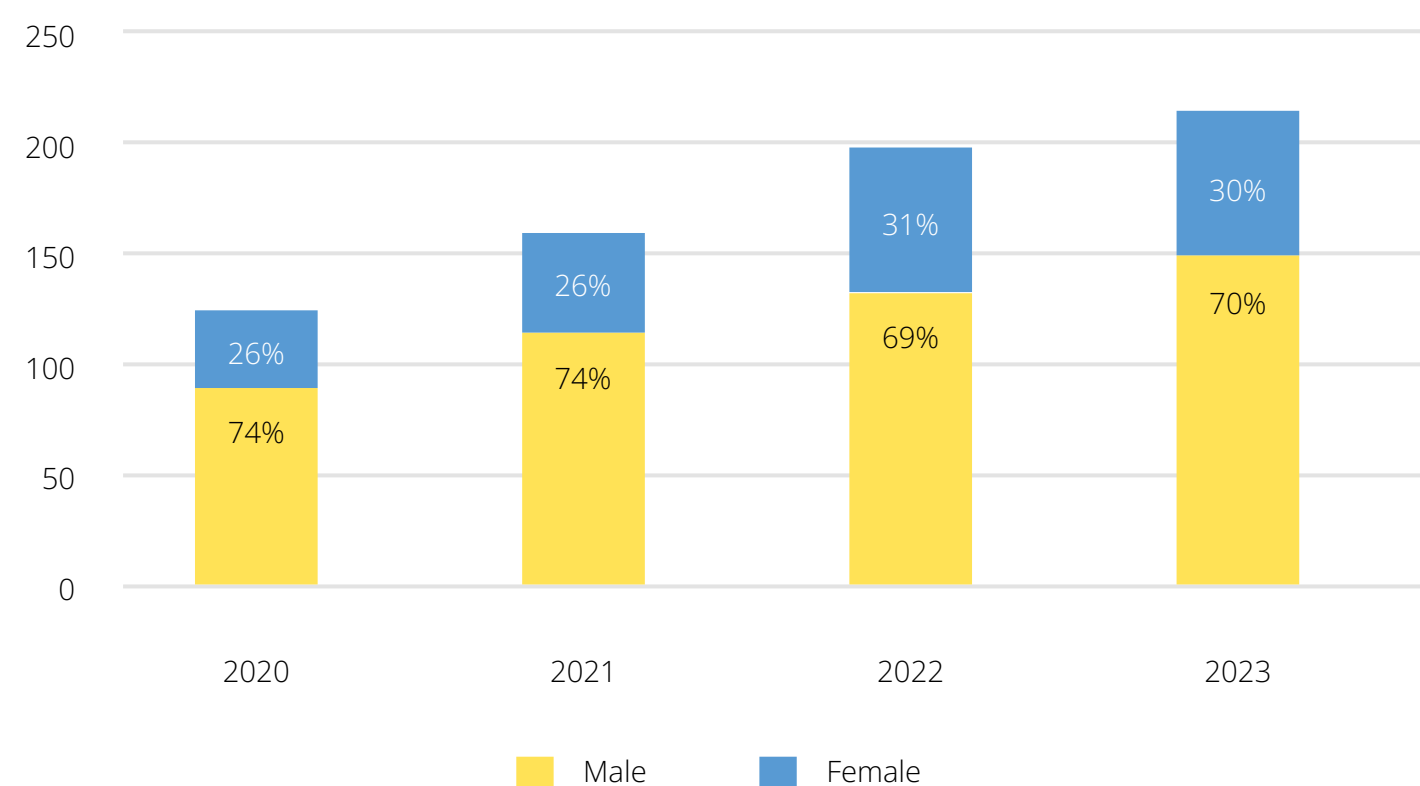


Diversity

We embrace and value diversity in all forms. Equal opportunity is integral to our recruitment process. We aim to develop a community of diverse talent, working in an environment of mutual respect, fairness and equality.

We are striving to close the gender gap between our employees who identify as male or female, especially in an industry where the proportion of males is typically higher.

Gender diversity



Governance

Compliance



Anti-bribery and corruption

Working at a global level, preventing fraud, bribery and corruption is a priority for all levels of our organisation. This is evidenced by compliance being a fixed item agenda for all Board meetings and by the appointment of a group Compliance Officer.

There is a robust Anti-bribery and Corruption (ABC) policy which sets out the group's approach in relation to fraud, bribery, corruption, and sanctions. The ABC Policy applies to all Plastic Energy group companies, all employees, directors and those working 'for' and 'with' Plastic Energy.

The ABC Policy is complemented by the group's Gifts & Hospitality Policy, as well as a Whistleblowing policy with an external hotline.

Compliance training is provided to the Board of Plastic Energy Global SL, the Executive Committee and employees. Training is territory specific but provided by a reputable external law firm.

All investors and material customers, suppliers and partners are required to provide Know Your Customer (KYC) information, allowing us to assess anti-bribery and corruption and sanctions risks, which may include filling in a KYC Questionnaire requesting, for example, information regarding whether adequate policies are in place and details of any compliance breaches. Contractual requirements for compliance with anti-bribery and corruption laws are also included in all key contracts. In addition, robust provisions covering compliance with applicable sanctions laws and rights arising in the event a party, or its related parties, become sanctioned, are included in contracts with suppliers and other partners.

