

A woman with dark hair pulled back, wearing a vibrant red batik dress with intricate white floral and geometric patterns. She is standing in an industrial environment, with large metal pipes and machinery visible in the background. The lighting is dramatic, highlighting her dress and the textures of the industrial setting.

# Preserving Heritage, Advancing Collaboration

SUSTAINABILITY REPORT  
2023



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# ABOUT THIS REPORT

[GRI 2-2, 2-3, 2-5]

**Welcome to Asia Pacific Rayon's (APR) fifth annual sustainability report, covering performance data and progress from January to December 2023, including historical data where relevant.**

## SCOPE AND BOUNDARIES

The scope of this report includes our viscose staple fibre mill (APR) and viscose rayon yarn manufacturing facility (APY)<sup>1</sup> in Pangkalan Kerinci, Riau, Indonesia. Except for data on human resources, it does not include our Jakarta and Singapore offices. Where possible, we have framed our performance within the context of the unique social and environmental conditions in Pangkalan Kerinci.

## REPORTING FRAMEWORKS AND BENCHMARKS

This report complements the sustainability-related disclosures published on [our website](#) and social media platforms. It has been prepared in accordance with the Global Reporting Initiative Standards,

referenced throughout as [GRI XXX-XX]. The full GRI Content Index is available [here](#). Performance data is also mapped against the European Union Best Available Techniques (EU BAT) Polymer BREF and Zero Discharge of Hazardous Chemicals (ZDHC) Man-made Cellulosic Fibres (MMCF) guidelines.

## STAKEHOLDER INCLUSIVENESS


To ensure this report addresses themes and topics important to all our partners, we consulted external stakeholders including a customer, a textile industry platform advisor, and internal stakeholders. We are guided by international and sector-wide platforms to which we belong and seek feedback for continuous improvement.


## ASSURANCE


Independent limited assurance was provided by KPMG LLP (Canada) on select sustainability reporting indicators in this report.<sup>2</sup>


## REPORT THEME AND RATIONALE

This report, themed 'Preserving Heritage, Advancing Collaboration,' highlights the need to advance Indonesia's industrial sector while protecting our nation's rich cultural heritage and traditional crafts. In partnering with local artisans and designers, industry peers, government agencies, and other key stakeholders, APR is forging a future that honours and celebrates our cultural legacy, drives sector-wide sustainability and ensures a resilient industry.

 [APR website](#)

 [APR LinkedIn](#)

 [APR Instagram](#)

 [APR Youtube](#)

<sup>1</sup> APY is a separate entity managed by APR. Unless otherwise stated, every mention of APR includes our APY business.  
<sup>2</sup> Limited assurance was undertaken for APRIL Group's 2023 Sustainability Report (APRIL SR2023), of which scope covers APR.





# STATEMENT FROM THE PRESIDENT DIRECTOR

[GRI 2-22]



APR is committed to playing a pivotal role in the global textile industry. We believe that sustainable practices are essential for the sector's long-term growth and the well-being of communities worldwide.

Dear stakeholders,

I am pleased to present our annual Sustainability Report, highlighting our progress and challenges in the third year of our APR2030 sustainability commitments, amidst local and global business challenges.

Themed **"Preserving Heritage, Advancing Collaboration"**, this 2023 report also marks our fifth anniversary since APR's commissioning back in December 2019. Thanks to your support and the dedication of APR's management and employees, APR remains Indonesia's leading viscose staple fibre manufacturer, serving both domestic and international markets.

Our APR2030 sustainability strategy, launched in 2021, is our commitment to achieving measurable and positive impacts on climate, communities, and people through a transparent assessment of progress. It outlines our priorities and targets across four key areas focused on climate and nature, clean manufacturing, circularity, and inclusive prosperity.

**In 2023, we made progress towards our APR2030 climate and clean manufacturing goals. These include reducing greenhouse gas emissions intensity by 91%, sulphur emission intensity by 58%, water consumption intensity by 38%, hazardous waste intensity by 33%, and energy usage intensity by 19% against our 2019 baselines.**

APR continues to promote circularity, **I am proud to announce that our R&D team has patented a revolutionary textile recycling technology that allows us to produce viscose fibre using a blend of 50% recycled textile pulp and virgin dissolving wood pulp.**

While we have made substantial progress, challenges remain. Aligning with the European Union Best Available Techniques (EU BAT) for hazardous waste remains complex due to discrepancies between EU and local regulations. We actively engage with regulators to address this challenge to drive meaningful transformation across the industry.

Building strong partnerships is key for APR. During the period, we continued to encourage collaboration and feedback from stakeholders to foster a shared vision and shared responsibility for sustainability. **We collaborated with local and global stakeholders, together with the Indonesian government, to support the expansion of textile recycling infrastructure and overcome market resistance towards recycled textiles.**

At the heart of our inclusive prosperity commitments is our textile hub in Riau, where we continue to support local socio-economic development through partnerships and collaborative projects, such as our Rumah Batik programme. Working closely with *Rantai Tekstil Lestari* (RTL) and the Riau chapter of the Indonesia Textile Association Riau (API Riau), we worked together with local designers and artisans through Jakarta Fashion Hub (JFH) and other textile and fashion industry events. APR will continue to seek collaborative opportunities to forge a future that honours our cultural legacy and drives sector-wide sustainability as we continue supporting the government's vision for Indonesia to become a global modest fashion hub.

APR is also committed to playing a pivotal role in the global textile industry. We believe that sustainable practices are essential for the sector's long-term growth and the well-being of communities worldwide. By investing in research and development, building international collaboration, and implementing innovative solutions, we are working towards a sustainable and prosperous future for the textile industry.

**APR sponsored the first Southeast Asian World Circular Textiles Day (WCTD) workshop co-hosted by RTL on 8 May 2023.** The workshop, themed "Roadmap to 2050: Materials, Products and Services, and People," welcomed government, textile, garment, and fashion industry stakeholders for wide-ranging discussions on achieving a global circular textile economy by 2050.

At a time when the Indonesian market is challenged by illegally imported textiles, **I encourage all industry players to collaborate with peers, suppliers, and all levels of government to seize opportunities, protect our heritage, and achieve sector-wide sustainability. APR is eager to engage in discussions with key agencies and partners to advance solutions.**

As we celebrate five years of progress, I want to emphasise that our achievements have only been possible with the invaluable partnerships and collaborations with our stakeholders. I look forward to deepening our commitment to sustainability and driving further advancements in our industry together. Thank you for your continued support and commitment to our shared vision.

**Basrie Kamba**  
President Director



# 2023 HIGHLIGHTS

## OUR OPERATIONAL FOOTPRINT



Reduced GHG emission intensity by **91.4%** since 2019



Reduced energy intensity by **19.4%** since 2019



Reduced sulphur emission intensity by more than **57%** since 2019, achieving a 94.9% sulphur recovery rate



Achieved **ZDHC Progressive level** for sodium sulphate recovery



Achieved **ZDHC Aspirational level** for zinc to water



Met **EU BAT criteria** for noise levels at the fence



Reduced water consumption intensity by **38.3%** since 2019



Reduced total hazardous waste intensity by **32.8%** since 2019



Reduced solid waste to landfill by **10%** compared since 2019



On track to meet all parameters outlined in EU BAT and **achieve Aspirational level in ZDHC** by Q4 2024.



Improved verified Higg FEM score to **71%**, up from 68% in 2022

## POLICIES AND PRACTICES



Updated our **Sustainability Policy** in February 2024



Adopted **new standalone Wood and Fibre Sourcing and Integrity and Ethics policies** in April 2024

## AWARDS AND RECOGNITIONS



Achieved **EcoVadis Gold rating**



Achieved **Blue PROPER rating** on inaugural Ministry of Environment and Forestry assessment



Received **C2C Certified Material Health Certificate** (Silver Version)



## INNOVATIONS



Received **patent approval** for textile recycling technology

## PROSPERING WITH COMMUNITIES



### Health

- Supported 42 *posyandus* and trained 263 cadres, including 34 women
- Distributed supplementary feeding packages to 1,644 toddlers and 149 malnourished expectant mothers

### Education

- Awarded inaugural APR IFI scholarship allowing **2** women entrepreneurs to study at the Islamic Fashion Institute (IFI) in Bandung, West Java
- Sponsored two general scholarships
- Conducted **9** public webinars (seven coordinated by the Jakarta Fashion Hub, two in collaboration with Rantai Tekstil Lestari)
- Supported training of local fashion SMEs through seven *Kelas Berbagi* with API Riau



### Eradicating poverty

- Continued to support SMEs through programmes with partners including RTL, API Riau, APSyFI, and the Indonesian Government

## SUPPORTING LOCAL SUSTAINABLE FASHION



Continued ongoing programmes to develop **Riau as a regional textile hub**



Helped women-owned batik SMES generate **> IDR 260 million** through the *Rumah Batik* programme



Collaborated with local creatives to showcase fashion pieces featuring traditional designs using **APR's biodegradable viscose** at events such as JMFV and Riau Berkain

## A FOCUS ON OUR EMPLOYEES



Increased verified Higg FSLM score from **84.6%** in 2022 to **86.3%** in 2023



Reduced lost-time injury frequency rate by **88.4%** since 2019



Women comprised **29%** of our workforce



Launched **scholarship programme** allowing APR employees to pursue post-secondary studies

# TARGETS AND PROGRESS

This section summarises our 2023 progress against our commitments and targets under our APR2030 agenda. Due to APR and APRIL's unique supply chain integration, some of our APR2030 targets build on APRIL's commitments. We believe our combined resources and actions will have a greater positive impact on the ground.

TARGET	TARGET YEAR	APR2030 TARGET	STATUS AS OF DECEMBER 2023
<b>CLIMATE AND NATURE POSITIVE</b> 			
Halve product carbon intensity (against 2019 baseline)	2030	✓	On track
Continue to source 100% renewable energy supply year-on-year	2030	✓	Achieved
Support the achievement of net-zero emissions from APRIL's land use	2030	✓	On track See APRIL's 2023 sustainability report for their progress
Contribute to conservation and wildlife habitat protection in Indonesia	Ongoing	✓	On track Currently designing programmes promoting women's leadership in conservation in Indonesia
<b>CLEAN MANUFACTURING</b> 			
Meet all EU BAT Polymer BREF criteria	2023	✓	Achieved except for criteria on hazardous waste
Meet ZDHC MMCF guidelines' aspirational levels	2025	✓	On track Achieved ZDHC Aspirational level for zinc to water in 2023 and chemical oxygen demand (COD) levels in 2022
Increase total sulphur recovery rate to >95%	2025	✓	On track Achieved 94.9% recovery rate
Reduce process water consumption intensity by 50% against 2019 baseline	2030	✓	On track Achieved 38.3% reduction against 2019 baseline
Reduce solid waste to landfill by 80% against 2019 baseline	2030	✓	On track Achieved 10% reduction against 2019 baseline
<b>CIRCULARITY</b> 			
Incorporate 20% recycled textile in VSF production	2030	✓	On track Successfully completed trials at APR pilot plant
Determine the feasibility of establishing Indonesia's first industrial-scale recycled textile facility	Ongoing	✓	Progress made Received patent approval for textile recycling technology; continuing to explore opportunities through research and partnerships
Determine the feasibility of establishing urban textile recycling centres in Singapore and Indonesia	Ongoing	✓	Progress made Research to begin at newly established RGE-NTU SusTex





TARGET	TARGET YEAR	APR2030 TARGET	STATUS AS OF DECEMBER 2023
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #4CAF50; color: white; padding: 5px;"><b>INCLUSIVE PROSPERITY</b></div> <div style="text-align: right;">    </div> </div>			
Eradicate extreme poverty within a 50km radius of our operations in partnership with APRIL	Ongoing	✔	<b>On track</b> See APRIL's 2023 sustainability report for their progress
Increase access to primary healthcare services for targeted villages surrounding our operations	Ongoing	✔	<b>Progress made</b> Increased the number of <i>posyandus</i> support and pursued ongoing programmes to enhance community access to primary healthcare
Expand programmes that promote traditional craftsmanship	Ongoing	✔	<b>Progress made</b> Pursued outreach through the ongoing <i>Rumah Batik</i> programme; collaborated with local creatives to showcase fashion pieces featuring traditional designs at events such as JMFV and Riau Berkain
Create a regional textile hub in Riau	Ongoing	✔	<b>Progress made</b> Pursued ongoing engagement programmes with women, SMEs, and youth to develop Riau as a textile hub
Advance gender equality across the value chain	Ongoing	✔	<b>Progress made</b> Increased the number of women in our workforce; supported women-owned businesses; pursued ongoing entrepreneurship programmes for women in Riau
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="background-color: #003366; color: white; padding: 5px;"><b>OTHER TARGETS</b></div> <div style="text-align: right;">    </div> </div>			
Obtain ISO EMS 50001:2018 certification for energy management	2024		<b>On track</b> Completed internal audit as of December 2023. An external audit is planned for 2024.
Achieve zero workplace fatalities	Ongoing		<b>Achieved</b>

# ABOUT APR

[GRI 2-1, 2-6]

## OPERATIONS AND PRODUCTION

Headquartered in Jakarta, PT Asia Pacific Rayon (APR) is a leading producer of bio-based and biodegradable viscose rayon textile made from renewable wood-based fibre. We are a privately held company and a member of the RGE group of resource-based manufacturing companies. We play an integral role in the downstream operations of our sister company and primary supplier, APRIL Group (APRIL), leveraging our vertically integrated pulp mill in Pangkalan Kerinci, Riau, Indonesia.

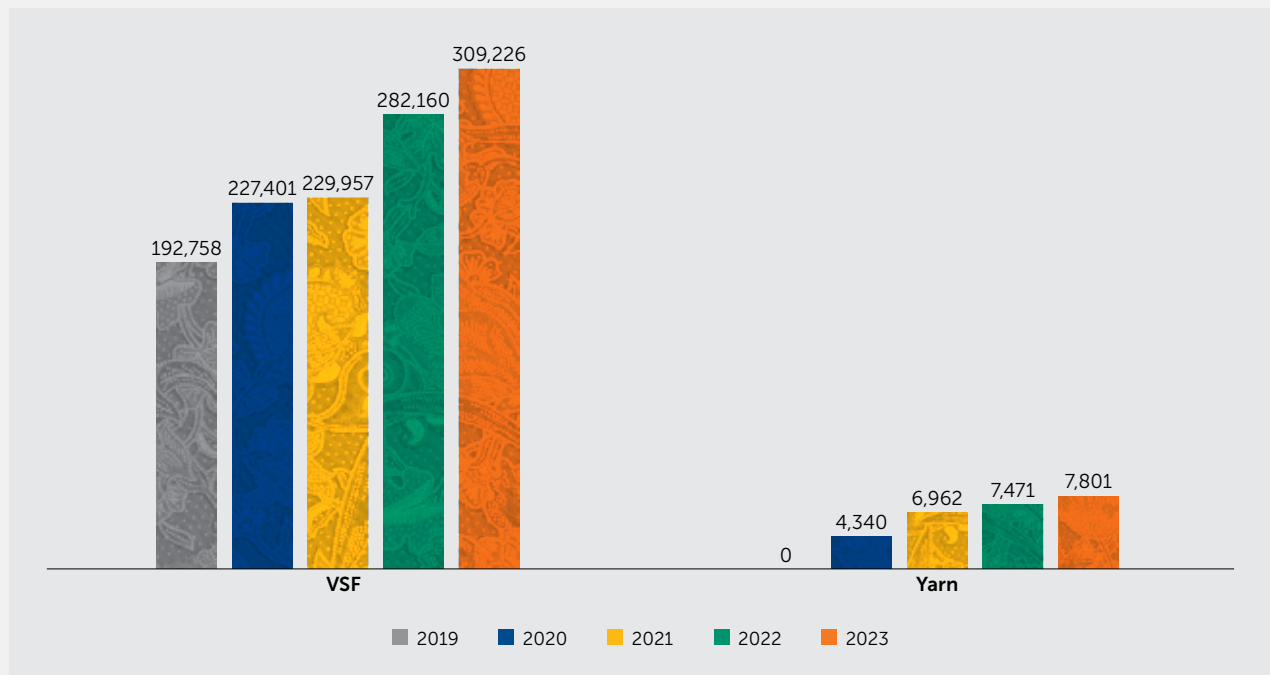
 [See Leveraging APRIL and APR integration](#)

APR operates a 300,000-tonne capacity viscose staple fibre (VSF) mill and a 7,552-tonne capacity yarn spinning facility - Asia Pacific Yarn (APY) - that sources VSF exclusively from APR.

Since 2019, our production volumes have consistently grown. VSF output rose from 192,758 tonnes to 309,226 tonnes in 2023 when we reached full production capacity, while yarn production increased from 4,340 tonnes to 7,801 tonnes in 2023. We sell high-quality VSF and yarn to yarn spinners, fabric makers, and garment manufacturers in Indonesia and 18 other countries, including Turkey, Pakistan, Bangladesh, Sri Lanka, and Vietnam.

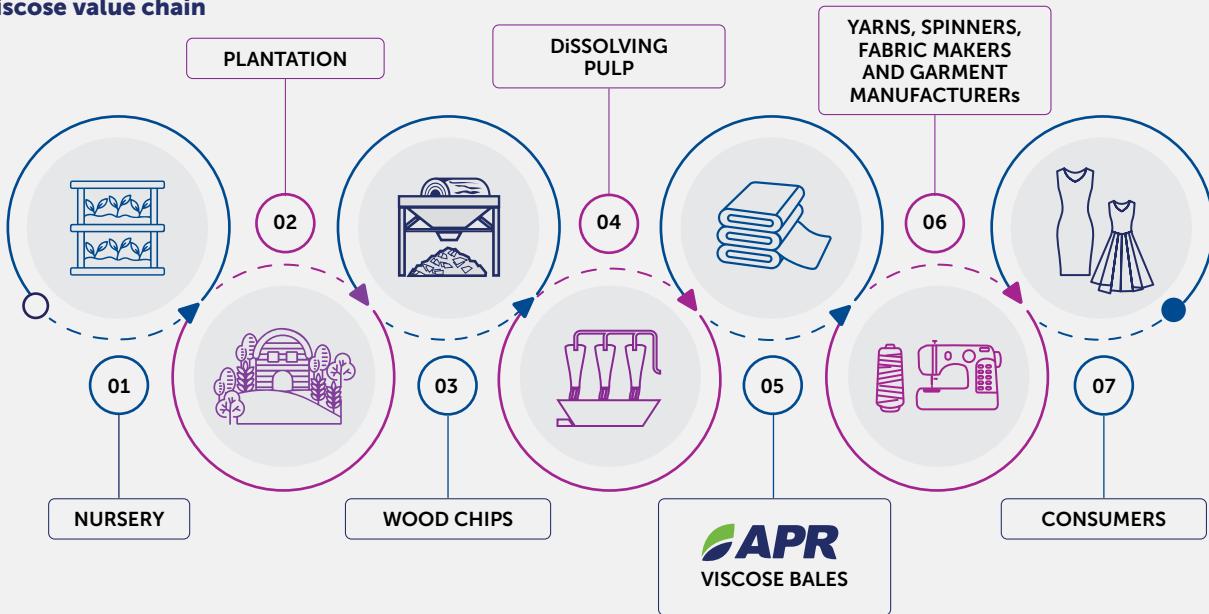
In 2023, APR's production increased by 10.6% compared to 2022. This growth was driven by stable pulp production and reaching full production capacity.

### VSF and yarn production 2019–2023 (t)



Our manufacturing operations are complemented by a dedicated research and development (R&D) centre equipped with a pilot plant and world-class laboratories. The centre develops new products and tests new yarns and fabrics, improving production quality and supporting Indonesia's textile industry. We also operate a sales and coordinating office in Singapore.

**Viscose value chain**



**USES AND MARKETS**

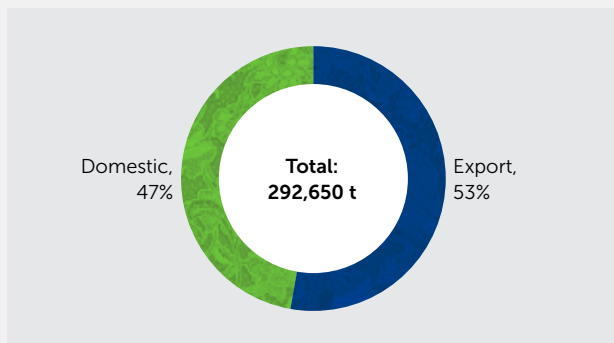
Viscose rayon is the second-largest cellulosic fibre group after cotton. It is a man-made cellulosic fibre (MMCF) derived from natural wood cellulose from fast-growing trees like acacia and eucalyptus. As a bio-based, renewable resource, viscose rayon has a lower carbon footprint than synthetic fabrics made with petroleum.

