Avantium
Full Year 2024 Results

19 March 2025

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Full Year 2024 Results

Highlights

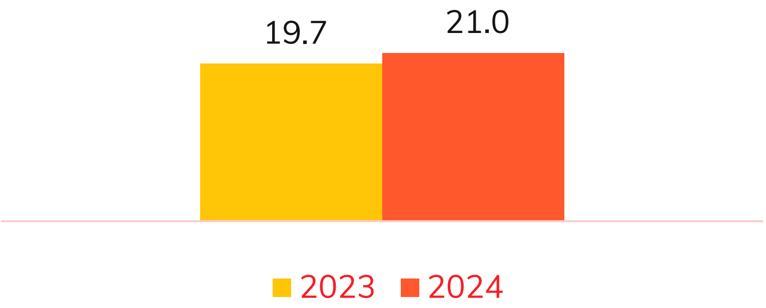
Anticipated sales under the offtake agreements in H2 2025

Creating the right conditions for future licensees

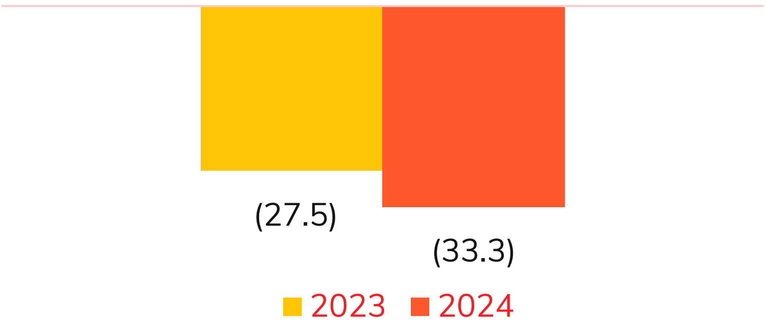
Groundbreaking polycotton textile waste technology

Financial highlights FY 2024 (€ millions)

