



True Purpose

Sustainability Report 2022

[Start reading](#)

Message from our CEO



Peter ter Horst
CEO Teijin Aramid

Finding true purpose

This year's sustainability report, with the theme "true purpose", draws inspiration from the Japanese concept Ikigai. Ikigai is about finding the purpose or reason for being that brings meaning and fulfilment to one's life. It encompasses four elements: what you love, what you are good at, what the world needs, and what you can be paid for.

At Teijin Aramid, we discover and pursue our true purpose by aligning our work and strategy with the broader needs of society. In doing so, we hope to foster meaning and purpose for our employees, customers, and partners. We aim to apply our core competencies and strengths to address global sustainability challenges, including climate change. This report explains how we achieve this by integrating sustainability into our processes and products.

We understand that it's crucial to look beyond purpose and take responsibility for the environmental impacts of our production facilities and aramid-based products. This report presents our roadmap for reducing, avoiding, compensating for, and ultimately negating these effects.

A handwritten signature in white ink, appearing to read 'P. ter Horst', written over a dark background.

Peter ter Horst
CEO Teijin Aramid

Ikigai

[Previous page](#)

TEIJIN

[Next page](#)

In this report

1 | Roadmap

4 | How we operate

2 | Progress and target

5 | What we create

3 | Sustainability journey

6 | How we collaborate

[Download the report](#)

Impact 2022 in key figures



100%

Electricity consumption based on renewable wind GO's for all our manufacturing sites, research facility and Head Office in the Netherlands



28%

Twaron* improved carbon footprint compared to 2014.*



6.4

Total Recordable Rate (TRR) of incidents (number of incidents per 1 million working hours) in 2022. (4.7 in 2021) LTI frequency rate: 2.0 (LTI's per 1.000.000 worked hours), compared to 1.8 in 2021



2000

People on Teijin Aramid's total Global payroll in 2022



50%

Increased retrieval of pre- and post-consumer aramid waste compared to 2021



248000

tons of CO₂ avoided emissions in the chain.**



6.8%

The increase amount of non-virgin material used in pulp production compared to 2021.

* No changes compared to 2021

** The use of aramids in applications such as tires and conveyor belts makes these applications considerably lighter, consequently saving energy and other resources.

[Previous page](#)

TEIJIN

[Next page](#)

1. Roadmap

Finding our true purpose – moving beyond high-performance fiber products to a sustainable future for all

Purpose becomes practice: our roadmap to sustainability

At Teijin Aramid, we understand our role in the global effort to create a more sustainable future. This has been the driver behind our commitment to reduce our own environmental footprint and create sustainable aramid-based products.

We can best realize our goals in an ecosystem with others. That's why we've combined the strength and support of our suppliers, partners and customers to help us reach our goals.

Our roadmap for sustainability is designed to affect our whole value chain by:

- Reduce CO₂ emissions from our front-end processes
- Avoid CO₂ emissions in the use phase of our products
- Developing sustainable end-of-life solutions to reuse, recycle and extend the life of aramids
- Using renewable raw materials and our own recycling capabilities

Watch video: Sustainability Roadmap



"In the spirit of collaboration, we're working with our partners toward a fully sustainable and circular aramid chain."

Peter ter Horst – CEO, Teijin Aramid

[Previous page](#)

TEIJIN

[Next page](#)

2. Progress and target

Towards net zero 2050



All our plants run on
100%
renewable and clean energy



All our plants run as energy efficiently as possible



We produce aramids based on
100%
renewable carbon only



Our internal and external loops are fully closed



We excel as a partner in the clean hydrogen economy, offering high-performance materials and solutions

Progress and targets

	Progress 2022*	Target 2025	Target 2030
Renewable electricity	100%	100%	100%
Renewable heat	-	40%	50%
Renewable carbon	-	10%	25%
Eco footprint kg CO₂ eq/kg	8,7	7	6
Avoided CO₂ emissions / Total emissions	-	50%	100%

*The appendix presents detailed information on the progress made in 2022.