APR produces a diversified range of viscose rayon by innovating in response to market demand. Our versatile viscose is becoming the fabric of choice for modest wear fashions and is gaining popularity in Muslim-majority nations. An increasing number of domestic and international manufacturers of baby wipes, dry and wet

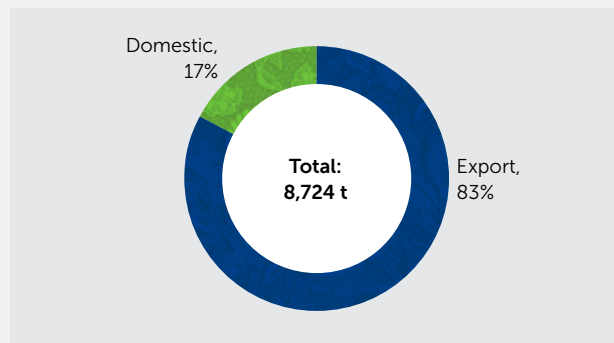
wipes, beauty masks, and other hygiene products have also adopted non-woven viscose fibre. In 2023, we sold 47% of our VSF to the Indonesian domestic market while exporting 53% to international markets. The bulk of our yarn production (83%) goes to export markets.

APR successfully adapted to the global textile industry slowdown caused by supply chain disruptions due to rising inflation, low exchange rates, and increased European energy prices. In 2023, we operated at full capacity, achieving a 98% excellence rating per our Better Quality, Higher Productivity, and Lower Cost (QPC) guidelines. We made customer service and communication core focus areas and maintained a local presence in foreign markets.

**VSF**



**Yarn**





# ABOUT APR

## SUPPORTING LOCAL SUSTAINABLE FASHION [GRI 3-3, 203-1]

We are committed to supporting the Indonesian government's goal of fostering sustainable domestic textile industry. Our efforts align with the National Industry Development Master Plan (RIPIN) 2015–2035. By providing competitively priced raw materials to meet local demand, we aim to reduce the country's reliance on textile imports.

As demand for sustainable apparel grows, APR can drive change in Riau and spur economic and cultural growth. One of APR's flagship projects is developing Riau into a fully operational regional textile hub or centre of excellence by 2030 in collaboration with industry peers, government partners, local businesses, artisans, and community associations.

## Rantai Tekstil Lestari

APR is a founding member of the Sustainable Textile Chain, or *Rantai Tekstil Lestari* (RTL), a cross-commodity, multi-stakeholder association that brings together Indonesian academics, fashion designers, civil society stakeholders, and private sector entities in the country's fashion and textile industry value chains. APR is committed to supporting RTL's efforts to promote sustainability in the Indonesian textile and fashion industries. In 2023, RTL participated in and hosted collaborative events with the Singapore Fashion Council and industry partners from the United Kingdom and Taiwan.

### 2023 activities

## WORLD CIRCULAR TEXTILES DAY WORKSHOP

RTL co-hosted the first Southeast Asian World Circular Textiles Day (WCTD) workshop on 8 May 2023. The workshop themed 'Roadmap to 2050: Materials, Products and Services, and People' was sponsored by APR and welcomed government, textile, garment, and fashion industry stakeholders who participated in wide-ranging discussions on achieving a global circular textile economy by 2050. The workshop highlighted the need for international cooperation and regional approaches to circularity, accounting for cultural and economic differences from country to country. It examined the need for the fashion and textile industries to set specific 2050 climate targets in line with global goals and closed-loop production to limit resource extraction. WCTD was co-founded in 2020 by Amsterdam nonprofit Circle Economy, University Arts London Centre for Circular Design, and UK startup Worn Again Technologies.



## TEXTILE ASSOCIATION RIAU (API RIAU)

APR is a member of the Indonesia Textile Association Riau (API Riau) chapter, which aims to:

- Establish Riau as an Indonesian textile hub
- Scale up textile and apparel small and medium enterprises (SMEs) in Riau
- Preserve Malay cultural heritage

**KELAS BERBAGI - INDONESIAN TEXTILE DESIGN SHARING CLASS**

From January to October 2023, Asia Pacific Rayon (APR) hosted a series of knowledge-sharing workshops (*Kelas Berbagi*) for members of the Riau Fashion Industry Association (API Riau). These workshops specifically targeted micro, small, and medium-sized enterprises (SMEs) within the Riau fashion industry, specialising in traditional Riau fabrics, tailors, and fashion designs..

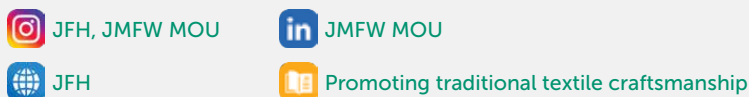
The training aimed to upskill participants, enhancing their competitiveness and contributing to Riau’s vision of becoming a leading textile hub in Indonesia. The carefully curated curriculum of the *Kelas Berbagi* workshops equipped participating fashion SMEs and local designers with the latest industry knowledge and trends. Subject matter experts delivered sessions on a range of topics, including digital marketing strategies, sustainable textile materials, motif development for traditional fabrics, and contemporary fashion styling. Notably, one workshop was co-organised with the Indonesian Fiber and Filament Yarn Producers Association (APSyFI) and the Ministry of Tourism and Creative Economy, further enriching the programme’s offerings.

One of the sessions, titled “Enriching Your Design Using Traditional Wastra,” was led by Ion Akhmad, a Fashion Consultant and Co-Founder of Luxina.id, who is also affiliated with APR. Mr. Akhmad not only facilitated the session but also designed and curated the batik creations showcased by API Riau collaborators on the Jakarta Muslim Fashion Week (JMFW) 2024 runway.



**JAKARTA FASHION HUB**

APR’s Jakarta Fashion Hub (JFH) was launched in 2020 as a collaborative platform for individuals in the Indonesian fashion landscape, connecting the design community to producers of fabrics and fabric blends that use sustainable viscose. JFH’s dedicated campaigns include the Everything Indonesia programme, which supports government initiatives to promote domestic products. JFH hosts, sponsors, and participates in fashion events year-round, including Jakarta Fashion Week, JMFW, Muslim Fashion Festival (MUFFEST), and Fashion Revolution. Notable achievements in 2023 include:



# APPROACH TO SUSTAINABILITY

[GRI 2-23, 2-24]

APR has made sustainability a core component of our operations since day one. As part of the RGE Group of Companies, we are informed by the RGE Group Sustainability Policy, which was updated in July 2023 and addresses four main pillars – Climate, Nature and Biodiversity Protection and Conservation, Human Rights, and Sustainable Growth.


In February 2024, we updated our Sustainability Policy to ensure we remain aligned with the Group’s direction and further strengthen our commitments. In April 2024, APR also adopted new standalone Wood and Fibre Sourcing and Integrity and Ethics policies in line with RGE’s standards, which set out our commitments to sustainable sourcing and ethical business practices. We continue to uphold human rights within our value chain, guided by our Human Rights Policy launched in 2022.

## APR2030

In November 2021, we launched the Asia Pacific Rayon 2030 (APR2030) sustainability agenda, covering four priority areas and setting corresponding targets for the next ten years. As updated in this report, we continued to implement its measures and meet its key performance indicators (KPIs) in 2023. We conducted several awareness campaigns in May and June 2023, communicating our 2022 achievements towards our APR2030 goals to approximately 400 employees during events at the APRIL learning institute (ALI).


**APR2030**

APR2030 is our commitment to achieving a measurable and positive impact on climate and nature, promoting inclusive prosperity and gender equality across our value chain and improving on clean and closed loop manufacturing processes from fibre-to-fashion while accelerating circularity and innovation




**CLIMATE AND NATURE POSITIVE**

- 50% lower product carbon emissions
- 100% renewable energy
- Net Zero emissions from land-use by APRIL
- Contribute to conservation + wildlife habitat protection in Indonesia




**CLEAN MANUFACTURING**

- >95% Total sulphur recovery
- 50% less water used
- 80% less waste to landfill
- EU BAT compliant by 2024
- ZDHC MMCF aspirational levels by 2025



**CIRCULARITY**

- 20% recycled textile content
- Feasibility for scaled recycled textile facility
- Establish urban textile recycling centres



**INCLUSIVE PROSPERITY**




- ZERO extreme poverty
- Increase access to primary health care services
- Promote traditional textile craftsmanship
- Create a regional textile hub
- Advance gender equality

 [APR2030 Dashboard](#)



**CONTRIBUTING TO UNITED NATIONS' SDGs**

APR2030 has identified ten Core, Catalytic, and Contributed Sustainable Development Goals (SDGs) most relevant to our business and 17 specific SDG targets that we contribute to. These are mapped to the core pillars of APR2030 and aligned with our material topics.

CORE GOALS	CATALYTIC GOALS	CONTRIBUTED GOALS
<p><b>Most relevant to APR's business</b></p>  <p><b>SDG targets:</b> 6.3, 6.4, 9B, 9.3, 12.4, 12.5, 12.6, 13.2</p> <p><b>APR2030 commitment areas:</b> Clean Manufacturing, Circularity, Inclusive Prosperity, Climate and Nature Positive</p>	<p><b>Enable APR to have a positive, direct, and significant impact on surrounding communities</b></p>  <p><b>SDG targets:</b> 3.2, 4.1, 4.4, 17.14, 17.16</p> <p><b>APR2030 commitment areas:</b> Inclusive Prosperity, Circularity</p>	<p><b>Goals to whose attainment APR directly or indirectly contributes</b></p>  <p><b>SDG targets:</b> 2.2, 8.5, 8.8, 15.1</p> <p><b>APR2030 commitment areas:</b> Inclusive Prosperity, Climate and Nature Positive</p>

 **Material topics and the SDGs**



# APPROACH TO SUSTAINABILITY

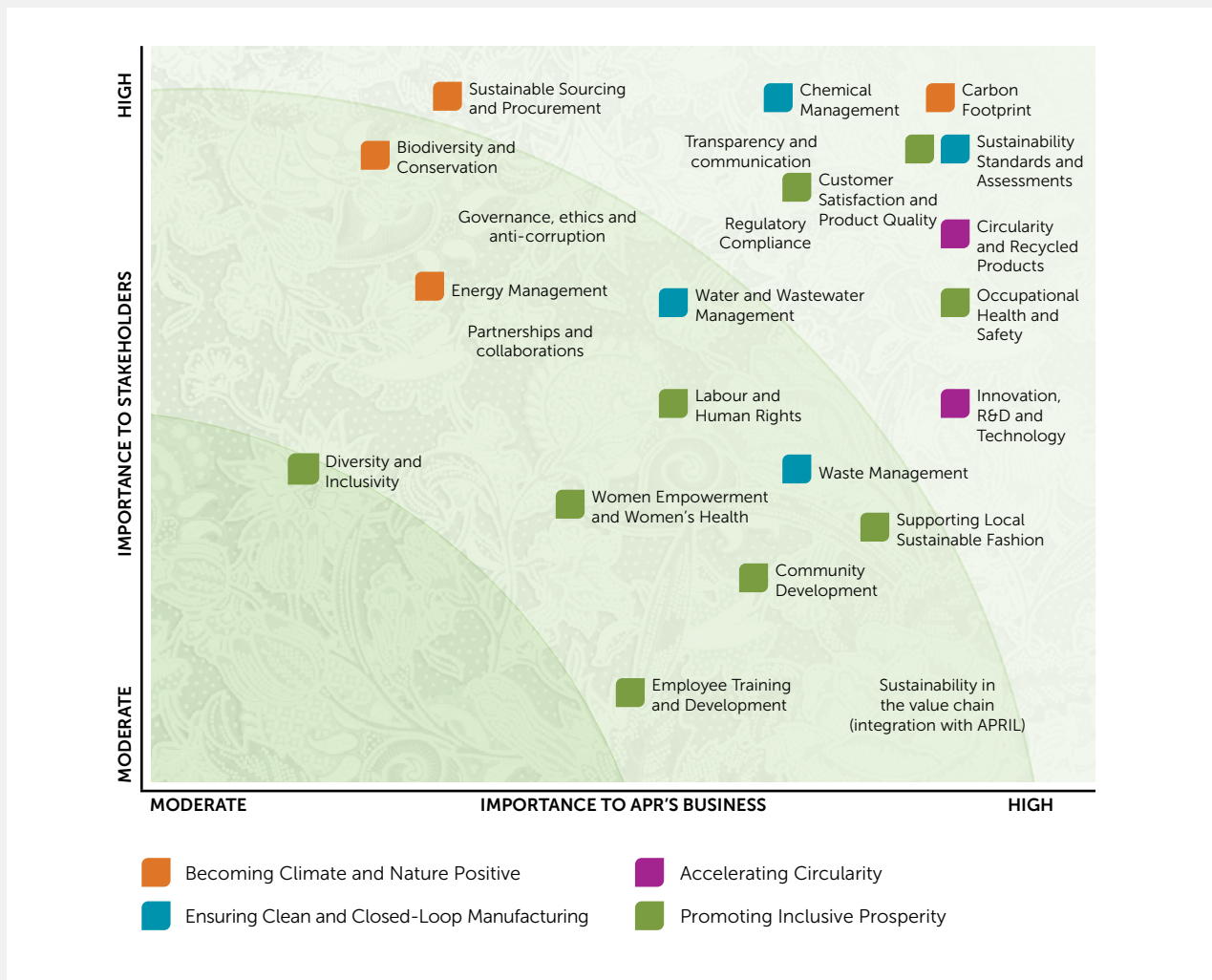
## MATERIALITY [GRI 3-1, 3-2]

APR conducts materiality assessments to prioritise critical components of our sustainability strategy, address stakeholder concerns, and ensure robust sustainability reporting. We conducted an initial materiality assessment upon launching our operations in 2019, identifying ten material topics. A 2022 reassessment identified 23 material topics, including 11 new ones and ten carried over from the first assessment. We mapped and aligned each materiality topic with our APR2030 commitments and the United Nations Sustainable Development Goals (SDGs).

Although our materiality topics have remained unchanged since the 2022 reassessment, we continue to engage with stakeholders to align our focus areas and sustainability strategy with emerging issues and industry trends.

 [See Material topics and the SDGs](#)

### Materiality matrix 2023



 See: [APR SR2022, p22–23](#) for an overview of the 2022 reassessment and [p72–74](#) for material topic definitions

**LEVERAGING APRIL AND APR INTEGRATION**  
**[GRI 2-6]**

APR and APRIL’s integrated facilities streamline and consolidate production at a single site, ensuring a consistent supply of raw materials and facilitating effective operational control. This integration enhances our resilience to external disruptions, boosts operational efficiencies, and creates economies of scale. It also enables us to enforce rigorous sustainable production policies and consistently deliver high-quality products that meet global market demands.

Moreover, our shared infrastructure allows us to leverage each other’s strengths and achieve common sustainability goals. Our APR2030 and APRIL2030 sustainability strategies are grounded in shared foundational principles that address industry-wide and sector-specific issues.

APR and APRIL collaborate on decarbonisation roadmaps, environment protection and remediation initiatives, and community programmes for inclusive prosperity. This unique collaborative model, which adopts a holistic value chain approach rather than a gate-to-gate perspective, enabling us to maximise our on-the-ground impact and preventing the double-counting of sustainability achievements.





# APPROACH TO SUSTAINABILITY

## GOVERNANCE AND RESPONSIBLE PRACTICES [GRI 2-9, 2-11, 2-12, 2-13, 2-16, 3-3, 205-3]

The APR leadership team is responsible for our sustainability plan and strategy with guidance from APR's President Director and the RGE Executive Management Board. Our Operations Manager implements the sustainability plan at the operational level on a day-to-day basis, while the Head of Sustainability implements our sustainability strategy.

APR is bound to the ethical and professional business conduct rules in the RGE Global Code of Conduct (CoC), including its zero tolerance for corruption clauses, in compliance with legal requirements. The Code applies to all employees – who receive annual refresher training on our policy commitments.

APR suppliers must adhere to our Code of Procurement Ethics, which details our values, principles, and commitments in line with RGE's Sustainability Framework and APR's Sustainability Policy. Our procurement department audits suppliers to ensure they respect their obligations against these commitments, reporting its findings to the APR leadership team.

## WHISTLEBLOWING AND GRIEVANCES [GRI 2-25, 2-26]

Employees can report violations of the CoC to their immediate manager or human resources representative. A confidential internal audit hotline is also available to report misconduct and for whistleblowing. We promptly and fairly process reported breaches against/of our legal obligations and impose appropriate penalties or disciplinary actions as warranted. We report all critical grievances to APR's senior management team.

A comprehensive grievance procedure is available on our website. It allows internal and external stakeholders to report APR policy violations, concerns, and complaints. The APR Grievance Committee processes grievances other than human rights violations, which are managed by an Independent Advisory Committee. These two bodies assess grievances, provide transparent, and accountable feedback, and arrive at mutually agreed-upon settlements that satisfy all parties' requirements.

No grievances or corruption cases were reported in 2023.



See also [APR Grievance Procedure](#)

## REGULATORY COMPLIANCE [GRI 2-27]

APR complies with the Ministry of Environment and Forestry (MOEF) requirements and the conditions of our operating licence. We have installed a SPARING wastewater monitoring system and a continuing emissions monitoring system (CEMS) to provide real-time updates to the Indonesian government, as mandated. There were no regulatory or environmental non-compliances during the reporting period.<sup>3</sup>

## PARTNERSHIPS AND ENGAGEMENT [GRI 2-28, 2-29]

APR builds constructive partnerships and engages with stakeholders openly and transparently to realise our APR2030 sustainability commitments.

We collaborate with industry peers and are a member and signatory of various industry associations and agreements. Through these platforms, we engage in discussions and share best practices aimed at achieving mutual sustainability goals and maximizing our impact within the industry. These include:

### International frameworks:

- Zero Discharge of Hazardous Chemicals (ZDHC) Foundation
- Textile Exchange
- Cascale (formerly Sustainable Apparel Coalition, or SAC)
- United Nations Convention on Climate Change (UNFCCC) Fashion Industry Charter

### National affiliations:

- Indonesia Business Council for Sustainable Development
- Asosiasi Pertekstilan Indonesia (API)
- Indonesian Fiber and Filament Yarn Producers Association (APSyFI)
- Rantai Tekstil Lestari (RTL)

Please see [Stakeholder engagement](#) for details on shareholder groups and engagement approaches.

<sup>3</sup> Per thresholds in MOEF regulation No.7/2012—Annex II (*PerMen LH No.7 Tahun 2012 Lampiran II*) on wastewater quality and MOEF regulation No.5/2014 (*Permen LH RI No.5 Tahun 2014*) on air emissions.





# APPROACH TO SUSTAINABILITY

## 2023 ACTIVITIES:

### INDUSTRY ASSOCIATIONS

Contributed to the development of the [revised ZDHC v.3 MMCF guidelines](#).