We seek the advice of external law firms and compliance specialists as and when required.

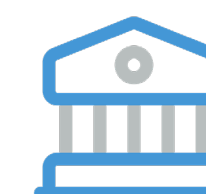




Data protection

We follow strict cyber risk and data protection policies to ensure the personal data of our employees is processed fairly, lawfully, and transparently. Our policy abides by the relevant data protection regulations for the jurisdictions in which we operate. We are also certified to the Cyber Essentials standard.

With external suppliers and customers, our agreements require compliance with data protection law where relevant.



Tax

With operations and offices across the UK, Europe and Asia, we have a dedicated Head of Tax. They are responsible for ensuring we comply with relevant taxation obligations, accurately account for taxes when due, and carry out tax planning.



Supplier engagement

To achieve our vision of a sustainable plastics value chain, we have developed a Supplier / Licensee Code of Conduct that sets out the principles and commitments required of our suppliers and licensees as part of a business transaction with us. One of the central principles of the Code is to ensure that those we contract with respect the human rights of all people, with regard to the UN Guiding Principles on Business and Human Rights, along with other internationally established Principles.

Under the Code, those who agree to abide by the Code are responsible for ensuring that they, their employees, officers, directors, and any subcontractors comply with the standards set out in this Code. The Code also asks that every signatory ensures their suppliers, contractors and business partners, participating in the delivery of products or services to Plastic Energy, also comply with the Code. The Code is incorporated in our licensing agreements as part of the standards that our licensees sign up to and we are now looking to roll this out across our procurement processes for suppliers.



Looking ahead



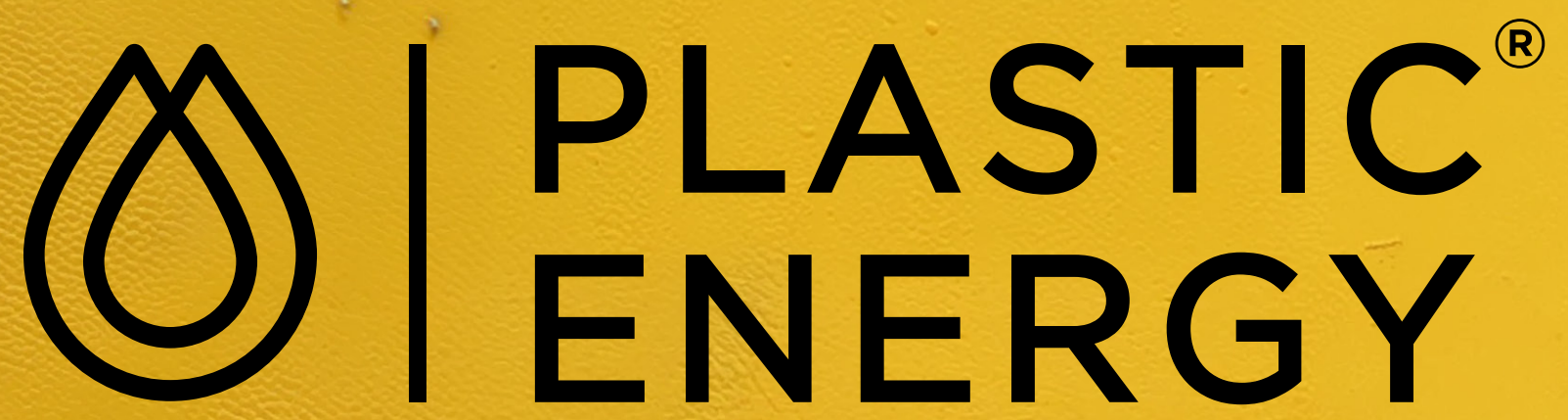
Seven years after we started operations at the world's first commercial scale chemical recycling plants, it is exciting to see this technology becoming formally integrated as a key solution to help achieve a circular economy of plastics.

In 2023, we saw an increase in the number of policies setting higher plastic packaging recycled content targets, providing a clear incentive for the recycling market to scale up. The ongoing development of the Global Plastics Treaty towards a global framework to tackle plastic pollution will harmonise rules for using plastics more sustainably. As the need for global recycling infrastructure grows, the number of chemical recycling projects being developed across the world is increasing to meet a higher demand of recycled polymers.

Plastic Energy is committed to meeting the market demand for recycled polymers in the most sustainable way. As a young business, early on our sustainability journey, we recognise that there is still more work to be done. We are working on improving the quality of our sustainability reporting to enable greater transparency and accountability towards our stakeholders.

In the meantime, we will continue to hold ourselves to the standards detailed throughout this report, with voluntary annual disclosures to provide transparency.





Contact

 info@plasticenergy.com

 plasticenergy.com

 [Plastic Energy](https://www.linkedin.com/company/plastic-energy)

 [@plasticenergy](https://twitter.com/plasticenergy)

 [@plasticenergyrecycling](https://www.instagram.com/plasticenergyrecycling)