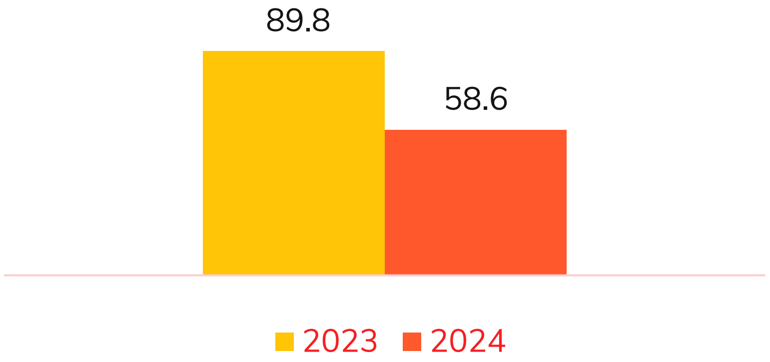
Revenues



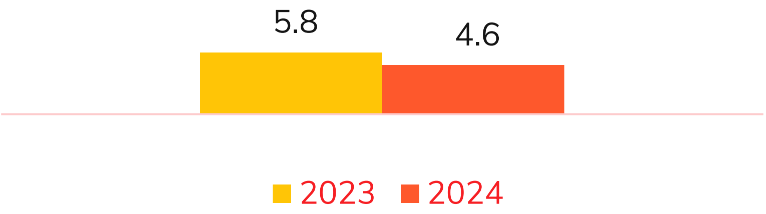
EBITDA



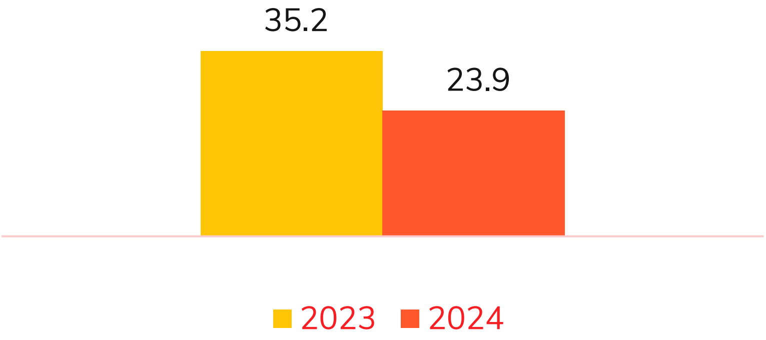
Investments



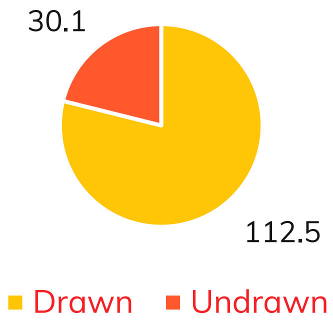
Other income (grants)



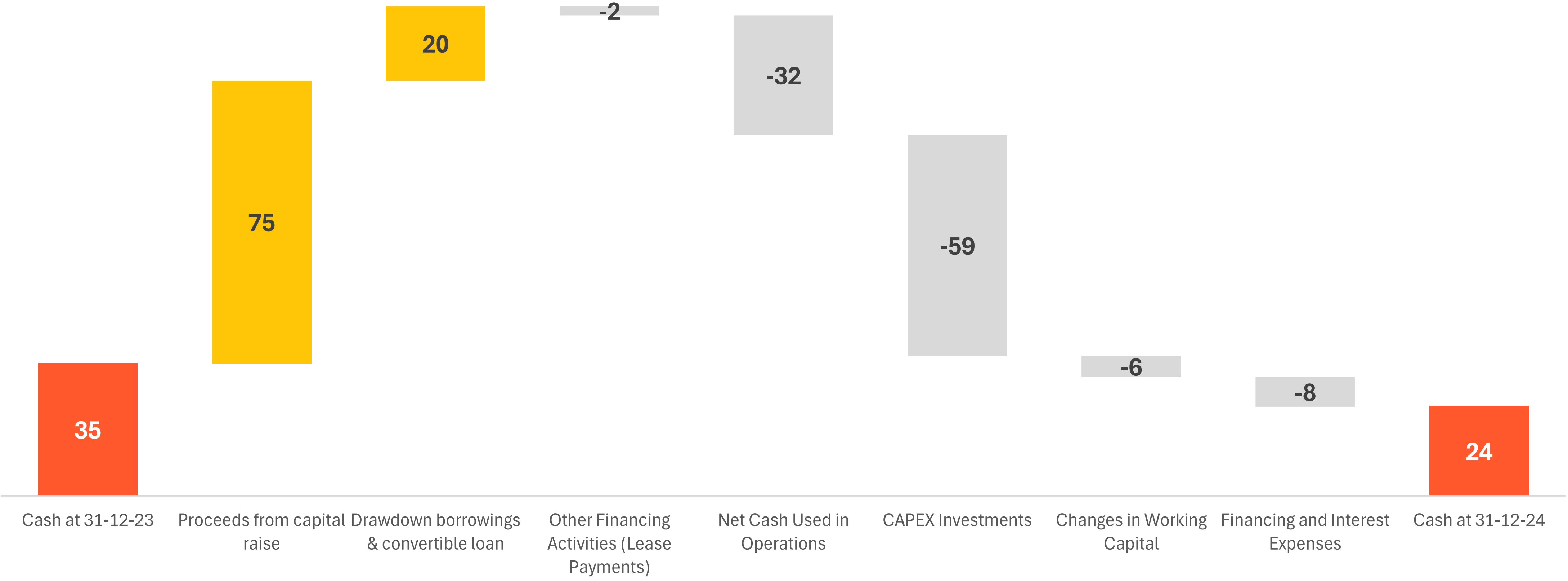
Cash position



Borrowings



Cash flows 2024 (€ millions)