### EVENTS

Participated in the Dhaka International Textile and Garment Machinery Exhibition (DTG) 2023 in February 2023



Participated in the ITMA exhibition, 8–14 June 2023



Hosted founders from Circle Economy, Worn Again Technologies, and the University of the Arts London on World Circular Textiles Day (WCTD) in October 2023, showcasing our integrated and sustainable operations



### PARTNERSHIPS

Teamed with 12 industry partners to showcase sustainable viscose rayon at the 2023 Indo Intertex-Inatex event during JIEXPO Kemayoran, March 29–31 2023



Director-General of the Ministry of Industry visit, 2023 Indo Intertex-Inatex

Partnered with an engineering company to assess the feasibility of increasing our production capacity from 900 to 950 metric tonne (MT)/day. Our benchmarking studies included a visit to the Sateri viscose plant in China to facilitate cross-learning and the creation of a robust action plan

Collaborated with K.A.L.A Studio to launch a new collection made with our 100% biodegradable viscose in May 2023



Promoting traditional textile craftsmanship

Ongoing partnership with the Matahari department store chain:

- Used garment trade-in programme, October–November 2023
- Sustainable fashion collection showcasing APR's biodegradable viscose fabric

Partnered with Maranatha University in July 2023



Promoting traditional textile craftsmanship



### API RIAU

Promoted Muslim fashion using traditional Riau batik motifs made by local batik artisans and designers at Jakarta Muslim Fashion Week, 23 October 2023

Organised knowledge sharing classes with the Ministry of Tourism and Creative Economy, APSyFI, and other partners to enrich members' knowledge of fashion, textiles, marketing, and business management

Participated in *Riau Berkain* 2023 at Living World Pekanbaru, presenting ready-to-wear fashion collections by API Riau artisans and designers



Stakeholder engagement



Joined the International Textile Manufacturers Federation (ITMF)

Contributed to the development of the new Industry 4.0 viscose manufacturing standard

Participated in Jakarta Muslim Fashion Week, 20–22 October 2023, showcasing Wastra Riau modest fashion collection



Participated in Jakarta Fashion Week (JFW), 23–29 October 2023, showcasing sustainable fashion collection by four local brands using APR viscose rayon



Supported the JFW Fashion Designers Competition (*Lomba Perancang Mode*) and presented the APR Award for a design using our viscose rayon



**RANTAI TEKSTIL LESTARI (RTL)**

Hosted focus group discussions with students from RMIT on 26 January 2023

Sponsored the first Southeast Asian World Circular Textiles Day (WCTD) workshop co-hosted by RTL on 8 May 2023, themed “Roadmap to 2050: Materials, Products & Services, and People”

Participated in the ZDHC’s first Indonesian conference titled “Accelerating Sustainable Chemical Management: The ZDHC Way” on 26 July 2023, including a briefing note from APR’s President Director, Basrie Kamba, and a presentation from our Operational Director, Saleel Rajaram Nayak

Participated in the 5 October WCTD conference, sharing case studies on circularity in the fashion industry



Participated in the “Towards Circularity: An ASEAN Perspective on Zero Waste Management in The Fashion Industry” panel discussion organised by the Indonesian Ambassador to Thailand and the ASEAN Centre for Sustainable Development Studies & Dialogue (ACSDSD), 2 October 2023

Participated in the TESTEX seminar on “Sustainability Solutions”, 13 December 2023

Participated in inaugural RTL member gathering and annual meeting, 5 October 2023



Participated in TVRI interview to share knowledge and experiences about the challenges faced and progress made towards sustainable fashion



# APPROACH TO SUSTAINABILITY

## TRANSPARENCY AND COMMUNICATION [GRI 2-14]

Long-term relationships require transparency and trust. We inform and update APR stakeholders on our sustainability initiatives, targets, and progress on our website, in quarterly newsletters, and annual reports that are reviewed and approved by APR leadership and the RGE executive team.

Communicating our sustainable [Pulp Sourcing Policy](#) and environmental management practices can be complex. Nevertheless, we are committed to transparency and sustainability to enhance our standing among stakeholders, particularly end-users and consumer brands. Our commitment to transparency includes our engagement with Canopy.<sup>4</sup>

Despite improving our Canopy Hot Button rating, APR is still categorised as “high risk” due to historical sources in Indonesia, which Canopy identifies as “ancient and endangered forests.” Over the last four years, we have advocated for a more nuanced assessment, urging Canopy to consider our company’s deforestation-free commitment since 2015 and the local and historical context to properly evaluate our fibre sourcing practices fairly and accurately.

In 2023, an independent consultant assessed CanopyStyle and Hot Button Report against relevant ideal standards. The findings, which have been shared with Canopy noted weaknesses in consistency and transparency of the evaluation and ranking process. See final report on <https://www.aprilasia.com/media>

We encourage stakeholders to evaluate our sustainability performance through the lens of other relevant certifications and independent assessments, such as the Zoological Society of London’s Sustainability Policy Transparency Toolkit (ZSL SPOTT). A comprehensive assessment of these benchmarks will provide a balanced perspective on APR’s sustainability initiatives.

## SUSTAINABLE STANDARDS AND ASSESSMENTS [GRI 3-3, 417-1, 417-2]

APR operates a world-class VSF production facility that exceeds local regulatory requirements and the criteria of the European Union Best Available Techniques (EU BAT) Polymer BREF and ZDHC MMCF guidelines. We voluntarily subscribe to Cascale’s (formerly Sustainable Apparel Coalition, or SAC) Higg Facility Environmental Module (FEM) and Facility Social & Labor Module (FSLM), and submit to annual environmental, social, and governance reviews by the Sustainable Apparel Coalition, EcoVadis, and CDP, among others.

We independently audit and certify our sustainable production and management practices by third parties to ensure they meet international market criteria, especially regarding hazardous chemical management. To ensure the quality of APR VSF and yarn, we subscribe to internationally recognised standards, including the OEKO-TEX®, FKT, and the OK biodegradable label.

In 2023, we assessed all our products, confirming 100% compliance with all applicable voluntary marketing, labelling, and service information codes during the reporting period.

APR participated in the development of the revised [ZDHC v.3 MMCF guidelines](#) and ZDHC Dissolved Pulp Guidelines V1.0, joining industry discussions to share expertise in sustainability best practices. Additionally, we provided training and education to local suppliers improve their awareness and understanding of how Higg Facility Environmental Module (Higg FEM) and FSLM (Facility Social and Labour Module) requirements apply to their daily operations.

 See also: [Clean manufacturing](#)

<sup>4</sup> Canopy is an international environmental nonprofit organisation working with companies to make fibre supply chains more sustainable and protect the world’s remaining Ancient and Endangered Forests.



**Notable achievements in 2023:****STANDARDS**

- Improved verified Higg FEM score to 71%
- Reduced fence noise level to meet EU BAT threshold
- Improved verified Higg FSLM score to 86.3%
- Reduced zinc levels in water, exceeding ZDHC's Aspirational level
- Improved sodium sulphate recovery, meeting ZDHC's Progressive level

**AWARDS, CERTIFICATION AND LABELS**

- Awarded C2C Certified Material Health Certificate (Silver Version)
- Earned inaugural Ministry of Environmental and Forestry Blue PROPER rating for July 2022–June 2023

**ESG ASSESSMENTS**

- Received B score for CDP Climate Change disclosures
- Achieved EcoVadis Gold rating for the first time





# CLIMATE AND NATURE

The fashion industry generates significant greenhouse gas (GHG) emissions and is increasingly at risk from climate change. In 2018, APR signed the United Nations Framework Convention on Climate Change (UNFCCC) *Fashion Industry Charter for Climate Action*, committing to support the goal of limiting the average global temperature rise to 1.5°C above pre-industrial levels, per the 2015 Paris Agreement.

APR joined the Science Based Targets initiative (SBTi) in December 2022, and will be setting SBTi-approved reduction targets towards zero emissions by 2050. APR also supports industry climate initiatives, including the MMCF 2030 Vision, Textile Exchange 2030 Climate+ Strategy, and the Cascale (formerly Sustainable Apparel Coalition, or SAC) Decarbonisation Program.

APR's carbon reduction strategy improves operational efficiencies, reduces environmental impacts, and aligns with our primary supplier's emissions reduction and biodiversity conservation goals. We disclose our carbon footprint annually and use the CDP climate change questionnaire to ensure transparency about climate-related risks.



- Halve Product Carbon Intensity (Against 2019 Baseline) Based On Cradle-to-gate LCA Approach By 2030

- Ensure **100% Of Energy Supply** Comes From **Renewable Sources**

- Support The Achievement Of **Net-zero Emissions** From APRIL's Land Use By 2030

- Contribute To APRIL's Conservation And Wildlife Habitat Protection Initiatives In Indonesia

CORE GOAL:



CONTRIBUTED GOAL:







# CLIMATE AND NATURE

## CARBON FOOTPRINT

[GRI 3-3, 305-1, 305-2, 305-4, 305-5]

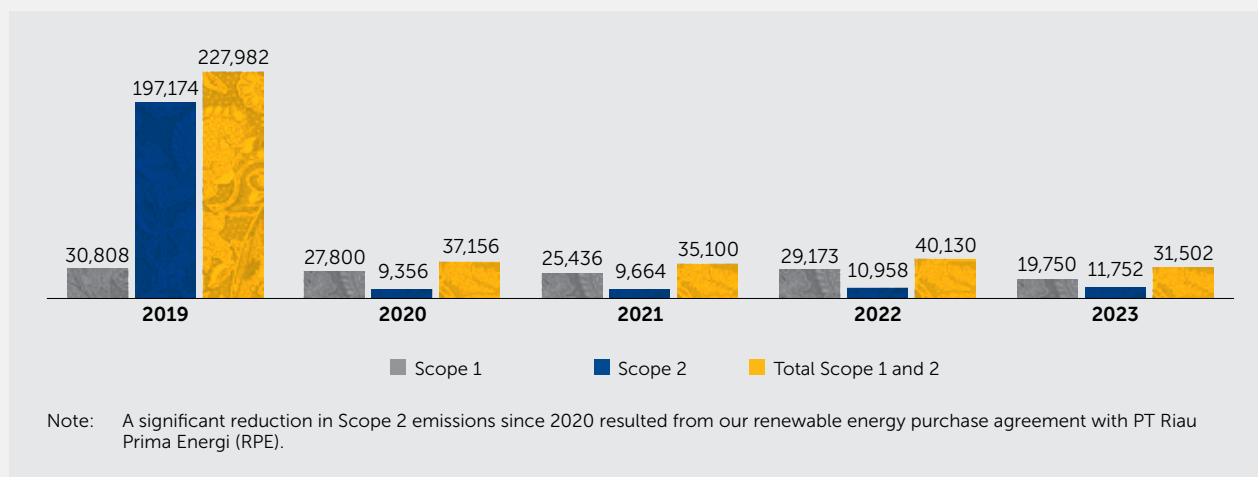
### APR emissions

We use the GHG protocol to calculate our GHG emissions and annually measure direct (Scope 1) emissions from APR-owned sources, including vehicle emissions and fuel combustion at our chemical plant. We also measure indirect (Scope 2) emissions from purchased electricity, steam, heat, and cooling, accounting for them using the market and location-based 'dual reporting' approach.

Our combined 2023 Scope 1 and Scope 2 (market-based) emissions and emission intensity reached a record low of 31,502 metric tonnes of carbon dioxide equivalent (t CO<sub>2</sub>e) and 0.10 t CO<sub>2</sub>e per tonne of VSF produced (t CO<sub>2</sub>e/t VSF) respectively, representing 86.2% and 91.4% reductions compared to 2019. These achievements are owed to our ongoing investments and programmes under our decarbonation strategy.

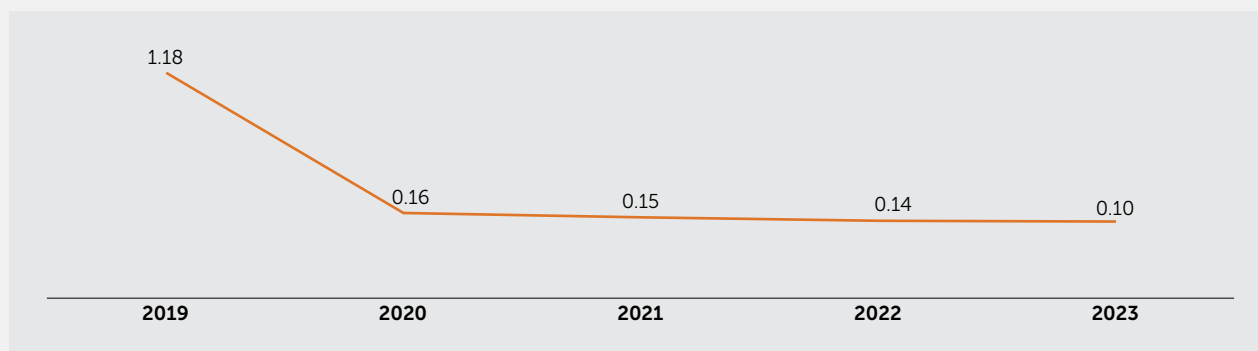
### Absolute Scope 1 and 2 GHG emissions 2019–2023 (t CO<sub>2</sub>e)

Market-based emissions



### Scope 1 and 2 GHG emissions intensity 2019–2023 (t CO<sub>2</sub>e/t VSF)

Market-based emissions





Our location-based Scope 2 emissions totalled 204,159 t CO<sub>2</sub>e in 2023. (See [Base data](#))

In 2023, APRIL conducted a complete GHG inventory across its entire operations, including APR. In view of this, we are streamlining and consolidating our protocols for collecting Scope 3 emissions data and will provide more information in future reports.

**HALVING PRODUCT CARBON INTENSITY IN THE VALUE CHAIN**

APR aims to reduce product cradle-to-gate carbon intensity by 50% by 2030 against our 2019 baseline.

In 2020, we conducted peer-reviewed life cycle assessments using a comprehensive value-chain approach. This inaugural assessment identified energy and chemical consumption as a significant problem and recommended a 36% reduction in total emissions intensity to achieve the above target. We will conduct a subsequent assessment in 2024 to review progress and determine areas for adjustments or improvements.

**APR'S DECARBONISATION STRATEGY**

APR's decarbonisation strategy addresses what we can control within our operations and across our entire value chain:



# CLIMATE AND NATURE

## ENERGY MANAGEMENT [GRI 3-3, 302-3, 302-4]

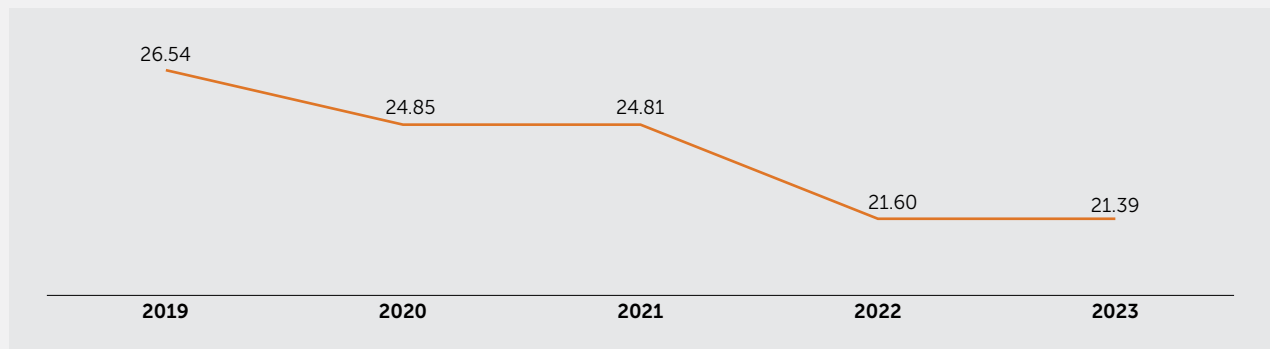
Since 2020, we have powered APR operations with 100% renewable energy purchased from PT Riau Prima Energi (RPE) at our Riau complex. This subsidiary operates multi-fuel and chemical recovery power boilers that supply electricity to APR and APRIL's integrated operations. We calculate our energy consumption using the mass balance approach based on the power needed to produce one tonne of VSF.

PT RPE generated over 129 million gigajoules (GJ) of energy in 2023, of which 88% is from renewable and cleaner energy sources. It progressively expanded this share, increasing solar power capacity from one

megawatt (MW) in 2021 to 13.5 MW, adding 2.5 MW of generation capacity in 2023. This is in alignment with PT RPE's goal of increasing its total solar power capacity to 50 MW by 2030.

APR's robust energy monitoring and measurement system tracks electricity and steam consumption across all departments, annually reviewing reduction goals based on the European Union Best Available Techniques (EU BAT) Polymer BREF standard. In 2023, our total energy consumed was 6.6 million GJ, a 7% increase from 2022. However, we reduced the energy intensity for every tonne of VSF produced to 21.39 GJ/t VSF, 19.4% lower than our 2019 baseline, thanks to our ongoing efforts to optimise our processes and increase energy efficiency.

### Energy intensity 2019–2023 (GJ/t VSF)



We continue to explore ways to reduce our energy footprint through initiatives that include:

Improving waste heat recovery and generating more steam as a by-product of APR operations

Pilot project to capture and convert high-pressure steam generated at PT RPE during VSF production into electricity

Expanding solar power generation capacity to 50 MW by 2025

Purchasing four electric buses in partnership with *Mobil Anak Bangsa*, expanding our fleet to six vehicles

In 2023, APR conducted an internal audit of our energy management system with a view to achieve ISO 50001:2018 certification in 2024. We will follow up with an external audit. We will also develop the capacity of our energy management team and increase human capital by engaging specialists and training our staff.

**SUSTAINABLE SOURCING AND PROCUREMENT**  
 [GRI 2-6, 3-3, 204-1, 301-1, 308-1, 308-2, 414-1, 414-2]

**Dissolving wood pulp**


APR sources 100% renewable dissolving wood pulp (DWP) to produce VSF. In 2023, we sourced 310,868 tonnes of DWP – an 8.85% increase from 2022 – from four direct suppliers. The bulk (96%) was sourced locally from APRIL and PT Toba Pulp Lestari. The remaining 4% originated outside Indonesia from existing suppliers in Canada, the United States, and Europe.

APR sources exclusively from Programme for the Endorsement of Forest Certification (PEFC™) certified suppliers, per our [Pulp Sourcing Policy](#) and our brand’s commitment to sustainable viscose production.

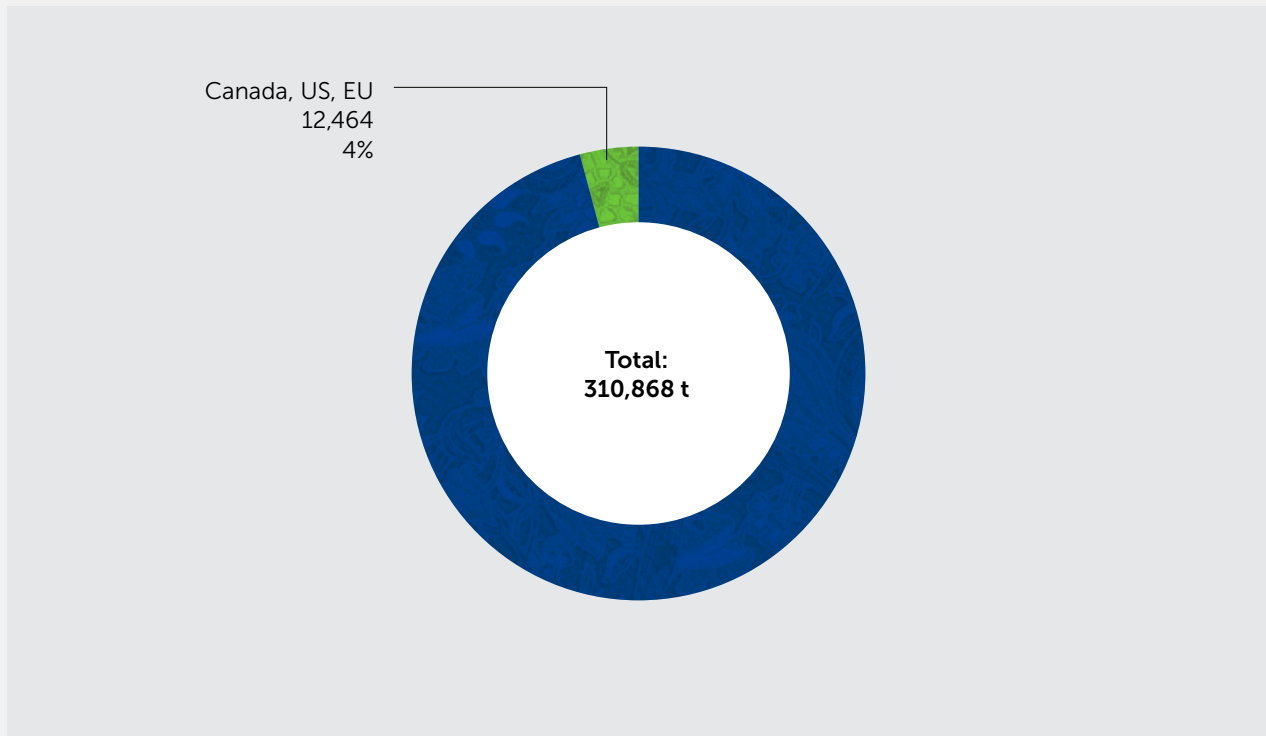
APR’s [Follow Our Fibre](#) tracking platform enables us to trace our supply to plantation based on supplier-provided data by tracing viscose fibre from nursery to bale. APR customers can scan QR and bar codes to confirm the origin of wood pulp used in bales they receive. We are currently adding APY products to Follow Our Fibre to improve traceability.

**Chemicals, oils, and packaging**

Chemicals, oils, and other VSF and yarn-processing materials represent 22% of our procurement budget. We source a small quantity of plastic, cardboard, and other packaging materials to wrap viscose bales delivered to customers.