Previous page

TEIJIN

Next page

3. Our journey

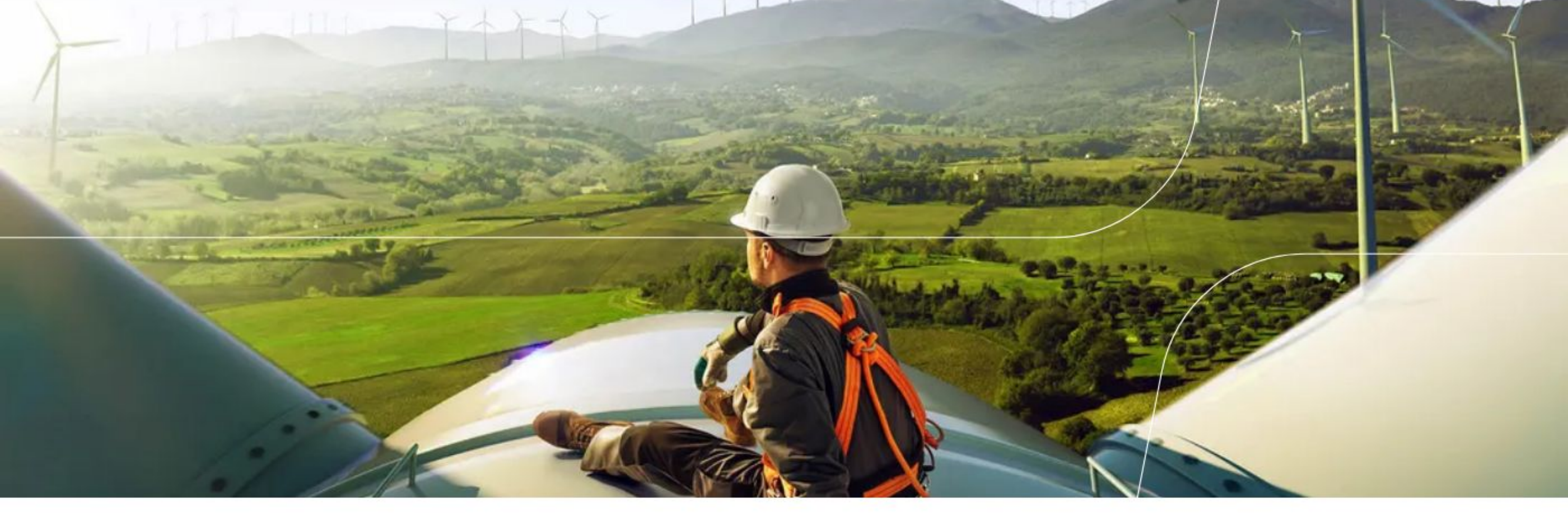
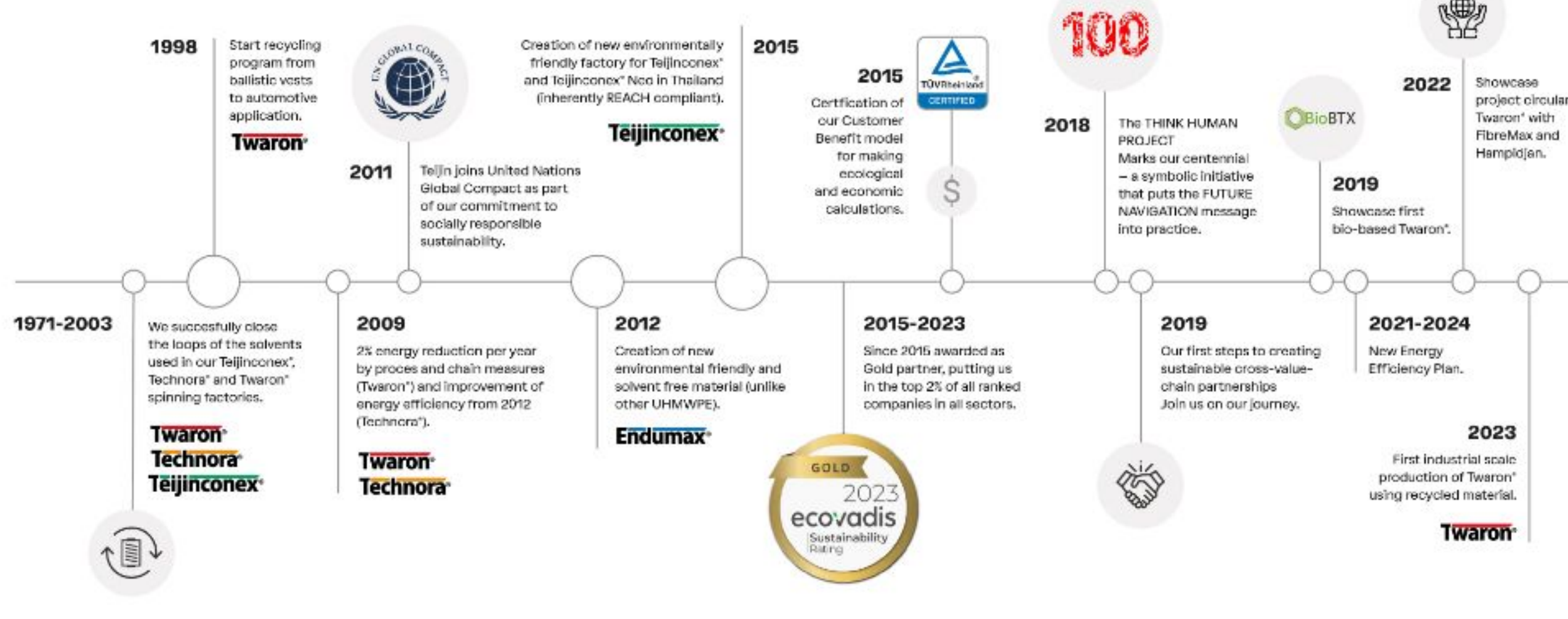
Sustainability journey

We started at the core, with our own practices, processes and culture. Subsequently, we invested in minimizing our carbon footprint and implementing renewable energy technology. Our focus is on product sustainability and practices that drive a circular economy.

Go directly to

[Closing the circularity loop](#)

[Partnering for circularity](#)



Our vision

Our vision is for a circular economy that includes both carbon neutrality and high product performance. The keys lie in circularity and in the transition to renewable raw materials and energy.

Teijin Aramid leads in this field with an Energy Transition & Circular Economy (ET&CE) team dedicated to achieving 'close to zero' waste and circularity well before 2050, as outlined in our Sustainability Roadmap.

By prioritizing efficient and sustainable production methods and supporting initiatives for renewable raw materials, we're taking the necessary steps toward a more sustainable future. We also take responsibility for our material flows by recycling aramids and repurposing end-of-life products.



"Diversity fuels the innovation that drives our energy transition and sustainable product development. Embracing inclusion empowers every voice to contribute to a brighter, more sustainable future for our planet."

Jan Roos – Director Energy Transition and Sustainable Development, Teijin Aramid

We need an ecosystem to succeed

Achieving aramid circularity is complex. It needs time and collective effort to resolve. We believe partnerships throughout the value chain are essential to achieving this goal.

One driver of such partnerships is the Teijin Environmental Solution Innovation Center (ESTIC) in Arnhem, the Netherlands, alongside Teijin Aramid's Research and Innovation Center (RIC).

RIC is grounded in cutting-edge science and focused on developing safe and sustainable solutions that offer an improved environmental footprint while delivering exceptional performance and value.

Closing the circularity loop

Leading the change to circular aramid production

Sustainable production is essential, and so are our high-performance aramids. Because we're set on becoming a net-zero company, we aim to produce zero waste and become CO2 neutral through circular production processes for all four of our products – Twaron®, Teijinconex®, Technora® and Endumax®.