Project execution: FDCA Flagship Plant

A journey of almost two decades…

FDCA Flagship Plant

Laboratory	FDCA Pilot Plant	FID	Construction completed	Start-up	Continuous operation
2006	2011	Dec. 2021	Oct. 2024	2025	2025>

The FDCA Flagship Plant

- First-of-a-kind plant
- Enabling sales of FDCA & PEF at commercial scale
- Proving technology at 5kta scale
- Located in Delfzijl, The Netherlands
- Recruited operations team of 70 people
- Critical for a successful licensing strategy

Starting up the FDCA Flagship Plant

2021 — FID

2022-2024 — Construction phase

H1 2025 — Start-up phase
- Sugar Dehydration
- Oxidation
- FDCA Purification

Polymerization to PEF

H2 2025 — Performance testing & regulatory validation

Sales of first FDCA and PEF to clients

First unloading of High Fructose Syrup – February 2025

Note: reflects anticipated timeline

Commercializing releaf®

Releaf® | The next generation polymer, with superior performance benefits

Superb barrier properties

10x better oxygen barrier

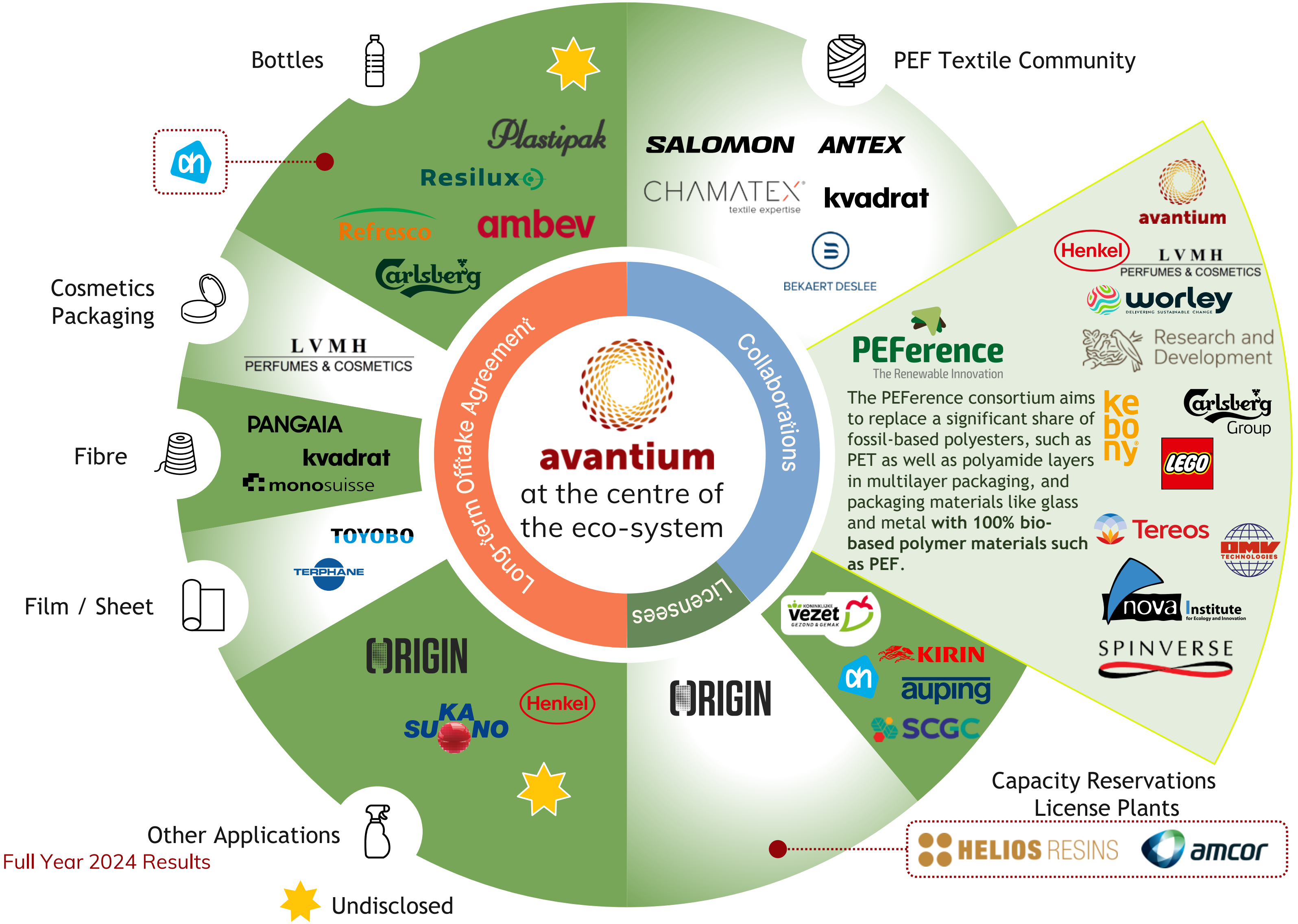
Circular, enhanced recyclability, 100% plant-based