 [See Chemical management and recovery](#)

**DWP sourced by region 2023 (t, %)**





# CLIMATE AND NATURE

## Supplier assessments and engagement

APR suppliers must adhere to our Sustainability Policy and Code of Procurement Ethics (COPE) and complete mandatory risk assessment questionnaires.

Our procurement team annually evaluates suppliers, assessing business ethics and integrity, technology, product and service quality, responsiveness, delivery, cost competitiveness, health, safety, and environmental performance. We conduct on-site inspections, if necessary, and review internal policies and management systems to ensure compliance with our environmental and social standards. In the event of non-compliance, we work with suppliers to address and resolve issues through comprehensive time-bound corrective action plans.

APR's and APRIL's integrated operations and shared policies ensure that DWP from our sister company's mills automatically meets the criteria of our Pulp Sourcing Policy on certified plantations, deforestation prevention, continuous improvement, and transparency. Furthermore, we assessed all local and international suppliers in 2023, confirming they comply with our policy commitments.

To meet Higg Facility Environmental Module (Higg FEM) and Zero Discharge of Hazardous Chemicals (ZDHC) standards, we encourage suppliers to conduct self-assessments and require chemical suppliers to submit declarations that materials provided do not contain hazardous or restricted chemicals.<sup>5</sup>

APR supports this process, by offering third-party facilitated workshops designed to raise awareness and train suppliers and contractors to complete their self-assessments and declarations. These workshops help suppliers better implement the Higg and ZDHC standards to meet our rigorous sustainability requirements.

 [See Pulp Sourcing Policy requirements](#)

## BIODIVERSITY CONSERVATION


[GRI 3-3, 304-1]

APR is dedicated to supporting our primary supplier, APRIL, in restoring natural landscapes and conserving biodiversity as part of our decade-long APR2030 strategy. APRIL's long-term conservation and restoration plans involve a 1-for-1 commitment to conserving natural forest areas equal to its forestry plantation areas, including the Restorasi Ekosistem Riau (RER) project.


APRIL currently conserves and restores 362,136 hectares in Indonesia, separately from conservation partnerships outside of its concession areas.


### Restorasi Ekosistem Riau (RER)

APRIL launched the RER project in 2013, a joint public-private initiative to restore and conserve ecologically significant peat forest areas on Sumatra's east coast. It covers over 150,600 hectares of intact peat forest on the Kampar Peninsula and Padang Island and is home to 800 animal and plant species.

 [APRIL published a comprehensive report marking RER's tenth anniversary in January 2024 to highlight the project's positive impacts. Read the report here.](#)

APR recognises APRIL's positive impact on surrounding landscapes and will continue contributing to RER and other APRIL initiatives.

 [Restorasi Ekosistem Riau](#)

 [Restorasi Ekosistem Riau](#)

<sup>5</sup> Chemicals listed in Annex 3 of the [Standard StEP by OEKO-TEX® Manufacturing Restricted Substances List \(MRSL\)](#), Edition 02.2024 and the [ZDHC MRSL Version 3.0](#).







# CLEAN MANUFACTURING

Adopting clean and closed-loop manufacturing processes is essential for minimising our environmental impact and is a central pillar of our APR2030 strategy. We capture and reuse chemicals and their by-products, continue to reduce hazardous substances in production with a view to eliminating them, treat and recycle wastewater, manage waste properly, and implement air pollution control methods.



■ **>95% Sulphur Recovery Rate** By 2025

■ **50% Reduction In Process Water Consumption Intensity** By 2030 (Against 2019 Baseline)

■ **80% Reduction In Solid Waste To Landfill** By 2030 (Against 2019 Baseline)

■ **Meet All Criteria Set Out In The EU BAT Polymer BREF** By 2023

■ **Meet ZDHC MMCF Guidelines 'Aspirational Levels'** By 2025

**CORE GOAL:**







# CLEAN MANUFACTURING

Our production processes comply with local regulations and international and industry standards, guidelines, and best practices, including:

- World Health Organization (WHO) guidelines
- OEKO-TEX® STeP standard Annex 5
- 2007 European Union Best Available Techniques (EU BAT) Reference Document on the Production of Polymers
- Zero Discharge of Hazardous Chemicals (ZDHC) Man-Made Cellulosic Fibres (MMCF) guidelines
- ZDHC Manufacturing Restricted Substances List (MRSL) v3.0
- Higg Facility Environmental Module (Higg FEM).

APR has successfully finalised the EU-BAT assessment and verification process in Q4 2024 and is progressing towards full compliance with all EU-BAT requirements. Additional information will be shared in the APR 2024 Sustainability Report.

At the time of this report's publication the EU BAT standard is under review, and the next revision is expected to be stricter. APR will take appropriate measures to comply with the new standard upon its release.

## SUPPORTING ZDHC

In July 2023, APR participated in the first ZDHC Roadmap to Zero Programme Conference in Indonesia, organised by ZDHC, *Rantai Tekstil Lestari* (RTL), and other industry stakeholders. We showcased our commitment to sustainability and our ongoing efforts to implement ZDHC guidelines.

As a ZDHC signatory since 2019, we have met the foundational and progressive requirements of the Roadmap to Zero Hazardous Discharge Programme. Per our APR2030 Clean Manufacturing goals, we aim to meet its aspirational requirements by 2025.

Earlier in the year, APR was invited to help develop the revised ZDHC v.3 MMCF guidelines. We are proud to have been recognised as industry experts in sustainability best practices, advancing environmental stewardship, and driving sustainable manufacturing innovation. We take seriously our responsibility to co-author robust, effective guidelines that are responsive to industry trends and advancements.



**APR progress against EU BAT BREF and ZDHC MMCF 2023**

Consumption (t/VSF)	Unit	2023	EU BAT	ZDHC		
Energy	GJ	21.39	20–30			
Process water	m <sup>3</sup>	30.84	35–70			
Pulp	t	1.008	1.035–1.065	1.010–1.065		
Carbon Disulphide (CS <sub>2</sub> )	kg	61.65	80–100	80–100		
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> )	t	0.65	0.6–1.0	0.65–1.03		
Caustic Soda (NaOH)	t	0.52	0.4–0.6	0.45–0.6		
Zinc (Zn)	kg	2.38	2–10	2–10		
Spin finish	kg	4.40	3–5	3–5.3		
Sodium hypochlorite (NaOCl)	kg	43.30	0–50	0–70		
Emission per tonne (t/VSF)	Unit	2023	EU BAT	ZDHC		
Sulphur (S) to air	kg	13.16	12–20	F(35)	P(20)	A(12)
Sulphate (SO <sub>4</sub> <sup>2-</sup> ) to water	kg	124.62	200–300			
Zinc (Zn) to water	g	11.73	10–50	F(150)	P(60)	A(18)
Chemical oxygen demand (COD)	g	3,048.34	3000–5000	F(7200)	P(6000)	A(3600)
Total suspended solids (TSS)	mg/L	32.13		F(50)	P(15)	A(5)
Hazardous waste	kg	64.46	0.2–2			
Noise at the fence	dBA	65.66	55–70			
Recovery rates	Unit	2023	EU BAT	ZDHC		
Total Sulphur (S)	%	94.89		F(85%)	P(92%)	A(95%)
Sodium Sulphate (Na <sub>2</sub> SO <sub>4</sub> )	%	61.71		F(50%)	P(60%)	A(70%)

## Notes:

1. We have met targets in green cells and are on track to meet targets in yellow cells.
2. ZDHC stipulates Foundational (F), Progressive (P), and Aspirational (A) goals for some parameters.

**EARNING A BLUE RATING ON OUR FIRST PROPER ASSESSMENT**

In 2023, APR submitted our disclosures for an inaugural Ministry of Environment and Forestry PROPER assessment evaluating our facilities' environmental performance, regulatory compliance, and sustainable management practices. We earned a Blue rating, indicating adequate environmental compliance.

We also received the Top 5 Outstanding Achievement of Public Service Innovation Award for the effective use of life cycle analyses, social innovation, and social return on investment (SROI) criteria in our Environmental Management System.



# CLEAN MANUFACTURING

## CHEMICAL MANAGEMENT AND RECOVERY [GRI 3-3, 305-7]

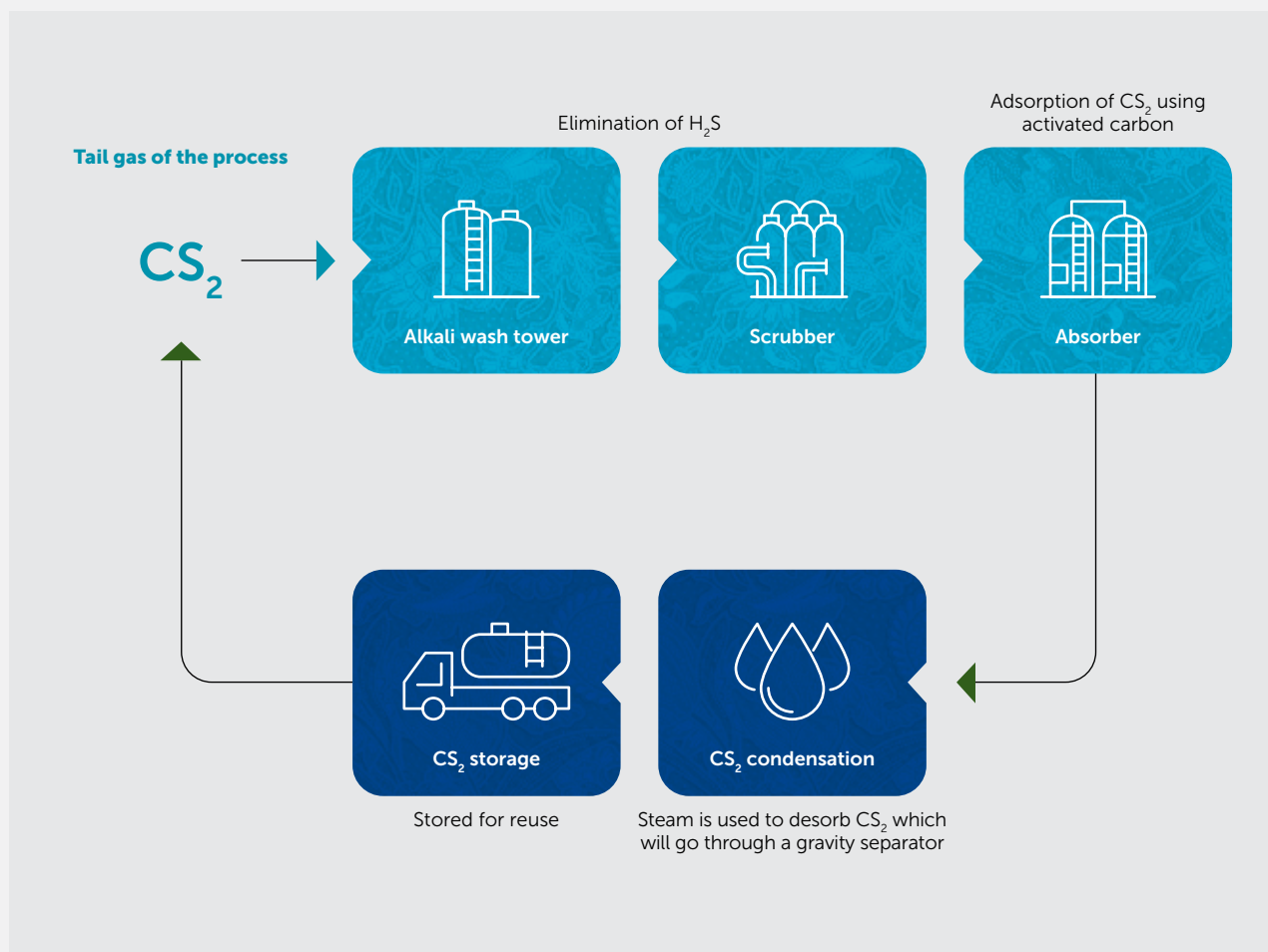
APR comprehensively documents chemical use and management. We follow ZDHC chemical recovery guidelines and submit relevant report data through the ZDHC portal as required.

### Sulphur recovery system

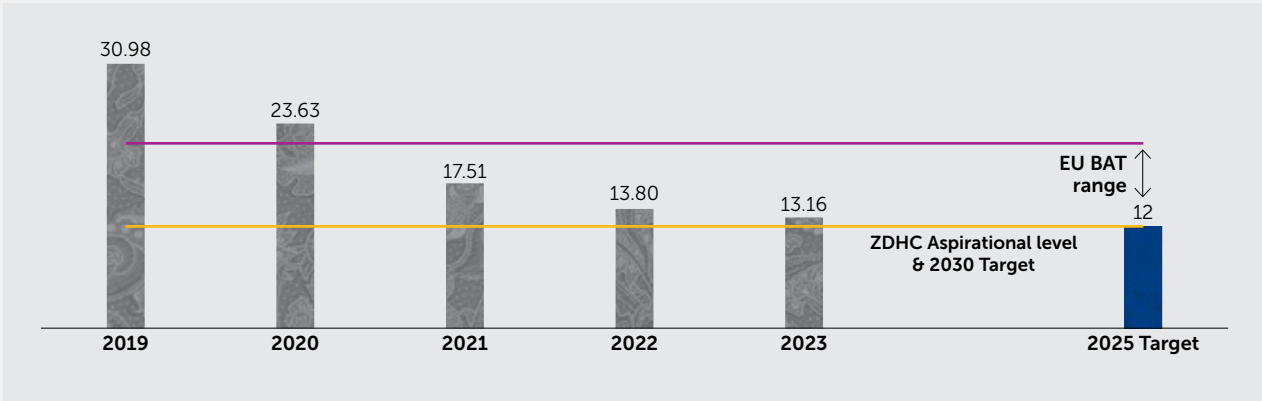
Viscose staple fibre (VSF) production is a multi-step chemical process that transforms dissolving wood pulp (DWP) into viscose fibre. DWP is treated with caustic soda (NaOH) and carbon disulfide (CS<sub>2</sub>) and regenerated in a sulphuric acid bath to produce VSF.

We use a wet-process CS<sub>2</sub> recovery system to prevent the release of sulphur-rich gases into the atmosphere. It captures and converts these gases into reusable CS<sub>2</sub>, maximising resource recovery and minimising environmental impact.

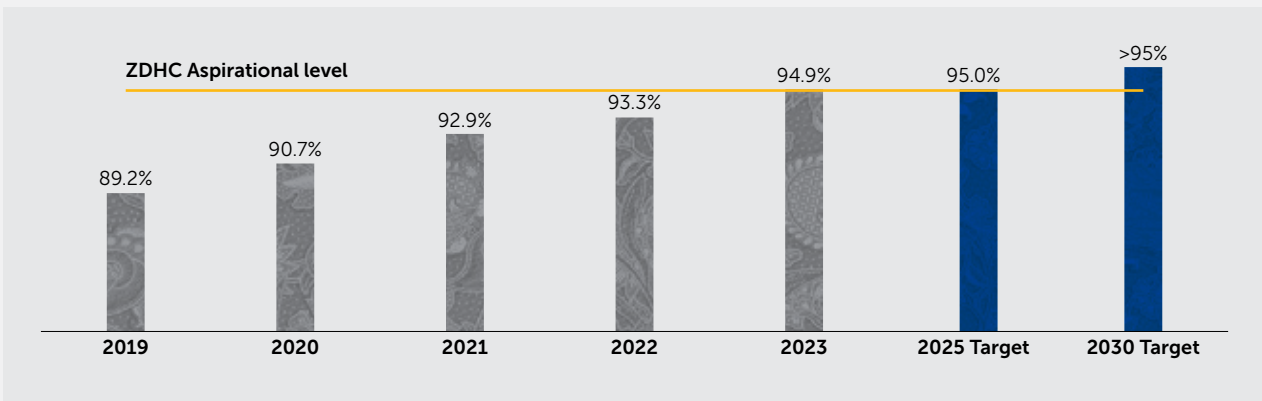
### CS<sub>2</sub> recovery system



**Sulphur emission intensity 2019–2023 (kg/t VSF)**



**Total sulphur recovery rate 2019–2023 (%)**



Our sulphur emission intensity and sulphur recovery rate are improving year on year. Our 2023 sulphur emission intensity was 13.16 kilograms per tonne of VSF, 4.6% lower than in 2022 and 57% less than our 2019 baseline of 30.98 kg/t VSF. Our sulphur recovery rate was 94.9%, nearly ZDHC’s aspirational level of 95%. We are on track to reach our APR2030 targets.

**THE FIRST INDONESIAN VSF FACILITY TO MEET THE NEW GOVERNMENT REQUIREMENT**

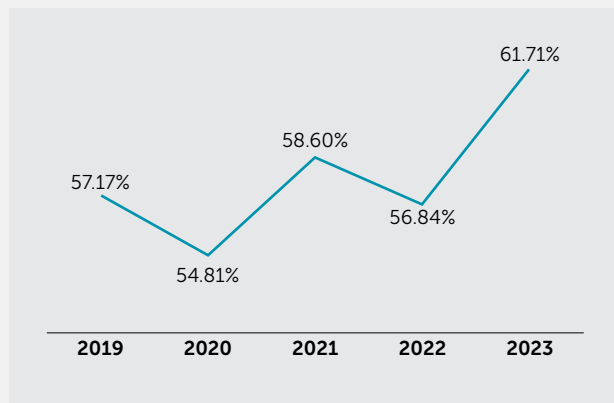
In April 2023, APR inaugurated a continuous emissions monitoring system (CEMS), becoming the first Indonesian VSF facility to comply with the new government requirement. It measures and transmits real-time air quality indicators to the Ministry of Environment and Forestry’s SISPEK emissions monitoring platform.

# CLEAN MANUFACTURING

## Sulphate recovery

Sodium sulphate is a solid by-product of VSF production. This valuable compound has diverse applications and is recovered using a simple evaporation process. By enhancing and optimising our chemical recovery processes, we raised our recovery rate from 56.84% in 2022 to 61.71% in 2023.

### Sodium sulphate (Na<sub>2</sub>SO<sub>4</sub>) recovery 2019–2023 (%)



We sell recovered sodium sulphate worldwide for industrial applications. We also supply unsold sodium sulphate to our sister company, APRIL, as a bleaching agent for its pulp mill at our integrated operations, demonstrating circularity in action. We supplied 26,760 tonnes of sodium sulphate to APRIL.

## Avoiding hazardous chemicals

In addition to advancing chemical recovery, we are looking to phase out hazardous chemicals, such as the sodium dichromate (Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) used in our spinneret cleaning process. This chemical contains the heavy metal chromium and is on the ZDHC Manufacturing Restricted Substances List (MRSL)<sup>6</sup>. In 2023, we completed an internal feasibility study on potential sodium dichromate substitutes for spinneret cleaning. We are now focused on translating laboratory findings into practices at our operations and are seeking efficient and innovative technologies for their effective implementation.

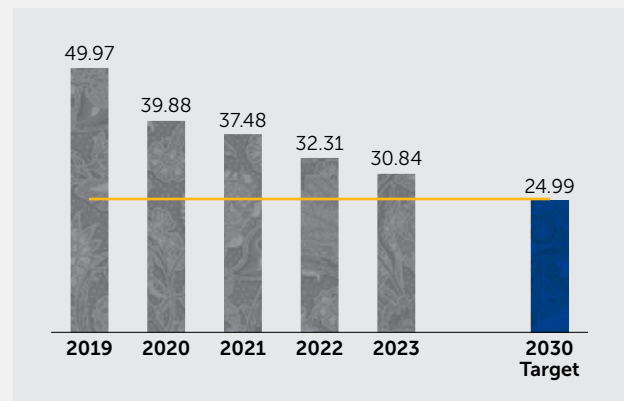
6 Based on the ZDHC MRSL guidance sheet on heavy metals. Available [here](#).

## WATER AND WASTEWATER MANAGEMENT [GRI 3-3, 303-1, 303-2, 303-5]

APR buys treated water from PT Riau Prima Energi (RPE), an APRIL subsidiary licenced to extract water from the Kampar River for industrial purposes. **Our annual process water consumption intensity levels have declined since our first year of operations, with a cumulative reduction of 38.3% to 30.84 m<sup>3</sup>/t VSF in 2023.** These figures are due to optimising our processes and improving efficiency while increasing production, reusing condensate water, and reusing recycled water from our domestic wastewater treatment plant.

We continue to work towards our APR 2030 target of reducing water consumption by 50% by 2030 compared to our 2019 baseline.

### Process water consumption intensity (m<sup>3</sup>/t VSF)



The wastewater generated by our mill processes is treated at a dedicated effluent treatment plant (ETP), where it undergoes primary and secondary treatment and an activated sludge process. We collect daily wastewater samples at strategic locations to monitor quality before discharge into the Kampar River.