[Watch video: Recycling methods](#)



Investment in recycling technologies

We're investing in research and technologies to scale up our existing recycling routes:

- Route 1:** For over 20 years, Teijin Aramid has a successful record of mechanically recycling end-of-life para-aramid products to pulp. Efforts in mechanical recycling of meta-aramids focus on recovering and recycling end of life materials to staple fiber blends with virgin and recycled content.
- Route 2:** Our Research and Innovation Center (RIC) had successful yarn-to-yarn pilot trials. Now we are moving to commercial production. For meta-aramid, the prove of principle has been done at research scale.
- Route 3:** Chemical recycling, also known as depolymerization, means breaking down the aramid polymer molecules into small chemical building blocks. We then reintroduce these into our polymerization factory to produce new polymers. Another alternative is to use bio-based raw materials or recycled plastic produced by our suppliers as building blocks. The ultimate goal is to replace all fossil-based resources with sustainable ones.

Partnering for circularity

Partnering for circularity means building alliances in product redesign, take-back logistics and prepping the materials for recycling.

Recycling: Aramid is too good to waste

Building successful Sustainable Value Chain Alliances (SVCA) means connecting all business partners, from customers to end-users and recycling hubs.

CONTACT us if you would like to join our recycling efforts: recycling@teijinaramid.com

Recycling hubs are crucial for the raw material supply of our recycling plant, from sourcing to the preparing the material for production again.

Long-term contracts with these hubs create stability in quality and supply. In addition, by increasing the intake of end-of-life material, we reduce waste and lower our carbon footprint. Together with our partners, we've already increased the intake of end-of-life aramid material by 50% compared to 2021.

Join us today

We're looking for partners to join us in our sustainability purpose, who can prepare to aramid waste in their new life.



Go directly to

Energy efficiency, sustainable energy

Raw materials transition

Purposeful transparency

Diversity and Inclusion

Ethical Commitments

4. How we operate

Operating with excellence

Safety first

We launched our global Safety First program in 2022 to ensure that safety is even more firmly embedded in our organizational culture. Keeping our employees safe at work is an essential aspect of our true purpose. The program strives to elevate our safety standards and ensure that this passion is reflected in our behaviour.

- ✓ Safety is our top priority. Our life-saving rules always prevail.
- ✓ We stop working when it is unsafe.
- ✓ We comply with our rules and agreements.
- ✓ We lead by example.
- ✓ We report unsafe situations and help to resolve them.

We improved our QHSE policy

The Safety First Global campaign began by improving the content and awareness of our Quality, Health, Safety and Environment (QHSE) Policy, which sets high standards for our way of working.

Our QHSE policy

Our QHSE Policy

We supply safe, reliable and durable products to our customers that meet the agreed specifications.

We comply with laws and regulations.

We use our QHSE system to identify and manage risks and learn from our mistakes.

Health & Safety

We take care of each other and ensure a healthy and safe workplace.

We encourage a safety culture in which open communication, mutual trust, feedback, ownership, respect and care for each other are important characteristics.

We work according to agreed standards, regulations and specifications.

We ensure through training that everyone can work safely and responsibly and can continue to learn and grow.

Environment

We contribute to sustainability and circularity and prevent negative consequences of our activities on people and the environment.

We are transparent about our QHSE goals and performance and discuss these both internally and externally.

We are a good neighbor.



We spread awareness

The Safety First program kicked off with an awareness campaign to increase the visibility of and communication around incidents. A safety video, telling true stories about accidents that happened by the ones who were involved, was shown to all employees followed by discussions to encourage open communication. This enabled local Safety First teams to improve safety and safety awareness.

We provided risk-assessment education

The next campaign "Last-minute risk assessment" addressed our golden rule: Stop working when it is not safe. All managers now have a toolbox of resources to improve general knowledge on last-minute risk assessment for all work situations.

"Safety is not just a priority; safety is the basic condition for doing our jobs. At the end of the day, we must all go home safe."

Peter ter Horst, CEO, Teijin Aramid

Energy efficiency and transition to sustainable energy

Globally, 2022 was an eventful year with energy price increases reaching new heights. In this context, Teijin Aramid's true-purpose quest to deliver on our energy efficiency and transition plans came into even sharper focus.

[Read more](#)