APR's production wastewater system collects and processes wastewater from our mill. We sample wastewater quality twice daily at strategic locations before discharging it into the Kampar River. We also sample it monthly at upstream and downstream discharge points to assess overall river conditions.



We deliver real-time wastewater quality data to Ministry of Environment and Forestry (MOEF) servers using the SPARING<sup>7</sup> online monitoring system and publish our wastewater data on the voluntary [ZDHC Wastewater Gateway](#) twice a year. We meet and exceed ZDHC aspirational levels for chemical oxygen demand (COD) and zinc-to-water and expect to achieve the ZDHC aspirational level for total suspended solids (TSS) by 2025.

**WASTE MANAGEMENT**

[GRI 3-3, 306-1, 306-2, 306-3, 306-4, 306-5]

APR’s waste management approach follows the 3R principles: reduce, reuse, and recycle. Our waste reduction and circularity initiatives include:

**Upgrading VSF spinnerets to reduce clumping and TOW waste by 60–70%**

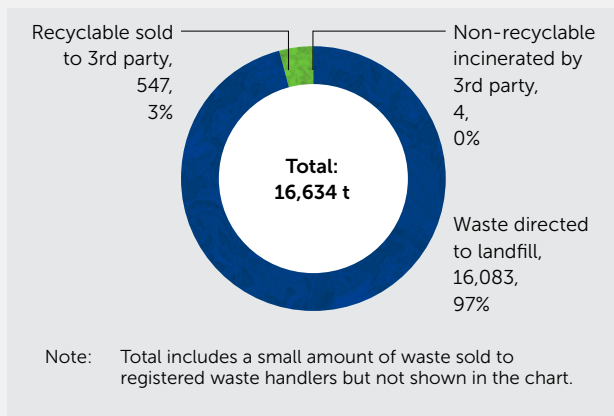
**Recycling reusable cellulose retrieved during scheduled filter maintenance**

**Recycling and processing TOW waste into saleable fibre**

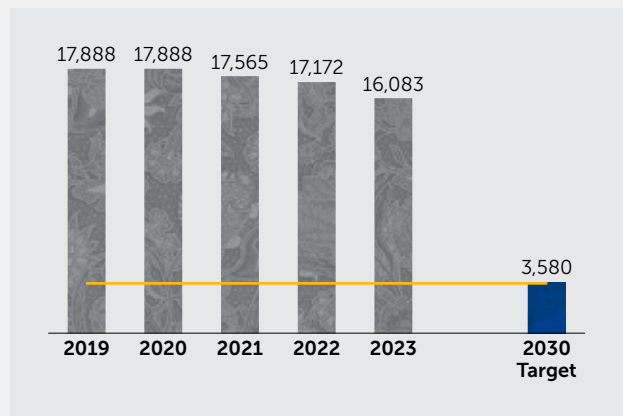
**Obtained permit for the recovery and reuse of zinc from our waste pipes as fertiliser at our plantations**

In 2023, we produced 16,634 tonnes of waste, compared to 18,284 tonnes in 2019 – a reduction of 9% since our first year of operations. We sold 3.3% to registered waste handlers for recovery and reuse and directed 96.7% to landfill, including 0.5% TOW waste (reject VSF). The volume of solid waste to landfill fell by 1,805 tonnes or 10% compared to 2019.

**Waste generated by type 2023 (t, %)**



**Solid waste directed to landfill 2019–2023 (t)**

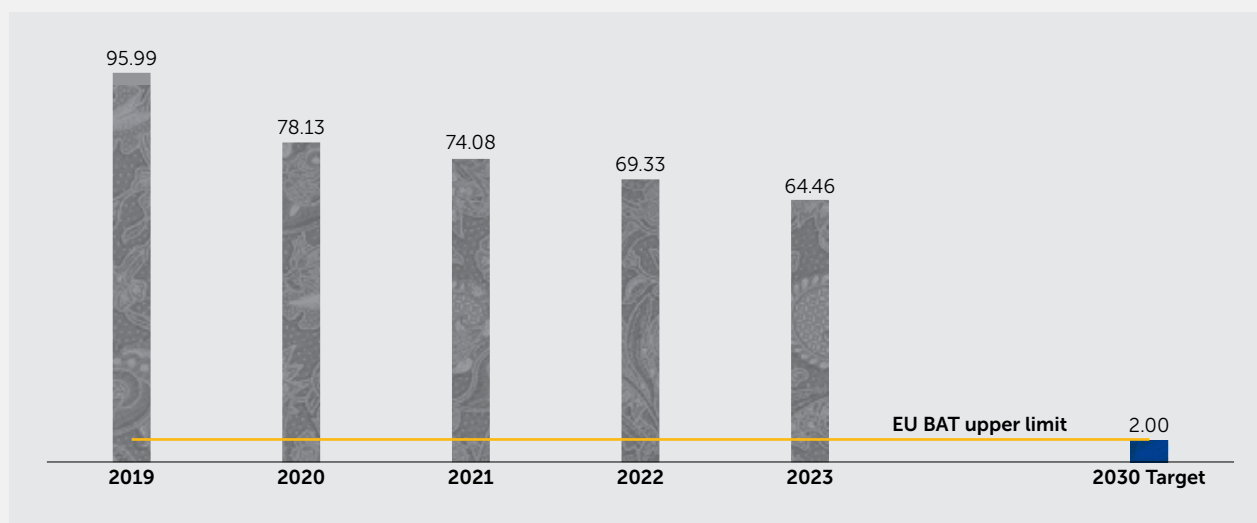


<sup>7</sup> SPARING stands for *Sistem Pemantauan Kualitas Air Limbah secara Terus Menerus dan Dalam Jaringan*. It is a mandatory requirement under the Regulation of the MOEF of the Republic of Indonesia Number P.93/Menlhk/Setjen/Kum.1/8/2018 concerning Procedures for Monitoring and Reporting of Water Quality.

# CLEAN MANUFACTURING

Our 2023 hazardous waste intensity was 64.5 kilograms per tonne of VSF produced (kg/t VSF), a 6.9% reduction from 2022 and a cumulative 32.8% reduction from our 2019 baseline.

## Hazardous waste intensity 2019–2023 (kg/t VSF)



Despite our progress, achieving the EU BAT Polymer BREF target of 2 kg/t VSF remains a substantial challenge due to the differences in legal classifications of hazardous waste in different countries and regions, particularly Indonesia and Europe. We are collaborating closely with the Indonesian government to investigate the nature of our waste, analysing its chemical properties, environmental impact, and toxicity levels, while sharing insights on the EU BAT Polymer BREF standard.

APR continues to innovate to meet the ambitious APR2030 goal of reducing waste by 80% and is exploring further waste reduction and circular production methods at our operations. Furthermore, we are partnering with pulp and paper consulting firms and engaging with industry peers in the viscose sector to collectively tackle the material challenges hindering our waste reduction efforts.



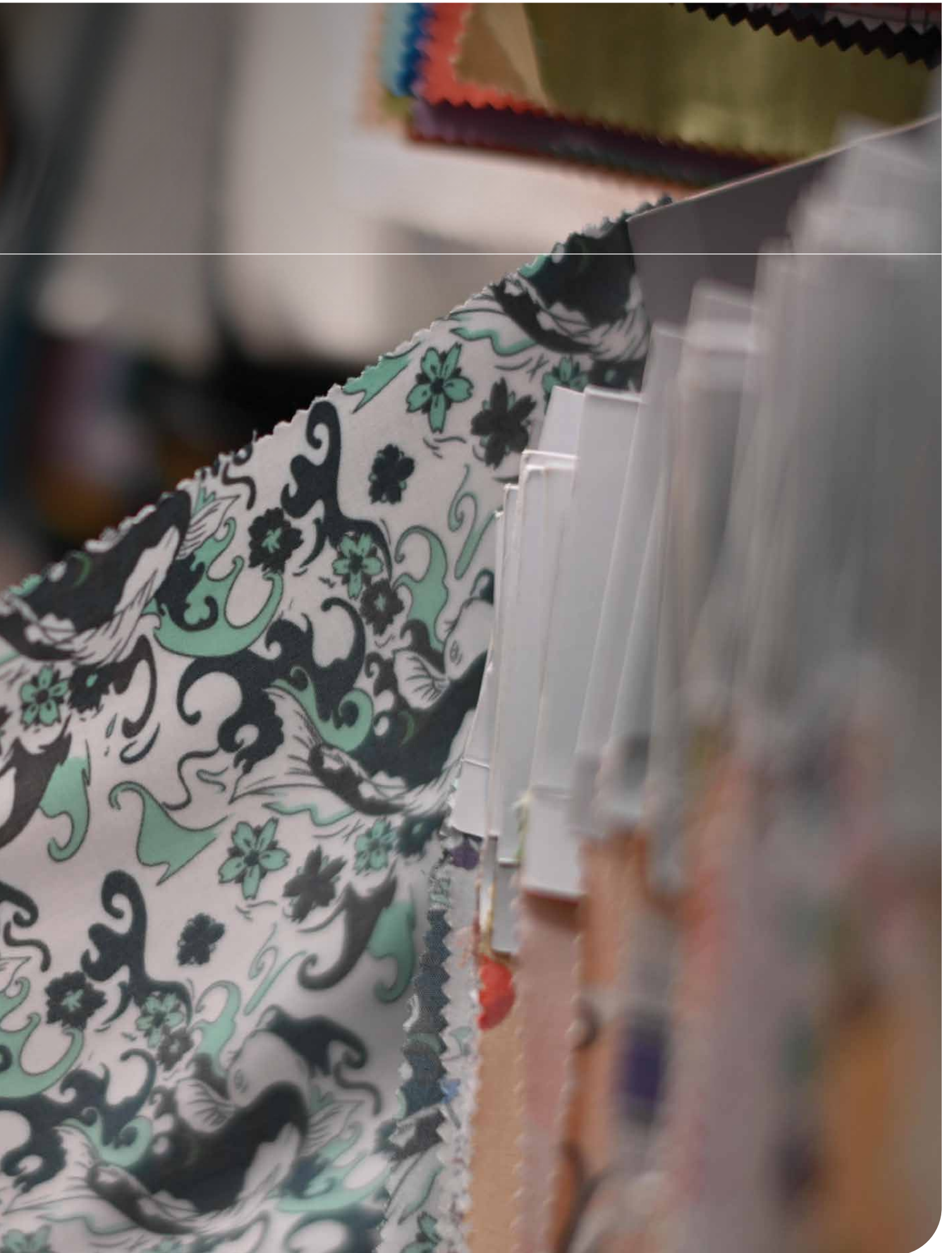


# CIRCULARITY

## ACCELERATING INNOVATION AND R&D [GRI 3-3]

As a responsible fibre and yarn producer, APR recognises our crucial role in transitioning the industry from a take-make-dispose model toward a more sustainable, circular economy. By leveraging our strong R&D capabilities, extensive market connections, and collaborative approach, we invest in systemic solutions and actively seek partnerships to drive next-generation circularity innovations and minimise waste across the textile industry.

	<ul style="list-style-type: none"> <li>20% Recycled Textile Composition In VSF Production By 2030</li> </ul>	<ul style="list-style-type: none"> <li>Determine Feasibility Of Establishing Indonesia's First Commercial-Scale Recycled Textile Facility</li> </ul>	<ul style="list-style-type: none"> <li>Determine Feasibility Of Establishing Urban Textile Recycling Centres In Singapore And Indonesia</li> </ul>		
<b>CORE GOAL:</b>		<b>CATALYTIC GOAL:</b>		<b>CONTRIBUTED GOAL:</b>	





# CIRCULARITY

## THE KERINCI R&D CENTRE

Our Riau complex is home to a world-class R&D facility established by APRIL in 2003, alongside APR's dedicated R&D facility established in 2018. We invest in state-of-the-art technology, including an automated pilot plant that allows us to test, modify, and refine our processes on a smaller scale before rolling out changes at our main viscose production plant. Our expert R&D team is focused on innovating waste management strategies by minimising and reducing waste across all operations, including secondary production and distribution.

### RECYCLING TEXTILE WASTE WITH MATAHARI

In November 2022, we launched a textile waste recovery programme at select locations of Matahari, one of Indonesia's largest retail chains, to reduce textile waste in landfills. From October to November 2023, we invited customers to recycle used denim at designated collection boxes in exchange for store discounts. We sorted the collected denim, repurposed it as feedstock for APR's fibre-to-fibre recycling programme or diverting it to be downcycled into other household products.

By the end of 2023, collection boxes had been placed in 46 Matahari stores across Jabodetabek, Medan, Surabaya, and Bandung, with plans for further expansion.

### RECYCLING MATERIAL AS SHIPPING STRAPS

We use plastic straps containing 30% recycled material to secure viscose bales for shipping and are seeking alternatives to increase recycled content.



For more on our waste reduction initiatives, see [Waste management](#)

## USING RECYCLED TEXTILES IN VSF PRODUCTION [GRI 301-1, 301-2, 301-3, 306-2]

Our APR2030 strategy includes a commitment to using 20% recycled textiles as raw material. Our R&D teams have trialled several in-house technologies and types of textile waste since 2020, identifying challenges and developing solutions to increase recycled content in our manufacturing processes. **In early 2023, we received a patent for our revolutionary technology that allows us to manufacture viscose fibre using a blend of 50% recycled textile (RT) pulp with regular dissolving wood pulp.** As of June 2024, we have identified and secured suitable feedstock and are exploring methods to scale up our textile recycling technology.

Despite our breakthroughs, we recognise the challenges and realities of the current market, including the need for significant upfront investments and slow uptake from consumer brands and manufacturers. We are also mindful of the potential impact of this new recycling technology on the informal secondary market for recycled textiles, which is a source of income for local communities in Indonesia.


## THE RGE-NTU SUSTEX RESEARCH CENTRE

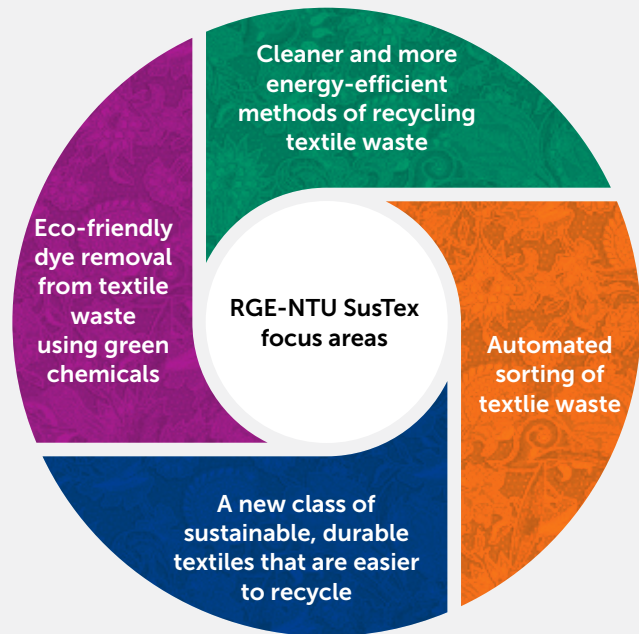
Our Singapore-based parent company, RGE, supports our circularity initiatives and is a member of the Singapore Fashion Council. Formerly known as the Textile and Fashion Federation (TaFF), the Singapore Fashion Council promotes circular economy and waste reduction innovation in the Asian fashion industry. RGE has also pledged USD 200 million to advance next-generation textile and fibre innovation over the next ten years.



Through its RGE Technology Centre (RTC), RGE partnered with the Nanyang Technological University (NTU) in 2022, establishing the RGE-NTU Sustainable Textile Research Centre (SusTex) to enhance circularity within the fashion value chain. Its primary focus is developing a textile recycling plant for urban environments.

In 2023, the research team conducted an on-site brainstorming session to better understand recycled textile pulp standards and quality specifications. While the textile recycling technology is still under development, the long-term objective is to achieve commercial viability. Further updates will be provided in future reports.

 [RGE YouTube on SusTex Research Centre](#)



# INCLUSIVE PROSPERITY

APR considers inclusive prosperity a core pillar of the APR2030 strategy. We support the socio-economic development of surrounding communities and our workforce.

APR operates its own community development programmes and partners with our sister company, APRIL, on joint initiatives in surrounding villages. APR engages with seven communities in a 10-kilometre radius around our Pelalawan and Siak Regency operations, while APRIL's initiatives extend to a 50-kilometre radius.

APR respects and protects the rights of our employees per the International Labour Organization's Declaration on Fundamental Principles and Rights at Work. We meet and exceed the provisions of EcoVadis, OEKO-TEX®, Higg Facility Social & Labor Module (FSLM), and other labour standards and schemes we adhere to, promoting safe and fair social and labour conditions for value chain workers.



- In partnership with APRIL, eradicate extreme poverty within a 50km radius of our operation
- Increase access to primary healthcare services in targeted villages within our operations
- Expand programmes that promote traditional craftsmanship
- Create a regional textile hub
- Advance gender equality across the value chain

CATALYTIC GOALS:



CONTRIBUTED GOAL:









# INCLUSIVE PROSPERITY

## OUR COMMUNITY

[GRI 3-3, 203-1, 203-2, 413-1, 413-2]

APR invests in the well-being of local communities directly and indirectly impacted by our operations. APR and APRIL operate transformative community empowerment programmes as part of our APR2030 and APRIL2030 commitments. We provide training, capacity building, knowledge sharing, access to new income sources, and partnership opportunities. These programmes and initiatives are developed with input from the affected communities to ensure their effectiveness.

### PUBLIC HEALTH

- Supported 42 *posyandus* employing 263 cadres
- Trained 34 female cadres
- Distributed supplementary feeding packages to 1,644 toddlers and 149 malnourished expectant mothers

### EDUCATING & ENGAGING YOUTH

- Awarded two Fashion scholarships
- Sponsored two general scholarships
- Conducted nine public webinars (seven coordinated by the Jakarta Fashion Hub, two in collaboration with *Rantai Tekstil Lestari*)

### 2023 community highlights:

### SUPPORTING LOCAL SMEs

- Engaged eight batik SMEs and two local fashion designers
- Supported training of local fashion SMEs through seven *Kelas Berbagi* with API Riau
- Collaborated with 12 SME offline partners to present ready-to-wear collection at the 2024 Jakarta Muslim Fashion Week (JMFW)
- Collaborated with 14 local fabric artisans and designers to showcase fashion collections made with APR viscose rayon at the *Riau Berkain* event

### PROMOTING TEXTILE ARTISANS & EMPOWERING WOMEN

- Championed traditional artisanship through the Riau Regional Textile Hub/ Centre of Excellence
- Trained 51 participants in *Rumah Batik*
- Trained five women in *songket* weaving







# INCLUSIVE PROSPERITY

## Reducing poverty

APR and APRIL have set a joint target of eliminating extreme poverty within 50 kilometres of our mill operations. In partnership with the Indonesian government and other stakeholders, we seek long-term, impact-driven solutions that create resilient communities.

Our shared approaches with APRIL include:

- **Social welfare:** Programmes that provide access to essential services (e.g. healthcare and education)
- **Income generation:** programmes that support local businesses and create jobs to generate new income (e.g. APR's livelihood programmes, APR's Riau textile hub, and programmes to empower women entrepreneurs).

## Health and nutrition for mothers and toddlers

APR and APRIL collaborate with community-based integrated health posts (*posyandus*), clinics in our vicinity, and local Family Welfare Programmes to improve healthcare access and outcomes in surrounding communities, including proper nutrition for expectant mothers and toddlers.

Preventing stunting and malnutrition are APR priorities. We support the Indonesian Government programme to eliminate toddler stunting in rural areas and achieve a 14% nationwide reduction against the 2014 baseline. We offer direct on-the-ground support and consult village heads and officials, *posyandu* cadres (community volunteers who staff *posyandu* community service posts), and other relevant stakeholders, including government representatives, on the national *Rembuk Stunting* prevention and management strategy. Together, we build solutions that improve the health of Indonesian mothers and their children. Our initiatives in 2023 include:

Providing health and nutrition education; running hygiene and sanitation campaigns

Setting up nutrition monitoring posts in Pangkalan Kerinci Kota and Pangkalan Kerinci Timur

Training *posyandu* cadres, especially on stunting reduction and management strategies

Distributing Information-Education-Communication Kits to 32 *posyandus* in Pangkalan Kerinci

Sponsoring counselling and training for expectant and young mothers, particularly on nutrition and childcare

Providing supplementary feeding support, e.g. food packets and nutritional supplements for mothers and toddlers

Providing treatment to pregnant women with chronic energy deficiency and recovery assistance to malnourished children under the age of five

Regularly monitoring *posyandu* activities at 32 service posts

Supplying equipment, including infant scales, to *posyandus* and providing women with labour (birthing) support



**PROMOTING TRADITIONAL TEXTILE CRAFTSMANSHIP**

**A textile hub in Riau**

APR’s Riau textile hub is the heart of our inclusive prosperity programme. This initiative supports our aim to establish a regional centre of excellence while supporting the local community and revitalising traditional Indonesian textile crafts.

We collaborate with like-minded stakeholders, including customers, suppliers, artisans, fashion designers, and schools, to launch prosperity-building programmes that support local women, small and medium-sized enterprises (SMEs), and youth. Our partners include *Rantai Tekstil Lestari* (RTL), API Riau, the Indonesian Fiber and Filament Yarn Producers Association (APSyFI), and other regional and national entities working to effect an industry-wide transformation.

**Textile hub initiatives**

	<b>Supporting community initiatives</b>		<b>Providing access to new income sources for community members</b>
	<b>Establishing a hub for batik making and songket weaving led by women in the community</b>		<b>Nurturing the talent of young adults by providing scholarships, training, and internships</b>
	<b>Supporting small businesses through development programmes and by integrating SMEs into our value chain</b>		<b>Promoting women employees to leadership positions through training and capacity building</b>

**PARTNERSHIP WITH MARANATHA CHRISTIAN UNIVERSITY**

In 2023, APR partnered with RTL and the Faculty of Art and Design at Maranatha Christian University in Bandung, Indonesia – a research-based university with a sustainable innovation ecosystem – to supply our biodegradable rayon fabric to the Batik Lasem community. This partnership aided the creation of batik pieces that were then selected as official souvenirs gifted to tourism ministers attending the G20 summit in Bali.

APR also supplied viscose rayon fabric directly to the university, which partnered with lifestyle brand Torajamelo to upcycle products resold to consumers on the brand’s Ahana e-commerce platform.

These two initiatives promote sustainable and socially responsible practices in the fashion industry.

# INCLUSIVE PROSPERITY

## Showcasing local designs on the national stage

In October 2023, APR presented 24 ready-to-wear modest fashion batik collections featuring modern to contemporary styles at 2024 Jakarta Muslim Fashion Week (JMFV) in Tangerang, Banten. The collection was a collaboration between API Riau, six local fashion designers and six batik artisans who participated in the *Kelas Berbagi*.

The “*Sajak di atas Ombak*” or “Rhymes on the Waves” collection was inspired by the Bono tidal bore in the Kampar River, Riau. It highlighted the province’s natural wealth through batik motifs depicting waves, *pacu jalur* boat races, arowana fish, palm fronds, and local crops. The collection used APR’s viscose rayon

derived from renewable sources, supporting sustainable fashion.

This collaboration showcased Riau’s potential as a creative hub supporting Indonesia’s ambition to become an international modest fashion centre. It highlighted the region’s fashion designers, distinctive *wastra*, and Indigenous Malay culture. The collection’s launch garnered significant attention from Muslim fashion aficionados nationwide. JMFV is an annual event held by Indonesia’s Trade Ministry and the Indonesian Chamber of Commerce and Industry (KADIN).



## RIAU BERKAIN

In November 2023, APR supported API Riau in organising its flagship *Riau Berkain* fashion event in Pekanbaru. The event showcased ready-to-wear fashion collections featuring traditional woven Riau Batik motifs created by 14 local fabric artisans and designers, and made with APR’s renewable and biodegradable viscose-rayon material. The event featured insightful discussions and talks and was attended by members of API Riau and the public.



## EMPOWERING WOMEN

In line with our APR2030 objective to promote gender equality throughout our value chain, all of our initiatives are designed to be inclusive, empowering and supporting women within the industry.

### Batik making and songket weaving

Our *Rumah Batik* and *songket* weaving programmes promote and preserve the traditions and cultures of local communities. They combine modern materials

and traditional crafts, introducing viscose rayon fibres into *songket* weaving and batik making. They also incorporate trendy new patterns and motifs to increase customer appeal, especially for younger consumers. These programmes support women, helping them gain financial independence, and have garnered significant praise and positive feedback from participants and community leaders. Initially aimed at women only, they are now offered to men.

## PROMOTING WOMEN ENTREPRENEURSHIP THROUGH BATIK

APR supports local SMEs through the *Rumah Batik* programme launched by our sister company APRIL in 2015. The programme includes training modules on traditional batik making and educates participants on patenting designs to increase their market value. Since becoming an equal opportunity programme in 2020, it has trained 47 women and 56 men. As of 2023, there are eight batik SMEs (*Rumah Batik*) in operation, which have collectively earned over IDR 260 million.

No	Business name	Gender of business owner	No. of employees	Average sales turnover 2023 (IDR)	Location
1	Rumah Batik Dekranasda Siak	Female	6	14,190,000	Siak
2	Rumah Batik Nagori	Female	50	172,000,000	Pisang Berebus, Kuansing
3	Batik Antau Singingi	Female	5	4,000,000	Kebun Lado, Kuansing
4	Batik Lebah	Female	6	3,650,000	Kebun Lado, Kuansing
5	Rumah Batik Andalan	Female	7	47,460,000	Pangkalan Kerinci Barat, Pelalawan
6	Batik Yus Pelalawan	Female	5	8,195,000	Pangkalan Kerinci Kota, Pelalawan
7	Rumah Batik Lalang Kabung	Female	3	2,765,000	Lalang Kabung, Pelalawan
8	Rumah Batik Seruni	Female	3	8,333,333	Dayun/Pangkalan Makmur, Siak

APR provides additional revenue opportunities to women and local artisans by introducing them to government offices that purchase batik for employee uniforms. APR and APRIL also purchase 2,000 pieces of batik a year from *Rumah Batik* for 'Batik Fridays' uniforms at the Riau complex.

To attract more participants to our batik programmes, APR is adopting new training methods and launching new programmes in 2023, including online sales and colour theory courses. In addition, we partnered with the Bandung Institute of Technology (ITB) and the Ministry of Tourism and Creative Economy to provide programme participants with further upskilling opportunities. We also offer APR internships to attract and encourage younger women to enrol in fashion design studies.



# INCLUSIVE PROSPERITY

Inspired by Rumah Batik, APR's *songket*-making programme is a collaboration with API Riau. Participants partnered with a local designer to create a collection that introduced innovative rayon and viscose blends as alternatives to traditional fabrics. Showcased at JMF, these elegant garments were made with high-quality *songket* fabrics that are lighter, cooler, and more comfortable than natural fibres but drape just as well.

## SUPPORTING WOMEN'S BUSINESSES

In 2023, we collaborated with women-owned Jakarta-based fashion label K.A.L.A Studio on a capsule collection called "Philo Garden", honouring the resilience and strength of Indonesian women. This collaboration showcases the adoption of APR's environmentally friendly, biodegradable viscose rayon by Indonesian fashion designers and brands, empowering women fashion designers and promoting sustainable consumer choices.



APR, K.A.L.A Studio collaborate for 'Philo Garden' eco-friendly clothing collection – Lifestyle – The Jakarta Post

Celebrating Resilience and Sustainability: APR x Kala Studio's Empowering Collaboration | Asia Pacific Rayon ([aprayon.com](http://aprayon.com))

## Youth engagement

Involving youth is essential to the mission of our regional textile centre, and young people are a core audience. We are committed to engaging with and uplifting youth through the textile industry. Since 2021, we have partnered with a local vocational school in Pangkalan Kerinci to promote opportunities for further education and jobs in the textile industry to high school graduates.

Additionally, we are partnering with seven universities<sup>8</sup> to conduct research projects on sustainable viscose rayon in the fashion industry. We will share more information about these initiatives in future reports.

In 2023, we awarded the inaugural APR IFI scholarship to two young women entrepreneurs, allowing them to study at the Islamic Fashion Institute (IFI) in Bandung, West Java. The IFI's twelve-month programme teaches fashion design and marketing and will provide them with skills they can share with their peers upon returning to their hometowns.

APR also offers aspiring students regular internship opportunities at various business units, including APY.

## OUR WORKFORCE

[GRI 3-3]

APR exceeds EcoVadis, OEKO-TEX®, Higg FSLM, and other labour standards that specify safe and fair work and social policies for value chain workers. Our [Human Rights Policy](#) specifies the labour rights policies in effect at our operations.

## EMPLOYEE OVERVIEW

[GRI 2-7, 2-8, 202-2, 408-1, 409-1]

**As of December 2023, APR and APY employ 869 people at our operations and offices in Riau, Jakarta, and Singapore.** Due to the increased capacity of our mill operations, we hired 74 employees in 2023.

APR directly employs all permanent hires. We vet and assess all vendors and contractors. Contracted workers are subject to on-site identification checks to ensure they are of legal working age and legally contracted to work, upholding our strict no-child or forced labour policies.

In 2023, we hired 376 contractors. Some occupy support roles on a long-term basis as vetted third-party service providers, including waste management staff and office cleaners. Other contractors occupy temporary positions, including labourers who provide extra capacity ahead of planned shutdowns and ad hoc maintenance workers who paint and repair our buildings.

<sup>8</sup> The seven universities are Universitas Kristen Maranatha, Universitas Kristen Petra Surabaya, Institut Kesenian Jakarta, Politeknik Negeri Media Kreatif, Sekolah Tinggi Desain LaSalle, Politeknik STTT Bandung, and the Islamic Fashion Institute Bandung.

Our Higg FSLM score continues to improve year on year. We achieved an 86.3% score in 2023, mainly due to establishing our new Contractor Management Department, which helps ensure that our business partners comply with regulations and uphold contractor rights and welfare.

### WAGES AND BENEFITS [GRI 2-30, 401-2, 407-1]

APR employees' salaries comply with provincial regulations. Workers in every employment category, including minimum wage earners, receive equal pay, regardless of gender. We operate in a remote region and offer APR employees and their families in-kind benefits, including health insurance, quality housing, nursing rooms for working mothers, daycare facilities, primary and secondary education, and transportation to and from our offices. Our schools offer employees' children the choice of Indonesia's national curriculum

or the International Baccalaureate syllabus.

APR employees can form or join a trade union and enter collective employment negotiations without fear of discrimination or retaliation. All are covered by a collective agreement.

### DIVERSITY AND INCLUSION [GRI 3-3, 405-1, 406-1]

APR embraces diversity and promotes equal opportunity in the workplace. We uphold a zero-tolerance discrimination and harassment policy. No cases of discrimination were reported in 2023.

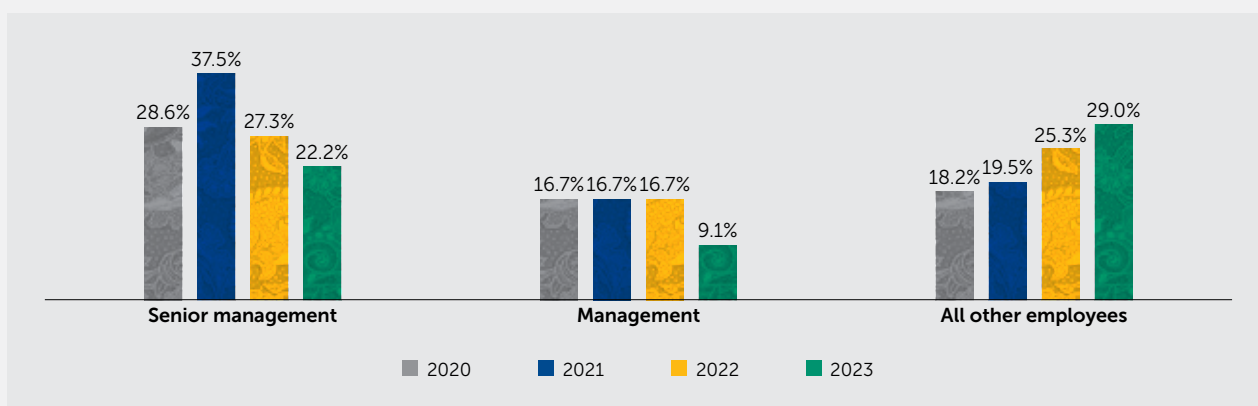
Due to the manual labour required at our facilities, the majority of our workforce is male. Women comprise 29.0% of APR's workforce, holding 22.2% of senior management positions and 9.1% of other managerial roles.



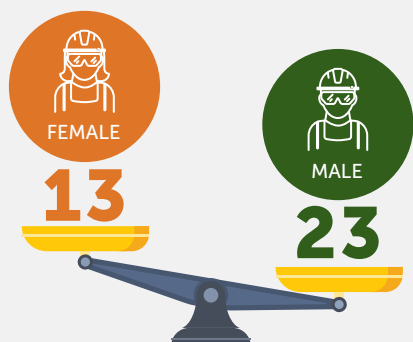
# INCLUSIVE PROSPERITY

We are committed to advancing gender equality throughout our value chain, employing women in traditionally male-dominated roles and men in roles typically held by women, such as garment making and sewing. We are pleased to report that women representation in the general workforce has increased from 18.2% in 2020 to 29% in 2023. In 2023, we assigned seven women to maintenance, laboratory, and shift coordinator roles - which are not traditionally employed by women. Additionally, 13 of our 36 forklift operators are women, while 14 of our 28 garment makers are men.

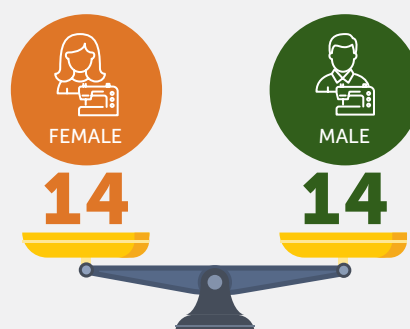
## Women representation in the workforce 2020–2023 (%)



## Forklift operators gender distribution



## Garment makers gender distribution



To support our women employees and enable them to balance work and family life, APR provides various facilities and services, including breastfeeding rooms, daycare services, and primary and secondary schools for their children.





### EMPLOYEE RETENTION AND DEVELOPMENT [GRI 3-3, 401-1, 404-2]

APR invests in our employees. Our success depends on recruiting, retaining, and developing talented, motivated workers. To improve their job performance, we offer employees soft-skill, technical, and leadership training at the APRIL Learning Institute (ALI). We also provide mandatory technical training to mill workers, regardless of gender. Employees are subject to annual performance reviews and assigned yearly development goals and targets.

In 2023, APR hired 74 employees, including 31 men and 43 women, including 57 under the age of 30. Turnover remained low at 3.8% for employees 30 and under, 4.9% for those between 30 and 50, and 6.7% for those over 50.

#### EMPLOYEE SCHOLARSHIP PROGRAMME

In May 2023, we launched a scholarship programme that allowed five APR employees to earn master's degrees in chemistry at Universitas Gadjah Mada (UGM) in its first year. We will expand this programme in 2024, providing meaningful professional and community development opportunities to other worthy candidates.

#### LONG SERVICE AWARD 2023

In 2023, 600 employees from employees from Riau Andalan Pulp and Paper (PT RAPP), the operating arm of APRIL, including five APR employees, were honoured for their long-time service, ranging from 25 to 35 years.

# INCLUSIVE PROSPERITY

## HEALTH AND SAFETY

[GRI 3-3, 403-1, 403-3, 403-4, 403-5, 403-8, 403-9]

APR maintains stringent workplace safety standards, continuously improving them per our Zero-Accident and Occupational Health and Safety (OSH) policies in compliance with the ISO 45001 standard. A health and safety committee, including management and employee representatives, oversees and implements OSH measures and reviews APR's OSH management system.

APR employees are issued personal protective equipment (PPE) and receive health and safety training relevant to their job function. We monitor worksites for health and safety and conduct frequent medical checks, including annual examinations at Riau complex clinics

and hearing and tinnitus tests for employees working near or operating loud machines. In 2023, the noise level at the Riau complex was 53.45 weighted decibels (dBA) at the fence, now well within the EU BAT limit of 70 dBA.

APR's OSH system tracks employee accidents and injuries. Our Contractor Safety Management System addresses OSH risks for on-site workers we do not directly employ. Our 2023 lost-time injury frequency rate (LTIFR) was 0.69, a 88.4% drop from 5.90 and our lowest since 2019. Our 2023 severity rate was 0.86, 71% lower than 2022.

We attribute these reductions to our OSH Action Plan and continuous improvement initiatives, which include:

Routine training every three months for all employees and contractors

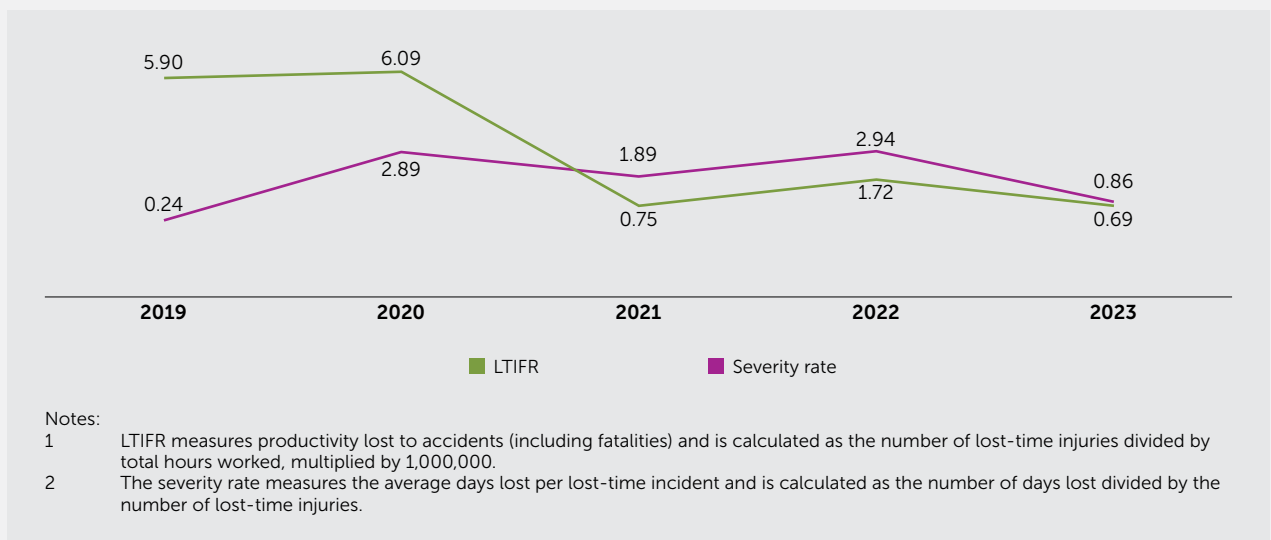
Risk analyses for non-routine activities before commencing work

Regular inspections and monitoring of all employee and contractor equipment and PPE

Weekly departmental safety sharing sessions

### Lost time injury frequency and severity rates 2019–2023

per 1 million hours worked



We strive to identify the root causes of accidents and minimise the likelihood of their recurrence. There were no workplace fatalities in 2023.

**OUR CUSTOMERS**  
[GRI 3-3, 416-1]

APR continuously improves our processes to meet evolving customer needs. We welcome customer feedback and communicate with customers to understand their concerns and co-create sustainable solutions. We keep up with industry news and stay informed on current and emerging sustainability trends to further our continuous improvement initiatives.

APR is more than a business-to-business company. We engage with end-users to better understand their needs. We promote the adoption of sustainable viscose in high-visibility markets and embrace business solutions that address consumer concerns about product end-of-life issues.

**Product quality and safety**

APR is certified against the OEKO-TEX®, FKT, and Cradle to Cradle (C2C) Material Health standards, among others, to assure customers that our products

meet stringent health and safety requirements.

We commissioned an online customer satisfaction survey in February and March 2023, with a 75% overall response rate from 71 customers in Bangladesh, Brazil, India, Indonesia, Malaysia, Nepal, Pakistan, Turkey, and the United Arab Emirates (UAE). It assessed customer sentiment across seven key areas: product quality, packaging quality, technical support, logistics, brand reputation, salesperson service, and product value.