The raw materials transition

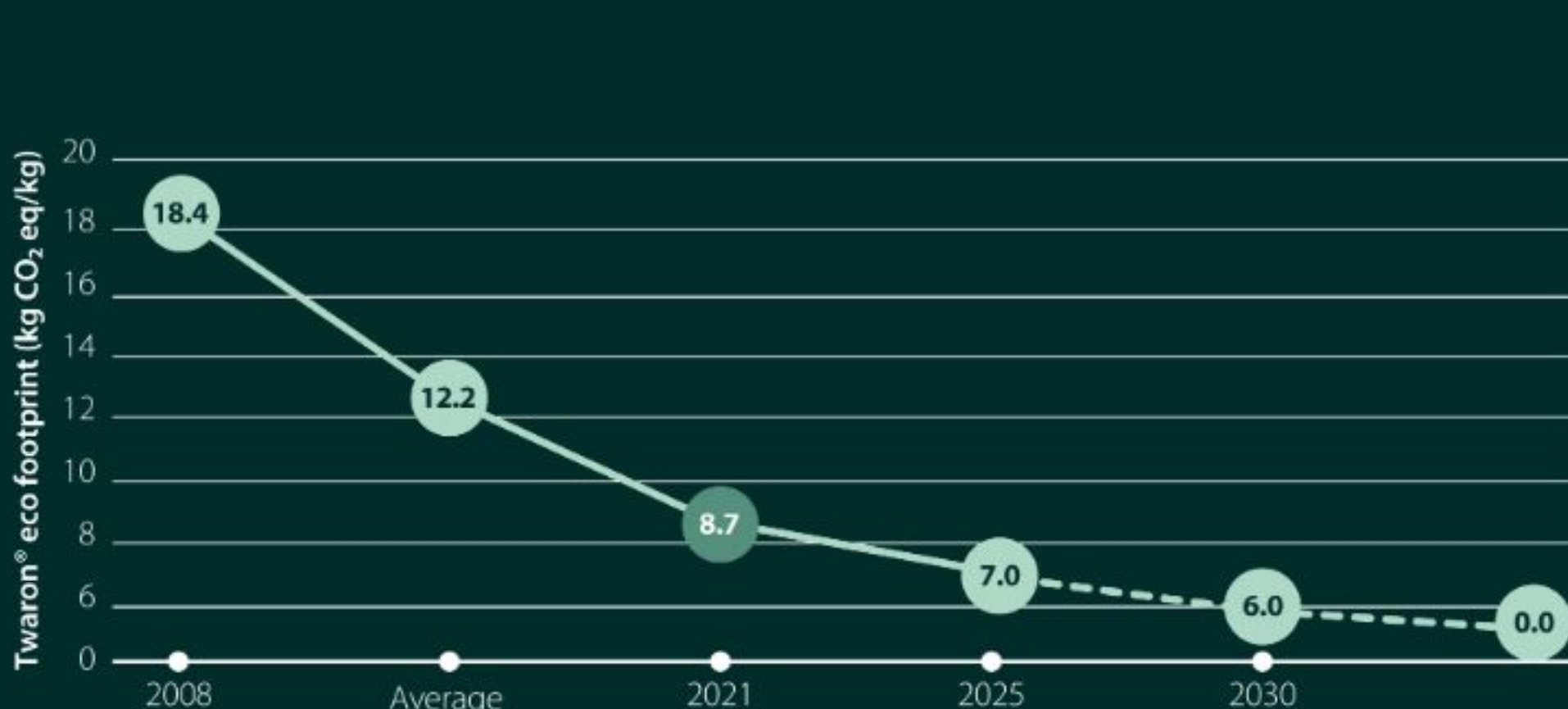
Achieving our sustainability goals can never be a solo journey – partnerships and collaboration are essential. This means our suppliers are crucial. They provide the raw materials we need to produce our high-performance aramids and, whilst fossil-based resources have been our primary feedstocks in the past, we are continuously looking for renewable alternatives to derive aromatic raw materials from sources such as biomass and plastic waste or recycled aramid products.

[Read more](#)

Purposeful transparency

A transparent aramid chain for Twaron®

In 2021, we launched our eco-datasheet for Twaron®. It explains the environmental impact of our products and services to our partners. As a step in our journey towards a fully sustainable and circular aramid value chain, the eco-datasheet includes recent calculations of Twaron's® carbon footprint measured in CO₂-equivalent units. It also includes information about its recyclability and compliance with current chemicals industry regulations and other leading environmental standards and assessments.

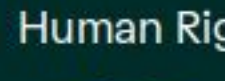


Our Life Cycle Assessment (LCA) study shows that Twaron's carbon footprint is steadily reducing and is now less than half of 2008. The LCA study was externally reviewed and conducted according to ISO standards 14040 and 14044.

EcoVadis-verified commitment

For the seventh year in a row, Teijin Aramid has achieved gold status in EcoVadis' sustainability assessment. This independent and objective assessment shows that we are in the top 2% of all ranked companies in all sectors. Teijin Aramid's overall score is 75 out of 100 points, with EcoVadis' assessments offering us objective insights and feedback we can use to strengthen our sustainability strategy.

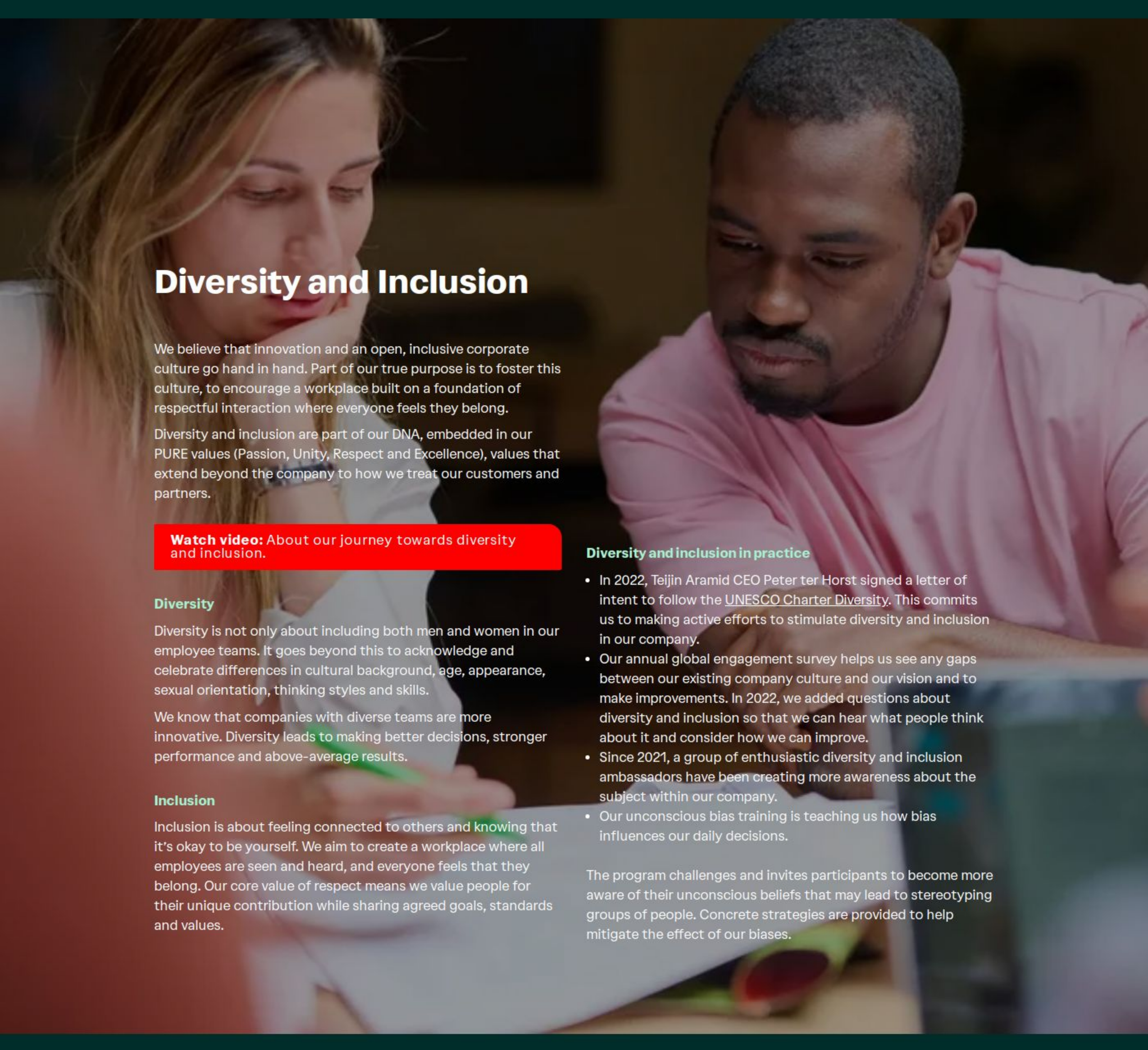
This remarkable achievement demonstrates our unwavering commitment to environmental protection and to strong ethical and social responsibility performance in areas such as Labor and Human Rights.



Science-Based Targets

The Science-Based Targets Initiative (SBTI) provides a clear path for enterprises to understand how much and how soon they must reduce their greenhouse gas emissions in order to achieve the Paris Agreement's goal of keeping the global temperature rise well below two degrees Celsius over pre-industrial levels. Teijin Group's new greenhouse gas emission targets have been verified by SBTi as helping to minimize climate change risks. Teijin Group is the first company in the Japanese chemical industry to be awarded this honor.

[Alignment with SDGs](#)



Diversity and Inclusion

We believe that innovation and an open, inclusive corporate culture go hand in hand. Part of our true purpose is to foster this culture, to encourage a workplace built on a foundation of respectful interaction where everyone feels they belong.

Diversity and inclusion are part of our DNA, embedded in our PURE values (Passion, Unity, Respect and Excellence), values that extend beyond the company to how we treat our customers and partners.

Watch video: About our journey towards diversity and inclusion.

Diversity

Diversity is not only about including both men and women in our employee teams. It goes beyond this to acknowledge and celebrate differences in cultural background, age, appearance, sexual orientation, thinking styles and skills.

We know that companies with diverse teams are more innovative. Diversity leads to making better decisions, stronger performance and above-average results.

Inclusion

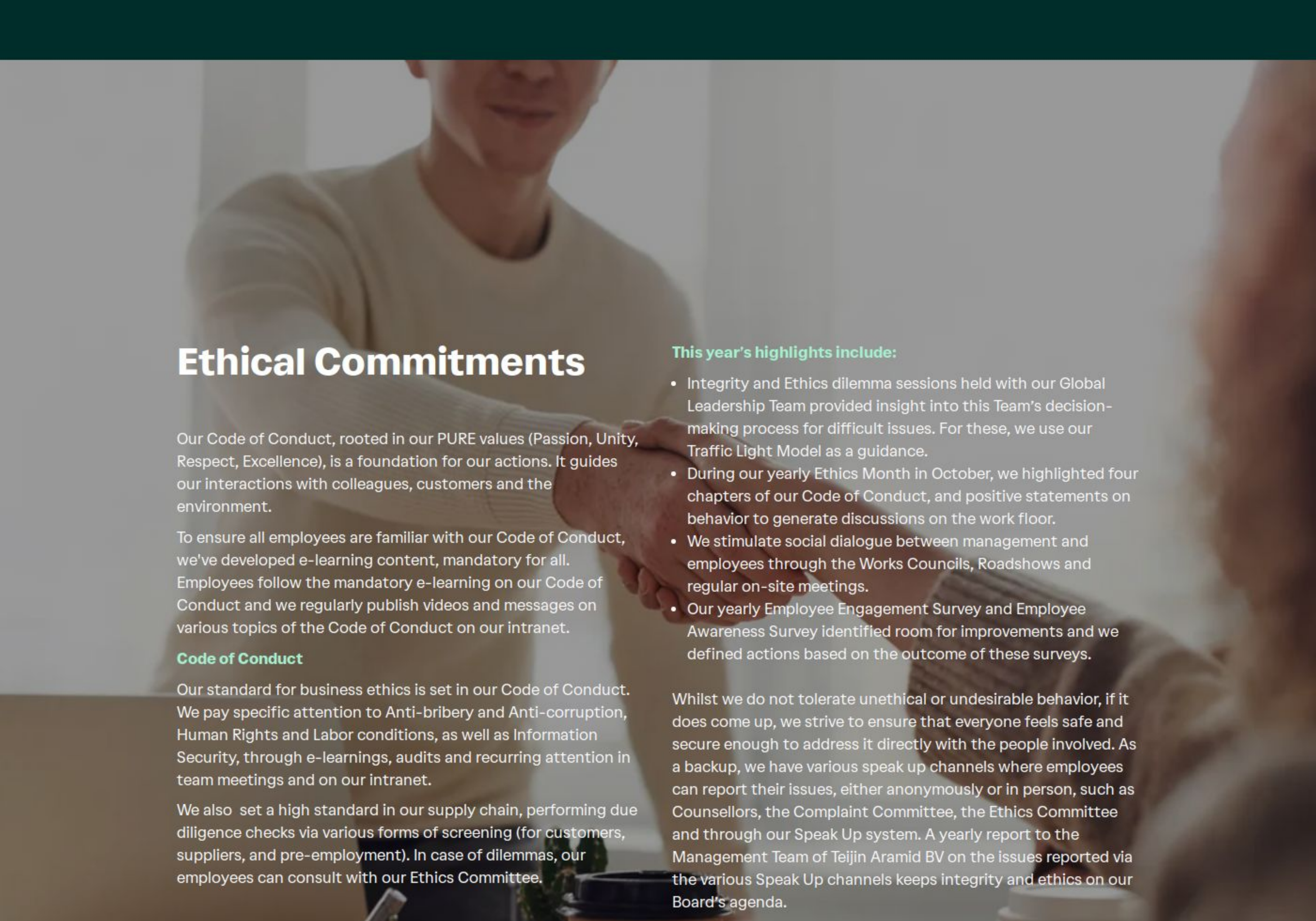
Inclusion is about feeling connected to others and knowing that it's okay to be yourself. We aim to create a workplace where all employees are seen and heard, and everyone feels that they belong. Our core value of respect means we value people for their unique contribution while sharing agreed goals, standards and values.