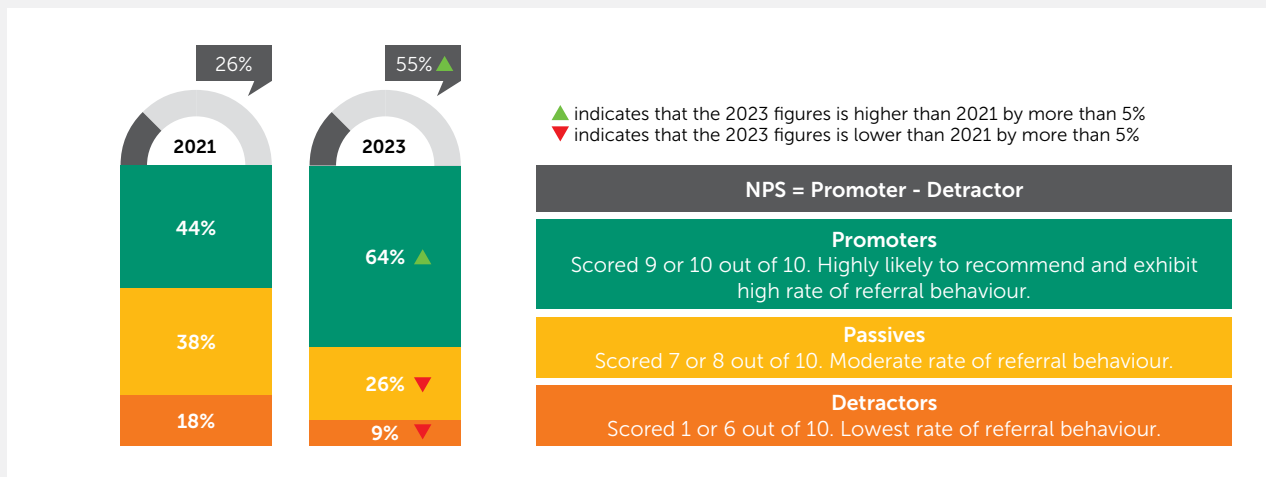
**Since our last assessment in 2021, APR’s overall customer satisfaction score increased across all areas. Our overall score is 4.2, and our net promoter score (NPS) almost doubled to 55% from 26% in 2021.**

Salesperson service and packaging quality received the highest scores, while product quality, technical support, and brand reputation were identified as needing improvement. APR will engage with customers in identified markets to address concerns and improve performance.

**Customer Satisfaction Score**

No	Attributes	2021	2023
1	Product Quality	72%	83% ▲
2	Product Value	69%	87% ▲
3	Salesperson Service	87%	92%
4	Logistics	72%	91% ▲
5	Technical Service	62%	75% ▲
6	Packaging Quality	87%	89%
7	Brand Reputation	68%	83% ▲
8	Overall Score	3.9	4.2

**Net Promoter Score (%)**





# INCLUSIVE PROSPERITY

## CUSTOMER TRIALS TO IMPROVE QUALITY

To improve the quality of our viscose products and bolster our efforts to become the industry's VSF supplier of choice, APR embarked on a series of trials with key customers in India and Turkey. We incorporated their feedback and insights into our processes to better meet their and other customers' expectations.

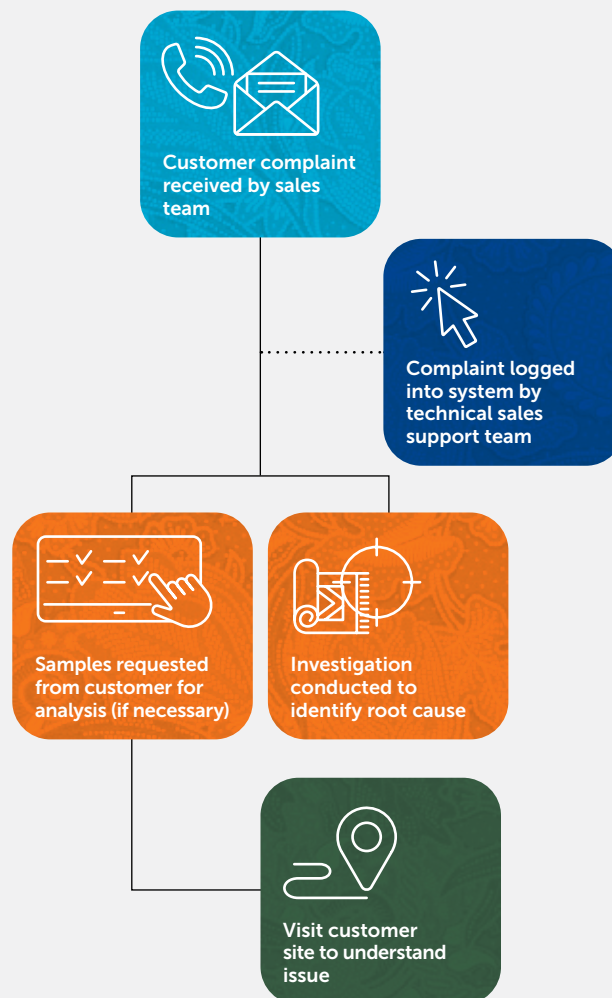
## ADDRESSING CUSTOMER COMPLAINTS

APR uses a computerised system to scan customer orders. It ensures that our products conform to all technical specifications, quality standards, and customer expectations and alerts us if they fail to meet these criteria.

Our technical sales support team is our customers' primary contact point. It follows strict procedures to process customer complaints and provide status updates, ensuring transparency and respectful business relationships.

APR and APY are closely integrated. APY manages APR's product quality, conducting trials and tests to identify quality issues before products reach customers, addressing non-conformities, communicating quality issues to customers, proposing solutions, and issuing product recalls, if needed.

## Overview of complaints procedure



### EXCELLENCE IN CUSTOMER SERVICE AND SUSTAINABLE PRACTICES

Commentary by Bulent Degirmencioglu, General Manager | Acarsoy Tekstil Ticaret ve Sanayi A.Ş.

APR supplies roughly 65% of Acarsoy's viscose production needs. It is a customer-focused company that provides world-class support and promptly addresses and communicates issues, proactively resolving complaints and implementing corrective actions.

Although APR's current products do not meet some brands' sustainability criteria, I acknowledge the company's efforts to certify its operations and improve its environmental performance. The APR2030 strategy is a step in the right direction. I hope APR will improve its production processes and quality control to meet our standards and obtain the certifications it needs to grow its market and earn customer trust.

*About: Bulent Degirmencioglu is the General Manager of Acarsoy Tekstil Ticaret ve Sanayi A.Ş. (Acarsoy), a leading yarn manufacturing company in Bursa, Turkey and an APR customer since 2019.*



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## STAKEHOLDER ENGAGEMENT

[GRI 2-28, 2-29, 403-4, 403-5]












Stakeholder group	Key topics engaged on	Method of engagement	Frequency of engagement
Customers	Quality, service, competitive pricing, sustainability certifications, uptake and adoption of viscose, product innovation	Sales team outreach, networking events, collaborating on product innovation	Regular contact as part of sales management
NGOs	Sourcing risks, zero-harm production, circularity, conservation	Introductory meetings, regular dialogue with our supply partners (especially on controversial issues)	As needed or during industry roundtable meetings
Employees	Engaging on APR policies and practices, fair employment conditions, sustainability training, and updates	Onboarding new employees, refresher courses for existing employees, trade union discussions, internal communications, social media engagement showcasing life in Kerinci	Annually
	Performance reviews, ALI leadership training, exchange programmes with Sateri	Internal communications	Ongoing (primarily in Kerinci)
	Occupational health and safety (OHS)	Awareness, education, and training programmes to promote OHS practices to employees	Ongoing
Suppliers	Long-term sourcing partnerships, connecting conservation to sourcing, addressing NGO concerns	Procurement engagement and assessment, ongoing dialogues	Ongoing
Local communities in Kerinci and Riau	Community development engagement, ongoing dialogue on issues of community concern, job creation, youth engagement	Ongoing dialogue and community outreach programmes	Ongoing












Stakeholder group	Key topics engaged on	Method of engagement	Frequency of engagement
Industry associations	<p>Member of:</p> <ul style="list-style-type: none"> <li>Textile Exchange</li> <li>Zero Discharge of Hazardous Chemicals (ZDHC) Man-Made Cellulosic Fibres (MMCF) 2030 Vision</li> <li>Sustainable Apparel Coalition</li> <li>Textile and Fashion Federation</li> <li>Indonesia Fashion Chamber (IFC) (Riau Chapter)</li> <li>Wiyasa TFA</li> <li>Walarmi (Natural Dye Association)</li> </ul> <p>Strategic roles in:</p> <ul style="list-style-type: none"> <li>Indonesia Business Council for Sustainable Development (IBCSO)</li> <li><i>Rantai Tekstil Lestari</i> (RTL)</li> <li>Indonesia Chambers of Commerce and Industry (KADIN)</li> <li><i>Asosiasi Pertekstilan Indonesia</i> (API)</li> <li>API Riau</li> <li><i>Asosiasi Produsen Serat Sintetis dan Filamen Indonesia</i> (APSyFI)</li> </ul>	Regular dialogue, roundtable discussions, advisory group meetings, annual events	Ongoing
Local and national governments	Investing in advancing sustainable textiles and fabrics in Indonesia and Singapore, research and development	Regular dialogue	Ongoing
Media	Press releases, annual media outreach	Media platforms	Annually or as needed
Industry peers	Industry-related topics on recycled waste and circularity	Industry platforms, one-to-one partnerships, collaborative research studies	Ongoing

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## MATERIAL TOPICS AND THE SDGS

SDG	Category	SDG target	2022 Material issue	APR2030 pillar
 SDG 2: Zero Hunger	Contributed	<b>2.2</b> By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.	<ul style="list-style-type: none"> <li>Community development</li> </ul>	
			<ul style="list-style-type: none"> <li>Women empowerment and women's health</li> </ul>	
 SDG 3: Good Health and Well-being	Catalytic	<b>3.2</b> By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.	<ul style="list-style-type: none"> <li>Community development</li> </ul>	
 SDG 4: Quality Education	Catalytic	<b>4.1</b> By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.	<ul style="list-style-type: none"> <li>Community development</li> </ul>	
		<b>4.4</b> By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.	<ul style="list-style-type: none"> <li>Supporting local sustainable fashion</li> </ul>	
			<ul style="list-style-type: none"> <li>Employee training and development</li> </ul>	
 SDG 6: Clean Water and Sanitation	Core	<b>6.3</b> By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	<ul style="list-style-type: none"> <li>Water and wastewater management</li> </ul>	
		<b>6.4</b> By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	<ul style="list-style-type: none"> <li>Water and wastewater management</li> </ul>	

SDG	Category	SDG target	2022 Material issue	APR2030 pillar
 <p><b>SDG 8: Decent Work and Economic Growth</b></p>	Contributed	<p><b>8.5</b> By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.</p>	<ul style="list-style-type: none"> <li>Diversity and inclusivity</li> </ul>	
		<p><b>8.8</b> Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.</p>	<ul style="list-style-type: none"> <li>Occupational health and safety</li> </ul>	
		<p><b>8.8</b> Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.</p>	<ul style="list-style-type: none"> <li>Labour and human rights</li> </ul>	
 <p><b>SDG 9: Industry, Innovation and Infrastructure</b></p>	Core	<p><b>9B</b> Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for inter alia, industrial diversification and value addition to commodities.</p>	<ul style="list-style-type: none"> <li>Circularity and recycled products</li> </ul>	
		<p><b>9B</b> Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for inter alia, industrial diversification and value addition to commodities.</p>	<ul style="list-style-type: none"> <li>Innovation, R&amp;D, and technology</li> </ul>	
		<p><b>9.3</b> Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.</p>	<ul style="list-style-type: none"> <li>Supporting local sustainable fashion</li> </ul>	
		<p><b>9.3</b> Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.</p>	<ul style="list-style-type: none"> <li>Women empowerment and women's health</li> </ul>	



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SDG	Category	SDG target	2022 Material issue	APR2030 pillar
 <b>SDG 12:</b> Responsible Consumption and Production	Core	<b>12.4</b> By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their lifecycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment.	<ul style="list-style-type: none"> <li>Chemical management</li> </ul>	
		<b>12.5</b> By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	<ul style="list-style-type: none"> <li>Waste management</li> </ul>	
		<b>12.6</b> Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	<ul style="list-style-type: none"> <li>Circularity and recycled products</li> </ul>	
			<ul style="list-style-type: none"> <li>Sustainability standards and assessments</li> </ul>	
			<ul style="list-style-type: none"> <li>Customer satisfaction and product quality</li> </ul>	
			<ul style="list-style-type: none"> <li>Transparency and communication</li> </ul>	
 <b>SDG 13:</b> Climate Action	Core	<b>13.2</b> Integrate climate change measures into national policies, strategies and planning.	<ul style="list-style-type: none"> <li>Carbon footprint</li> </ul>	
 <b>SDG 15:</b> Life on Land	Contributed	<b>15.1</b> By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.	<ul style="list-style-type: none"> <li>Energy management</li> </ul>	
			<ul style="list-style-type: none"> <li>Biodiversity and conservation</li> </ul>	
			<ul style="list-style-type: none"> <li>Sustainable sourcing and procurement</li> </ul>	

SDG	Category	SDG target	2022 Material issue	APR2030 pillar
 <p><b>SDG 17: Partnerships for the Goals</b></p>	Catalytic	<p><b>17.17</b> Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries.</p>	<ul style="list-style-type: none"> <li>• Circularity and recycled products</li> </ul>	
		<p><b>17.14</b> Enhance policy coherence for sustainable development.</p>	<ul style="list-style-type: none"> <li>• Sustainability in the value chain (integration with APRIL)</li> </ul>	
			<ul style="list-style-type: none"> <li>• Partnerships and collaboration</li> </ul>	
			<ul style="list-style-type: none"> <li>• Regulatory compliance</li> </ul>	
	<ul style="list-style-type: none"> <li>• Governance, ethics, and anti-corruption</li> </ul>			

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## BASE DATA

Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
<b>General disclosures [GRI 2-6, 2-7, 2-8, 2-27, 2-30]</b>							
Number of countries exported to	VSF exported to	no.	18	17	14	16	14
	Viscose yarn exported to	no.	13	15	14	15	N/A
Number of operations	VSF mill	no.	1	1	1	1	1
	Viscose yarn mill	no.	1	1	1	1	N/A
Capacity of production facility	Viscose staple fibre	t/year	300,000	300,000	240,000	240,000	240,000
	Viscose yarn	t/year	7,552	7,552	7,552	7,552	N/A
Total production	Viscose staple fibre	t	309,226	282,160	229,957	227,401	192,758
	Viscose yarn	t	7,801	7,471	6,962	4,340	N/A
Number of employees	Total	no.	869	848	749	789	839
	Male	no.	624	635	602	645	733
	Female	no.	245	213	147	144	106
Permanent employees	Total	no.	869	818	749	789	697
	Male	no.	624	606	602	645	594
	Female	no.	245	212	147	144	103
Temporary employees	Total	no.	0	30	0	0	142
	Male	no.	0	29	0	0	139
	Female	no.	0	1	0	0	3
Employees covered by collective bargaining agreements		no.	869	818	749	789	697
Workers who are not employees / contractors (total)		no.	376	356	438	272	272
Fines, non-compliances, monetary and non-monetary sanctions		no.	0	0	0	0	0
<b>Governance, ethics, and anti-corruption [GRI 205-2]</b>							
Directors communicated about anti-corruption policies		no.	0	0	N/A	N/A	N/A
Directors received training on anti-corruption		no.	0	2	N/A	N/A	N/A
Employees communicated on anti-corruption policies		no.	869	848*	N/A	N/A	N/A
<b>Sustainable standards and assessments [GRI 417-1]</b>							
Percentage of significant product or service categories covered by and assessed for compliance with requirements for product and service information and labelling		%	100%	100%	N/A	N/A	N/A

\* Restated to include all employee categories.



Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
<b>Carbon footprint [GRI 305-1, 305-2, 305-3, 305-4]</b>							
Gross direct (Scope 1) GHG emissions		t CO <sub>2</sub> e	19,750	29,173	25,436	27,800	30,808
Gross indirect (Scope 2) GHG emissions (market-based)		t CO <sub>2</sub> e	11,752	10,958	9,664	9,356	197,174
Gross indirect (Scope 2) GHG emissions (location-based)		t CO <sub>2</sub> e	204,159	146,138	215,627	207,407	197,174
GHG emissions intensity ratio for the organisation (Scope 1+2 market based)		t CO <sub>2</sub> e/t VSF	0.1019	0.1422	0.1526	0.1634	1.1827
<b>Energy management [GRI 302-1, 302-3]</b>							
Electricity consumption (multi-fuel boilers)		GJ	933,556	938,773	878,284	798,804	754,671
		MWh	259,321	260,770	243,968	221,890	209,631
Steam consumption (pulp and paper chemical recovery boilers)		GJ	5,672,930	5,230,000	4,800,000	4,840,000	4,360,000
		MWh	1,575,814	1,452,778	1,333,333	1,344,444	1,211,111
		tonnes	2,111,983	1,947,093	1,786,976	2,042,557	N/A
Energy intensity		GJ/t VSF	21.39	21.60	24.81	24.85	26.54
Surplus steam exported to RPE		GJ	5,791	6,408	4,280	18,200	N/A
<b>Sustainable sourcing and procurement [GRI 204-1, 301-1, 308-1, 414-1, 414-2]</b>							
DWP sourced	Total	t	310,868	285,596	233,456	231,862	196,391
	Indonesia	t	298,404	272,172	217,261	222,305	178,014
	Canada, US, EU	t	12,464	13,424	16,195	9,556	18,376
Suppliers / Proportion of spending on local suppliers	APRIL (local)	%	58.65%	33.26%	31.31%	7.00%	N/A
	Toba Pulp Lestari (local)	%	37.34%	62.03%	61.76%	88.88%	N/A
	Cosmo Specialty Fibers (US)	%	0.88%	3.82%	5.26%	1.84%	N/A
	Rayonier Advanced Materials (Canada)	%	1.30%	0.87%	1.26%	1.13%	N/A
	Trader supplier (Hallein, Biocel pulp)	%	1.83%	0.00%	0.42%	1.15%	N/A
		%					
Procurement spent	DWP	%	77%	77%	77%	73%	65%
	Chemicals	%	22%	22%	22%	26%	33%
	Packaging	%	1%	1%	1%	1%	2%
Total production of DWP/VSF		t/t VSF	1.008	1.012	1.015	1.020	1.019
Traceability	VSF traceable to plantations	%	100%	100%	100%	100%	N/A
	VSF traceable to mills	%	100%	100%	100%	100%	N/A
	VSF traceable to nurseries	%	95.99%	95.30%	93.06%	95.88%	N/A

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Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
Certification – PEFC	DWP from certified sources	%	98.70%	99.83%	100%	98.87%	N/A
	DWP from controlled sources	%	1.30%	0.18%	N/A	1.13%	N/A
New suppliers screened for environmental and social impacts		no.	0	0	0	1	N/A
Suppliers assessed for environmental and social impacts		no.	0	4	5	4	N/A
Suppliers identified as having significant actual and potential negative impacts on environment and social		no.	0	0	0	0	N/A
<b>Chemical management [GRI 301-1, 305-7]</b>							
<b>Consumption intensity</b>							
Carbon disulphide (CS <sub>2</sub> )		kg/t VSF	61.65	73.16	70.17	73.76	73.95
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> )		t/t VSF	0.65	0.67	0.68	0.69	0.69
Caustic soda (NaOH)		t/t VSF	0.52	0.54	0.55	0.56	0.58
Zinc (Zn)		kg/t VSF	2.38	2.62	2.31	2.54	2.91
Spin finish		kg/t VSF	4.40	4.71	4.24	5.06	5.75
Sodium hypochlorite (NaOCl)		kg/t VSF	43.30	41.18	46.43	35.94	20.67
<b>Recovery</b>							
Total sulphur recovery		%	94.89%	93.35%	92.90%	90.66%	89.21%
Sodium sulphate (Na <sub>2</sub> SO <sub>4</sub> ) recovery		%	61.71%	56.84%	58.60%	54.81%	57.17%
<b>Significant emissions</b>							
Total sulphur emission intensity		kg/t VSF	13.16	13.80	17.51	23.63	30.98
CS <sub>2</sub> emissions		mg/Nm	307.00	470.58	356.59	520.50	279.25
H <sub>2</sub> S emissions		mg/Nm	11.00	25.15	21.01	22.20	17.11
<b>Water and wastewater management [GRI 303-3, 303-4, 303-5]</b>							
<b>Water withdrawal</b>							
Third-party water		m <sup>3</sup>	12,575,800	12,516,533	11,035,383	11,130,520	11,743,071
<b>Water discharge</b>							
Water discharged to Kampar River		m <sup>3</sup>	11,542,743	10,802,507	10,963,223	10,559,041	9,933,068
Water consumed		m <sup>3</sup>	1,033,057	1,714,026	72,160	571,479	1,810,003
<b>Quality of water discharged</b>							
COD		g/t VSF	3,048.34	2,929.64	3,628.59	3,110.31	2,690.53
		mg/L	81.83	73.68	73.80	64.26	48.74
BOD		mg/L	20.84	11.26	14.10	13.47	15.20
TSS		mg/L	32.13	41.16	33.70	29.67	36.39
Zn to water		g/kg	0.01	0.03	0.04	0.03	0.01
		mg/L	0.31	0.69	0.83	0.67	0.29
Sulphate (SO <sub>4</sub> ) to water		kg/t VSF	124.62	134.87	165.55	188.10	165.87
Process water consumption intensity		m <sup>3</sup> /t VSF	30.84	32.31	37.48	39.88	49.97
Cooling water consumption intensity		m <sup>3</sup> /t VSF	102.62	111.97	138.95	138.31	291.70

Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
<b>Waste management [GRI 306-3, 306-4, 306-5]</b>							
Total hazardous waste generated		kg	16,633,907	17,931,208	18,162,570	18,261,740	18,284,740
Diverted to registered waste handler (for waste energy recovery and reuse)		kg	72	669,764	597,970	373,960	396,960
Directed to landfill (effluent sludge and tow waste)		kg	16,082,554	17,171,710	17,564,600	17,887,780	17,887,780
Hazardous waste intensity		kg/t VSF	64.46	69.33	74.08	78.13	95.99
<b>Community development, women empowerment and women's health [GRI 413-1, 413-2]</b>							
Percentage of operations that implemented local community engagement, impact assessments, and/or development programs		%	100%	100%	N/A	100%	N/A
<b>Labour and human rights [GRI 401-1, 401-3]</b>							
<b>New employee hires and turnover</b>							
New hires by age group	< 30 years	no.	57	146	66	49	91
	30 - 50 years	no.	15	18	13	26	39
	> 50 years	no.	2	3	1	6	4
Employee turnover by age group	< 30 years	%	3.82%	6.30%	3.02%	6.59%	8.42%
	30 - 50 years	%	4.94%	9.55%	4.64%	2.86%	5.59%
	> 50 years	%	6.67%	2.33%	2.63%	0.00%	9.76%
New hires by gender	Male	no.	31	79	58	69	99
	Female	no.	43	88	22	12	35
Employee turnover by gender	Male	%	4.13%	6.42%	3.58%	5.27%	6.89%
	Female	%	4.78%	9.15%	2.75%	4.90%	15.52%
<b>Parental leave</b>							
Employees who took parental leave	Total	no.	163	61	37	34	N/A
	Male	no.	142	52	36	24	N/A
	Female	no.	21	9	1	10	N/A
Employees who returned to work after parental leave ended	Total	no.	163	61	37	34	N/A
	Male	no.	142	52	36	24	N/A
	Female	no.	21	9	1	10	N/A
<b>Diversity and inclusivity [405-1, 406-1]*</b>							
<b>Management gender diversity</b>							
Senior management	Male	no.	7	8	5	5	0
	Female	no.	2	3	3	2	0
Management	Male	no.	30	15	20	20	0
	Female	no.	3	3	4	4	0
Employee gender diversity	Male	no.	624	635	602	645	594
	Female	no.	245	213	147	144	103
Incidents of discrimination cases		no.	0	0	0	0	0

\* Data from previous years restated to include all employee categories.



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Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
<b>Employee training and development [GRI 404-1, 404-3]*</b>							
Employee training hours	Male	total hours	8,843	6,903	4,790	2,648	N/A
	Average per male employee	average hours	14.17	10.87	7.96	4.11	N/A
	Female	total hours	1,512	2,187	615	382	N/A
	Average per female employee	average hours	6.17	10.27	4.18	2.65	N/A
Employees receiving regular performance and career development reviews	Male	no.	624	635	602	645	0
	Female	no.	245	213	147	144	0
<b>Occupational health and safety [GRI 403-8, 403-9]</b>							
<b>Workers covered by OSH management system</b>							
Employees and workers covered by an OSH management system	no.		869	848	749	789	839
	%		100%	100%	100%	100%	100%
Workers covered by contractor safety management system	no.		376	356	438	272	272
	%		100%	100%	100%	100%	100%
<b>Employee and worker OSH management system</b>							
Fatalities as a result of work-related injuries	no.		0	0	0	1	0
	rate		0.00	0.00	0.00	0.72	0.00
Lost time injuries (fatalities & lost time Injuries)	no.		1	4	1	9	4
	rate		0.52	1.97	0.61	6.47	2.95
Recordable work-related injuries (first-aid cases)	no.		11	6	7	17	22
	rate		5.73	2.96	4.29	12.22	16.22
Total hours worked	hours		1,919,271	2,026,698	1,631,422	1,391,671	1,356,684
Total days lost due to work related injuries	days		10	33	20	71	4
Total recordable injury rate (TRIFR)	rate		6.25	4.93	4.90	18.68	19.16
<b>Contractor Safety Management System</b>							
Fatalities from work-related injuries	no.		0	0	0	0	0
	rate		0.00	0.00	0.00	0.00	0.00
Lost time injuries (fatalities & lost time Injuries)	no.		1	1	1	2	4
	rate		1.04	1.13	0.98	3.54	N/A
Recordable work-related injuries (first-aid cases)	no.		9	7	9	0	8
	rate		9.32	7.93	8.78	0.00	N/A
Total hours worked	hours		965,475	882,338	1,025,339	564,365	N/A
Total days lost due to work-related injuries	days		9	20	14	10	5
TRIFR	rate		10.36	9.07	9.75	3.54	N/A
<b>Overall APR employees and contractors</b>							
Lost time injury frequency rate	rate		0.69	1.72	0.75	6.09	5.90
TRIFR	rate		7.63	6.19	6.78	16.25	28.01
Severity rate	rate		0.86	2.94	1.89	2.89	0.24
Noise monitoring level	dB(A)		65.66	78.93	65.78	61.75	N/A

\* Data from previous years restated to include all employee categories.

Category/Indicator	Breakdown	UoM	2023	2022	2021	2020	2019
<b>Customer satisfaction and product quality [GRI 417-1]</b>							
Percentage of significant product and service categories for which health and safety impacts are assessed for improvement		%	100%	100%	N/A	N/A	N/A

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## GRI CONTENT INDEX (TO BE UPDATED IN FINAL DRAFT)

The Global Reporting Initiative (GRI) is a multi-stakeholder standard for sustainability reporting, providing guidance on determining report content and indicators. GRI is the most widely adopted global standard for sustainability reporting. It has been designed to enhance the global comparability and quality of information on environmental and social impacts, thereby enabling greater transparency and accountability of organisations. This report has been prepared in accordance with the GRI Universal Standards 2021. Our GRI Content Index references our 2023 Sustainability Report and the [APR website](#).

<b>Statement of use</b>	Asia Pacific Rayon has reported the information cited in this GRI content index for the period of 1 January 2023 to 31 December 2023 with reference to the GRI Standards.
<b>GRI 1 used</b>	GRI 1: Foundation 2021

GRI STANDARD	DISCLOSURE	LOCATION
GRI 2: General Disclosures 2021	2-1 Organizational details	About APR, p10
	2-2 Entities included in the organization's sustainability reporting	About this report, p2
	2-3 Reporting period, frequency and contact point	About this report, p2 Contact, p82
	2-4 Restatements of information	Stated throughout where relevant
	2-5 External assurance	About this report, p2
	2-6 Activities, value chain and other business relationships	About APR, p10 Leveraging the APRIL-APR integration, p17 Sustainable sourcing and procurement, p29 Base data, p68  Note: Net sales/revenue data is not available.
	2-7 Employees	Employee overview, p54 Base data, p68
	2-8 Workers who are not employees	Employee overview, p54 Base data, p68
	2-9 Governance structure and composition	Governance and responsible practices, p18
	2-11 Chair of the highest governance body	Governance and responsible practices, p18
	2-12 Role of the highest governance body in overseeing the management of impacts	Governance and responsible practices, p18
	2-13 Delegation of responsibility for managing impacts	Governance and responsible practices, p18
	2-14 Role of the highest governance body in sustainability reporting	Transparency and communication, p22
	2-16 Communication of critical concerns	Governance and responsible practices, p18



GRI STANDARD	DISCLOSURE	LOCATION
GRI 2: General Disclosures 2021	2-22 Statement on sustainable development strategy	Statement from the Director, p4
	2-23 Policy commitments	Approach to sustainability, p14 <a href="#">Sustainability Policy</a>
	2-24 Embedding policy commitments	Approach to sustainability, p14
	2-25 Processes to remediate negative impacts	Whistleblowing and grievances, p14 <a href="#">APR Grievance Procedure</a>
	2-26 Mechanisms for seeking advice and raising concerns	Whistleblowing and grievances, p14 <a href="#">APR Grievance Procedure</a>
	2-27 Compliance with laws and regulations	Regulatory compliance, p18 Base data, p68
	2-28 Membership associations	Partnerships and engagement, p18 Stakeholder engagement, p62 <a href="#">Associations</a>
	2-29 Approach to stakeholder engagement	Partnerships and engagement, p18 Stakeholder engagement, p62
	2-30 Collective bargaining agreements	Wages and benefits, p55 Base data, p68
GRI 3: Material Topics 2021	3-1 Process to determine material topics	Materiality, p16
	3-2 List of material topics	Materiality, p16
<b>Community development</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Supporting local sustainable fashion, p12 Our community, p48
GRI 202: Market Presence 2016	202-2 Proportion of senior management hired from the local community	Employee overview, p54
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	Supporting local sustainable fashion, p12 Our community, p48
	203-2 Significant indirect economic impacts	Our community, p48
GRI 413: Local Communities 2016	413-1 Operations with local community engagement, impact assessments, and development programs	Our community, p48
	413-2 Operations with significant actual and potential negative impacts on local communities	Our community, p48

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GRI STANDARD	DISCLOSURE	LOCATION
<b>Sustainable sourcing and procurement</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Sustainable sourcing and procurement, p29
GRI 204: Procurement Practices 2016	204-1 Proportion of spending on local suppliers	Sustainable sourcing and procurement, p29 Base data, p68
GRI 308: Supplier Environmental Assessment 2016	308-1 New suppliers that were screened using environmental criteria	Sustainable sourcing and procurement, p29 Base data, p68
	308-2 Negative environmental impacts in the supply chain and actions taken	Sustainable sourcing and procurement, p29 Base data, p68
GRI 414: Supplier Social Assessment 2016	414-1 New suppliers that were screened using social criteria	Sustainable sourcing and procurement, p29 Base data, p68
	414-2 Negative social impacts in the supply chain and actions taken	Sustainable sourcing and procurement, p29 Base data, p68
<b>Governance, ethics and anti-corruption</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Governance and responsible practices, p18
GRI 205: Anti-corruption 2016	205-2 Communication and training about anti-corruption policies and procedures	Base data, p68
	205-3 Confirmed incidents of corruption and actions taken	Governance and responsible practices, p18
<b>Circularity and recycled products</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Accelerating innovation and R&D, p42
GRI 301: Materials 2016	301-1 Materials used by weight or volume	Sustainable sourcing and procurement, p29 Using recycled textiles in VSF production, p44 Base data, p68
	301-2 Recycled input materials used	Using recycled textiles in VSF production, p44
	301-3 Reclaimed products and their packaging materials	Using recycled textiles in VSF production, p44
<b>Energy Management</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Energy management, p28
GRI 302: Energy 2016	302-1 Energy consumption within the organization	Base data, p68
	302-3 Energy intensity	Energy management, p28 Base data, p68
	302-4 Reduction of energy consumption	Energy management, p28

GRI STANDARD	DISCLOSURE	LOCATION
<b>Water and wastewater management</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Water and wastewater management, p38
GRI 303: Water and Effluents 2018	303-1 Interactions with water as a shared resource	Water and wastewater management, p38
	303-2 Management of water discharge-related impacts	Water and wastewater management, p38
	303-3 Water withdrawal	Base data, p68
	303-4 Water discharge	Base data, p68
	303-5 Water consumption	Water and wastewater management, p38 Base data, p68
<b>Biodiversity and conservation</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Biodiversity and conservation, p30
GRI 304: Biodiversity 2016	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	Biodiversity and conservation, p30
<b>Carbon footprint</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Carbon footprint, p26 Chemical management and recovery, p36
GRI 305: Emissions 2016	305-1 Direct (Scope 1) GHG emissions	Carbon footprint, p26 Base data, p68
	305-2 Energy indirect (Scope 2) GHG emissions	Carbon footprint, p26 Base data, p68
	305-4 GHG emissions intensity	Carbon footprint, p26
	305-5 Reduction of GHG emissions	Carbon footprint, p26
	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Chemical management and recovery, p36 Base data, p68
<b>Waste Management</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Waste management, p39
GRI 306: Waste 2020	306-1 Waste generation and significant waste-related impacts	Waste management, p39
	306-2 Management of significant waste-related impacts	Waste management, p39 Using recycled textiles in VSF production, p44
	306-3 Waste generated	Waste management, p39 Base data, p68
	306-4 Waste diverted from disposal	Waste management, p39 Base data, p68
	306-5 Waste directed to disposal	Waste management, p39 Base data, p68



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GRI STANDARD	DISCLOSURE	LOCATION
<b>Labour and human rights</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Our workforce, p54
GRI 401: Employment 2016	401-1 New employee hires and employee turnover	Employee retention and development, p57 Base data, p68
	401-2 Benefits provided to full-time employees that are not provided to temporary or parttime employees	Wages and benefits, p55
	401-3 Parental leave	Base data, p68
GRI 406: Non-discrimination 2016	406-1 Incidents of discrimination and corrective actions taken	Diversity and inclusion, p55 Base data, p68
GRI 407: Freedom of Association and Collective Bargaining 2016	407-1 Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	Wages and benefits, p55
GRI 408: Child Labor 2016	408-1 Operations and suppliers at significant risk for incidents of child labor	Employee overview, p54
GRI 409: Forced or Compulsory Labor 2016	409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor	Employee overview, p54
<b>Occupational health and safety</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Health and safety, p58
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	Health and safety, p58
	403-3 Occupational health services	Health and safety, p58
	403-4 Worker participation, consultation, and communication on occupational health and safety	Health and safety, p58 Stakeholder engagement, p62
	403-5 Worker training on occupational health and safety	Health and safety, p58 Stakeholder engagement, p62
	403-8 Workers covered by an occupational health and safety management system	Health and safety, p58 Base data, p68
	403-9 Work-related injuries	Health and safety, p58 Base data, p68

GRI STANDARD	DISCLOSURE	LOCATION
<b>Employee training and development</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Employee retention and development, p57
GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	Base data, p68
	404-2 Programs for upgrading employee skills and transition assistance programs	Employee retention and development, p57
	404-3 Percentage of employees receiving regular performance and career development reviews	Base data, p68
<b>Diversity and inclusivity</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Diversity and inclusion, p55
405-1: Diversity of governance bodies and employees	405-1 Diversity of governance bodies and employees	Diversity and inclusion, p55 Base data, p68
<b>Customer satisfaction and product quality</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Our customers, p59
GRI 416: Customer Health and Safety 2016	416-1 Assessment of the health and safety impacts of product and service categories	Our customers, p59 Base data, p68
<b>Sustainability standards and assessments</b>		
GRI 3: Material Topics 2021	3-3 Management of material topics	Sustainable standards and assessments, p22
GRI 417: Marketing and Labeling 2016	417-1 Requirements for product and service information and labeling	Sustainable standards and assessments, p22 Base data, p68
	417-2 Incidents of non-compliance concerning product and service information and labeling	Sustainable standards and assessments, p22
<b>Other topics not covered by the GRI Standards</b>		
Innovation		Accelerating innovation and R&D, p42

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## GLOSSARY

**Biodiversity** - The diversity (number and variety of species) of plant and animal life within a region.

**Biological Oxygen Demand (BOD)** - The amount of oxygen used when organic matter undergoes decomposition by microorganisms. BOD testing assesses the amount of organic matter in water.

**Carbon footprint** - The sum of greenhouse gas emissions and removals of a product system or an organisation, expressed as a carbon dioxide equivalent.

**Cellulose** - The primary structural component of all plants, approximately 40% of wood, and the raw material for dissolving wood pulp production.

**Chemical Oxygen Demand (COD)** - The measurement of the oxygen required to oxidise soluble and particulate organic matter in water. COD testing uses a strong chemical oxidising agent to chemically oxidise the organic material in a wastewater sample under controlled conditions.

**Cradle-to-gate** - A life cycle assessment model that assesses a product's environmental footprint from raw materials extraction ('cradle') until it leaves the factory ('gate').

**Dissolving wood pulp (DWP)** - Highly purified chemical pulp derived from wood intended primarily for conversion into chemical cellulose derivatives and used mainly in manufacturing viscose staple fibre.

**European Union Best Available Techniques (EU BAT) Polymer BREF** - The standard approved by legislators and regulators for meeting input and output standards for a particular process. The EU BAT provides information on the best available techniques, including emission levels, associated monitoring and consumption levels, and relevant site remediation measures. It is the global industry benchmark for preventing and controlling industrial pollution.

**Follow Our Fibre** - An APR platform that uses blockchain technology to track viscose bales and ensure sustainable sourcing throughout the supply chain.

**Global Reporting Initiative (GRI)** - A multi-stakeholder standard for sustainability reporting, providing guidance on determining report content and indicators.

**Greenhouse gas (GHG) emissions** - Gases in the atmosphere that absorb and emit radiation within the thermal infrared range. The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone.

**Higg Index** - A suite of tools that measures environmental and social impacts across the life cycle of apparel and footwear products.

**Higg Index** - A suite of tools that measures environmental and social impacts across the life cycle of clothing apparel and footwear.

**International Organization for Standardization (ISO)** - An organisation that publishes several standards impacting APR activities. The ISO 9000 series of standards pertains to quality management systems, ISO 14001 focuses on environmental performance and management, and ISO 45001 covers occupational health and safety management.



**Jakarta Fashion Hub (JFH)** - A collaborative space inaugurated by APR. It connects brands, fashion designers, and fashion enthusiasts to support the growth of a sustainable fashion industry in Indonesia.

**Life Cycle Assessment (LCA)** - A systematic analysis of the environmental impact of products throughout their life cycle from cradle to gate or cradle to grave.

**Man-made cellulosic fibre (MMCF)** - Materials made from cellulose-based fibres derived from plants, most commonly wood pulp.

**Non-governmental organisation (NGO)** - A term used in this report to designate grassroots and campaigning organisations focused on environmental and social issues.

**OEKO-TEX®** - An association of independent textile and leather testing institutes responsible for developing industry standards.

**Posyandus** - Community-based integrated health posts that support mothers and toddlers, staffed by community volunteers called cadres.

**Rembuk stunting** - Discussions and consultations on stunting prevention and management.

**Small and medium-sized enterprise (SME)** - Business whose revenues, assets, or number of employees fall below a certain threshold that varies by industry and country.

**Solid waste** - Dry organic and inorganic waste materials.

**Stakeholder** - Any group or individual that is affected by or can affect a company's operations.

**Sustainability** - A term expressing a long-term balance between social, economic, and environmental objectives. It is often linked to sustainable development, defined as development that meets the needs of current generations without compromising the needs of future generations.

**Sustainable Development Goals (SDGs)** - A United Nations blueprint to achieve a better, more sustainable, and inclusive future addressing global challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice.

**The Program for the Endorsement of Forest Certification™ (PEFC)** - An international non-profit organisation that promotes sustainable forest management through independent third-party certification schemes.

**Total suspended solid (TSS)** - a water quality parameter defined as the quantity of material suspended in a known volume of water trappable in a filter.

**TOW** - Viscose staple fibre that does not pass internal quality standards (also known as 'reject fibre').

**Traceability** - The ability to track sustainable VSF and DWP across the entire supply chain.

**United Nations Framework Convention on Climate Change (UNFCCC)** - An international environmental treaty negotiated at the Rio de Janeiro United Nations Conference on Environment and Development (UNCED) in 1992.

**Viscose staple fibre (VSF)** - A bio-based fibre made from purified cellulose, primarily DWP twisted to form yarn.

**Zero Discharge of Hazardous Chemicals (ZDHC)** - A multi-stakeholder collaboration of global brands, chemical suppliers, manufacturers, and other organisations committed to reducing the chemical footprint of the MMCF industry, responsible for industry guidelines such as the ZDHC MMCF Fibre Production Guidelines, ZDHC MMCF Interim Wastewater Guidelines, and ZDHC MMCF Interim Air Emissions Guidelines.

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