Diversity and Inclusion in practice

- In 2022, Teijin Aramid CEO Peter ter Horst signed a letter of intent to follow the [UNESCO Charter Diversity](#). This commits us to making active efforts to stimulate diversity and inclusion in our company.
- Our annual global engagement survey helps us see any gaps between our existing company culture and our vision and to make improvements. In 2022, we added questions about diversity and inclusion so that we can hear what people think about it and consider how we can improve.
- Since 2021, a group of enthusiastic diversity and inclusion ambassadors have been creating more awareness about the subject within our company.
- Our unconscious bias training is teaching us how bias influences our daily decisions.

The program challenges and invites participants to become more aware of their unconscious beliefs that may lead to stereotyping groups of people. Concrete strategies are provided to help mitigate the effect of our biases.

Diversity and inclusion are part of our DNA, embedded in our PURE values (Passion, Unity, Respect and Excellence), values that extend beyond the company to how we treat our customers and partners.



Ethical Commitments

Our Code of Conduct, rooted in our PURE values (Passion, Unity, Respect, Excellence), is a foundation for our actions. It guides our interactions with colleagues, customers and the environment.

To ensure all employees are familiar with our Code of Conduct, we've developed e-learning content, mandatory for all. Employees follow the mandatory e-learning on our Code of Conduct and we regularly publish videos and messages on various topics of the Code of Conduct on our intranet.

Code of Conduct

Our standard for business ethics is set in our Code of Conduct. We pay specific attention to Anti-bribery and Anti-corruption, Human Rights and Labor conditions, as well as Information Security, through e-learning, audits and recurring attention in team meetings and on our intranet.

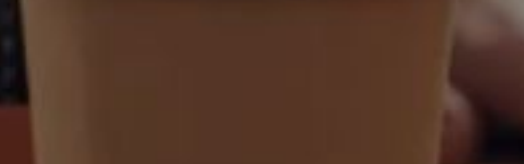
We also set a high standard in our supply chain, performing due diligence checks via various forms of screening (for customers, suppliers, and pre-employment). In case of dilemmas, our employees can consult with our Ethics Committee.

This year's highlights include:

- Integrity's Ethics dilemma sessions held with our Global Leadership Team provided insight into this Team's decision-making process for difficult issues. For these, we use our Traffic Light Model as a guidance.
- During our yearly Ethics Month in October, we highlighted four chapters of our Code of Conduct, and positive statements on behavior to generate discussions on the work floor.
- We stimulate social dialogue between management and employees through the Works Councils, Roadshows and regular on-site meetings.
- Our yearly Employee Engagement Survey and Employee Awareness Survey identified room for improvements and we defined actions based on the outcome of these surveys.

Whilst we do not tolerate unethical or undesirable behavior, if it does come up, we strive to ensure that everyone feels safe and secure enough to address it directly with the people involved. As a backup, we have various speak up channels where employees can report their issues, either anonymously or in person, such as Counsellors, the Complaint Committee, the Ethics Committee and through our Speak Up system. A yearly report to the Management Team of Teijin Aramid BV on the issues reported via the various Speak Up channels keeps integrity and ethics on our Board's agenda.

[Previous page](#)



[Next page](#)

5. What we create

Embedding sustainability in tires

The automotive and associated tire industry are currently going through a major sustainability-related transformation. The goals are clear: net zero and full material circularity by 2050. Teijin Aramid shares this ambition as part of our true purpose.

Go directly to

Twaron®: Better eco-performance over the entire lifecycle

Collaboration for a circular economy in the tire industry

Technological breakthrough

Partnering for true purpose

Green hydrogen matters

Tires play a key role in achieving these goals. Up to 90% of tires' environmental impact is in the use phase, through fuel consumption and associated exhaust gases. This is why the European Union (EU) has set regulatory measures for original equipment manufacturers (OEMs) to limit emissions in the use phase of internal combustion engine (ICE) vehicles.

Avoiding use phase emissions is about efficiency, about tires that decrease fuel consumption in ICEs and increase battery mileage in electric vehicles. This is where Twaron® excels.

Twaron®: Better eco-performance over the entire lifecycle

Using Twaron® in tires leads to a long-lasting, durable and lighter tire with a similar or increased performance. Lighter tires are more efficient, as weight is directly connected to fuel use. Less fuel consumption results in lower carbon emissions per kilometer, helping to comply with EU regulations and show better sustainability performances in general which is beneficial for the tire business. A lower carbon footprint without a compromise in quality is possible today.



To quantify these benefits, Teijin Aramid built a user-friendly model based on our TÜV certified Customer Benefit Model (CBM) methodology (which follows ISO 14040 and 14044 standards).

Get in touch

Our customers in the tire industry use it to compare Twaron®-based solutions to the standard rayon, polyester or steel reinforcement. Comparisons include data around costs and environmental emissions in both the raw material and use phases, and consider things like lifetime and fuel efficiency. Findings differ by case but general results for Twaron® in tires are:

- Higher initial price of raw materials
- Lower tire weight with the same performance
- Less fuel use and less direct CO2 emissions per kilometer
- The model shows lower emissions and lower costs over the lifecycle of the tire despite initial investment
- In the case of emission penalties, additional savings apply to customers.

Collaboration for a circular economy in the tire industry

We started mechanically recycling production leftovers of aramid-based tire cords containing Twaron®, and now we're going further. Physical and chemical recycling technologies are being developed to further increase the recycling potential of aramid yarn. And we're heavily focused on addressing the recyclability of aramids from end-of-life tire textiles.



Calling all stakeholders ...

In line with our core value of unity, Teijin Aramid has called on all stakeholders in the tire value chain to collaborate closely in order to find optimal solutions for recycling end-of-life tire textiles. This effort will help the environment and secure the future of the tire industry.

Technological breakthrough – from R&D to industrialization

Read More

Partnering for true purpose

Teijin Aramid and personal protective equipment (PPE) manufacturer LION have partnered to collect and recycle retired wildland and station firefighter PPE. Together, we aim to keep these materials out of landfills and repurpose them for new applications, such as helmet ear covers. LION and Teijin Aramid will work closely together to establish collection sites utilizing LION TotalCare and recycling processes that make it easy for firefighters and other first responders to send in their retired uniforms and PPE.

Using these recycled materials to produce new products helps to conserve resources and reduces the need for virgin materials, a significant step towards sustainability and a circular economy. This supports Teijin Aramid's efforts to align our business purpose to benefit people and the planet.

Teijin Aramid and LION are committed to working together to make this program a success.



Green hydrogen matters

Teijin Aramid is exploring the use of green hydrogen to enable the energy transition. We believe that hydrogen extracted from water by electro-chemical processes, powered entirely by renewable resources, will be a cornerstone of our future global energy system.

Hydrogen can be produced from water and returns to water after use, without greenhouse gas emissions and is therefore considered to be a clean energy carrier. It's a crucial step towards reducing emissions to net zero. As well as its use as an energy carrier, hydrogen is widely used as a building block to produce a variety of products in daily use. This hydrogen is currently produced using fossil fuels and needs to be replaced by clean hydrogen.

Read More

As well as its use as an energy carrier, hydrogen is widely used as a building block to produce a variety of products in daily use. This hydrogen is currently produced using fossil fuels and needs to be replaced by clean hydrogen.

Sustainable materials for green hydrogen

Teijin Aramid is intent on creating high-performance materials that are suitable for producing, storing, distributing and using hydrogen safely and efficiently. One challenge is the production of green hydrogen by water electrolysis in large-scale electrolyzer plants, specifically the material performance of the membranes used in the electrolytic stacks. This is why we are developing future-fit membrane materials that can be applied in electrolyzers to produce hydrogen, and in fuel cells to convert hydrogen back to electricity.

These membrane materials are exposed to harsh conditions in the electro-chemical environment during operation and need sufficient mechanical and thermal stability. At the same time, high proton conductivity properties are required to boost efficiency in use and further reduce the cost of green hydrogen production.

Our ambition goes beyond excellent material characteristics. We believe materials like these are essential to drive the energy transition.

6. How we collaborate

Respect and unity in collaboration

Go directly to

[Partnering to reduce CO₂ emissions](#)

[Learning and development](#)

Collaborating through social day initiatives

Helping people who need support gives us a sense of purpose beyond our business. This reality was behind the decision by Teijin Aramid Europe, Middle East, and Africa (EMEA) sales office to start a new, ongoing initiative called 'Social Day'. Every employee in the EMEA sales office can spend one working day a year volunteering with aid organizations.



Support for the Tafel in Wuppertal: The Tafel is an organization that provides food and essentials free of charge to those in need. The EMEA Industrial Team supported their activities for a day by assembling furniture and sorting food for distribution to the needy.

Partnering to reduce CO₂ emissions: Trees for All

Climate & biodiversity

At Teijin Aramid, our first focus is to avoid and reduce CO₂ emissions, but we also want to offset our emissions in a sustainable and impactful way. This is why we partnered with [Trees for All](#), a foundation that plants trees in the Netherlands, Bolivia, Mexico and elsewhere. Donations from Teijin Aramid to this non-profit organization are used for their CBF- and ANBI-certified projects and we receive certificates for compensated CO₂ emissions.

Each year Teijin Aramid compensates for the amount of CO₂ emitted during business travel by car and airplane – in 2022 the donations covered approximately 336.29 tons of CO₂ emissions.

By planting trees, Trees for All aims to restore degraded land, enhance biodiversity and help combat climate change by removing carbon dioxide from the atmosphere. These goals are at the heart of Teijin Aramid's true purpose – to be a business that plays its part in contributing to a cleaner, healthier and more sustainable future for all.

In 2022 the donations covered approximately

336.29
tons

Learning and development

Advancing industry change



We know that our employees are the key to achieving Teijin Aramid's true purpose, so it makes sense to prioritize learning and development in our rapidly changing world. We are committed to ensuring that all employees have the right skills to succeed, to enable our company to keep evolving and responding to new developments.

[Read more](#)

True Purpose

Sustainability Report 2022

Finding our true purpose – moving beyond high-performance fiber products to a sustainable future for all

At Teijin Aramid, we discover and pursue our true purpose by aligning our work and strategy with the broader needs of society. We aim to apply our core competencies and strengths to address global sustainability challenges, including climate change. In doing so, we hope to foster meaning and purpose for our employees, customers, and partners.

Please visit www.teijinaramid.com/sustainability if you would like to read our Sustainability Report 2022, or email us at sustainability@teijinaramid.com for more information.

Disclaimer: this data reflects our best knowledge at the time of publication. The content is subject to change as a result of new developments. It only contains a selection of the properties of the product(s) and is meant for commercial use only. Teijin Aramid gives no warranties and does not accept any liability regarding (i) the fitness of the products for any particular use, (ii) the correctness, completeness and usage of the information, (iii) the usage of the products (iv) or any infringement of any (intellectual or industrial) property of a third party. All intellectual property rights regarding this publication are the property of – or are licensed to – Teijin Aramid. Without our prior written consent, the reproduction and publishing of (parts of) this publication is prohibited.

Previous page

TEIJIN

Ikigai

A Japanese philosophy that translates as a purpose. Ikigai principles can clarify and realign business purpose, for people, planet and profit. It's the merger between who we are, what we love to do and how we can serve others.






JAN ROOS

DIRECTOR SUSTAINABILITY

About our roadmap, our
sustainability roadmap.

A young man with short brown hair, wearing a white lab coat and blue safety goggles, is speaking in a laboratory setting. He has an open-mouthed expression, suggesting he is in the middle of a sentence or explanation. The background is slightly out of focus, showing laboratory equipment like a red pipette and a glass flask on a stand.

has exactly the same
properties and high quality

Energy efficiency

We are proud that our plan to meet the 2021—2024 European Energy Efficiency Directive (EED) is on schedule. Progress has been made through improved process control and new technology which has been implemented at the Delfzijl site. In Emmen, a third Mechanical Vapor Recompression (MVR) unit was commissioned to recover energy by recycling waste heat and a number of feed-effluent heat exchangers now optimize heat recovery.

Renewable energy

Whilst striving to meet our 2025 and 2030 renewable heat targets of 40% and 50% respectively, we've concluded that large-scale electrification through e-furnaces and high-temperature heat pumps is not yet feasible for our production machines. This is why we've increased our focus on sourcing renewable heat opportunities externally. Currently, these opportunities are limited but we are excited about future possibilities in hydrogen networks and carbon capture and storage (CCS) infrastructure.

Our journey toward

Diversity & Inclusion

Isabelle Damen

Chief Financial Officer



Renewable raw materials

Last year, we focused on sourcing renewable raw materials and we've been scouting for potential new suppliers who can meet our high-quality standards. The future looks promising with activities that currently include exchanging specifications and testing samples with selected companies to see if we are a good fit. It's an iterative, small-scale process, with suppliers improving on the quality of the samples as we move closer to industrial-scale production.

Closing the loop with chemical recycling

Through Research and Development, we have developed chemical recycling technology to fully recover aramid from our products. The results so far look promising – we have discovered a way to convert our yarn back to monomers.

This is early-stage technology but holds promise for a future industrial-scale depolymerization plant.

The power of partnerships

Active participation in subsidized consortia projects is helping us to find long-term partners that can work alongside us on four- to eight-year projects. We were granted three new proposals this year. In two of them, we evaluate useful chemicals in complex industrial waste and biomass as a source of renewable carbon.



We'll play a more active role in the third, 3CRA, which addresses the circularity of nitrogen-containing chemicals and polymers.

Our team will study both the biotechnology route towards p-Phenylenediamine (PPD) and chemical depolymerization using ammonia (NH₃ gas). Through partnerships we are able to align our business interests and work together to achieve our goal of a sustainable future for all.

Alignment with Sustainable Development Goals (SDGs)

For Teijin Aramid, SDGs represent a framework for aligning our business strategies and operations with global sustainability objectives. By integrating the SDGs into our practices, we can contribute to the achievement of these goals while also creating long-term value for our stakeholders.





Sustainable materials for green hydrogen

Teijin Aramid is intent on creating high-performance materials that are suitable for producing, storing, distributing and using hydrogen safely and efficiently.

One challenge is the production of green hydrogen by water electrolysis in large scale electrolyzer plants, specifically the material performance of the membranes used in the electrolytic stacks.

This is why we are developing future-fit membrane materials that can be applied in electrolyzers to produce hydrogen, and in fuel cells to convert hydrogen back to electricity.

These membrane materials are exposed to harsh conditions in the electro-chemical environment during operation and need sufficient mechanical and thermal stability.

At the same time, high proton conductivity properties are required to boost efficiency in use and further reduce the cost of green hydrogen production.

Our ambition goes beyond excellent material characteristics. We believe materials like these are essential to drive the energy transition.

We are one of the few companies in the world with the ability to deliver this more sustainable solution and we're excited to help make this a possibility around the world.



Re-spinning yarn supports Teijin Aramid's goal of creating a fully sustainable and circular aramid chain, which is increasingly important to our customers and a world that needs greater resource efficiency and waste reduction.

We are pushing the boundaries of sustainable aramid production through the innovative Twaron® physical recycling project. This project aims to use the recycled aramid yarn by spinning it into new yarn containing both virgin and recycled content.

As 2022 came to a close, the team reached a significant milestone, gearing up for a production trial to demonstrate the potential of this process. It's an important step towards industrializing the Twaron® physical recycling project.



Our approach to learning and development is holistic, with a variety of methods and programs that include e-learning courses, practical instruction, learning on the job, and classroom training. Employees take responsibility for their own development, with Teijin Aramid providing all the support they need.

Professional development isn't our only priority; we also invest in employees' personal and career growth. For example, management development programs provide training to managers with outstanding performance and potential, and regular onboarding programs familiarize new employees with our business and sustainability commitments.

This year's report outlines our work in terms of our PURE values, with chapters covering:

- Higher initial price of raw materials
- Lower tire weight with the same performance
- Less fuel use and less direct CO₂ emissions per kilometer
- Substantial financial benefits for customers OEMs

Jan Roos - Director Energy Transition and Sustainable Development

“Diversity fuels the innovation that drives our energy transition and sustainable product development. Embracing inclusion empowers every voice to contribute to a brighter, more sustainable future for our planet.”