8x better CO_2 barrier

Food waste reduction:
Up to 5-6 times longer shelf life

Up to
20%
weight reduction

Commitments from leading brands

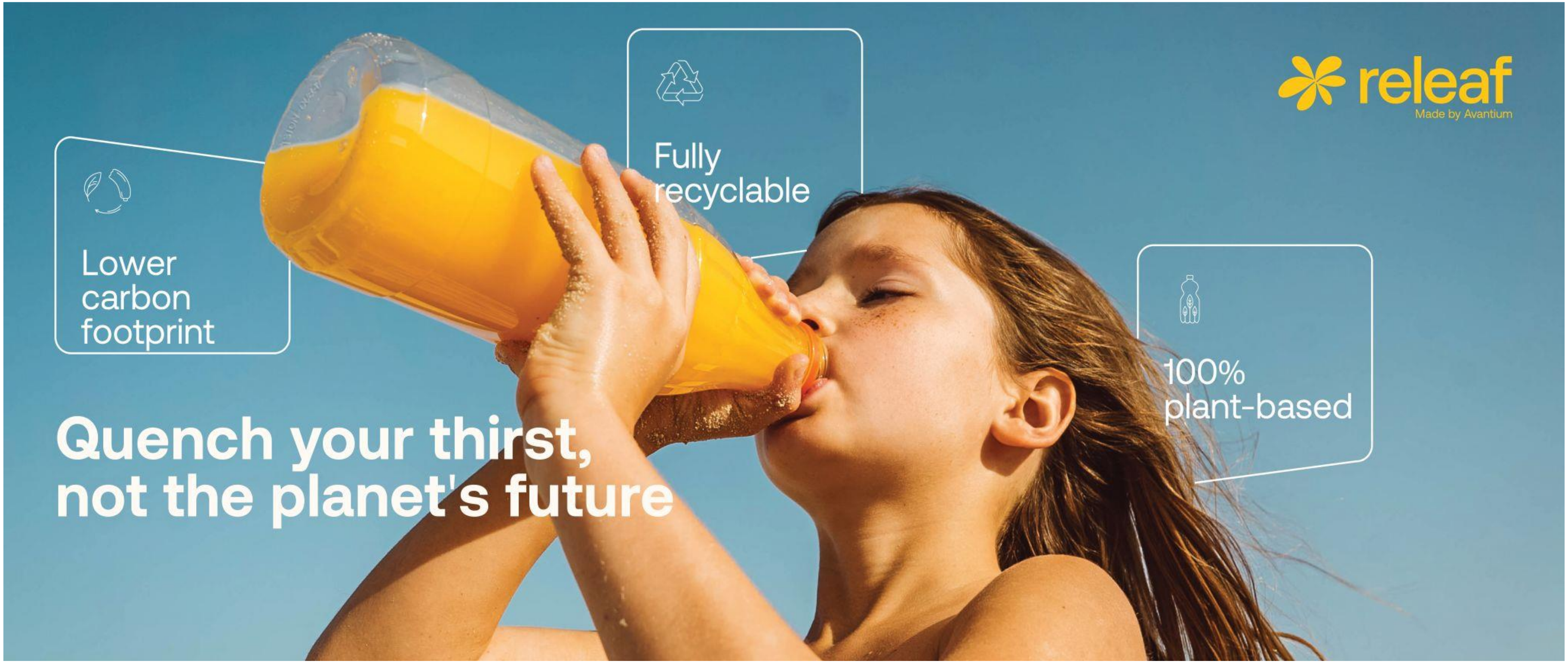


16
Offtake Agreements

2
Capacity Reservations Future Plants

1
Technology License Agreement

Releaf® | Engaging brands and consumers



The future: from pilot and flagship plant to license plants

Pilot Plant

2011

Flagship Plant

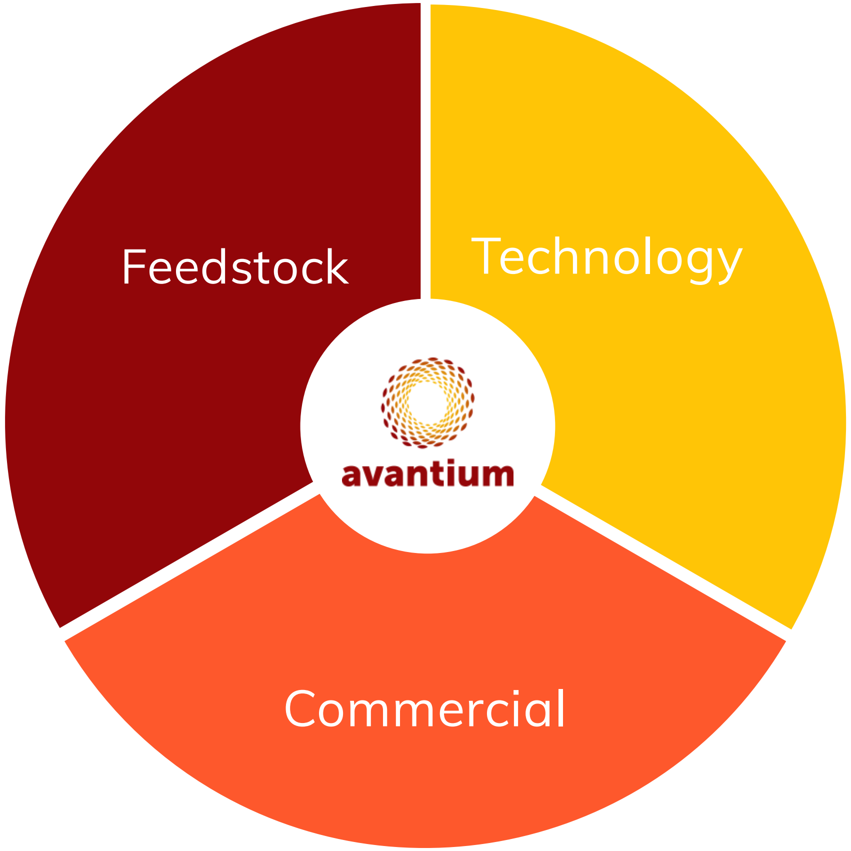
2024

Potential License Plants

2025>

Optimizing licensing strategy through the supply chain

Mitigating feedstock risk through 1st and 2nd gen strategy



Mitigating technology risk through FDCA Flagship Plant

Capacity reservations for future license plants

FDCA – feedstock agnostic, utilising Gen 1 and 2 feedstocks

1st Generation Feedstock

Glucose/fructose from starch

- FDCA Flagship Plant is using Gen 1 feedstock: starch – an abundant & low value co-product
- Regionally & commercially available
- Sugar surplus, no competition with food supply

2nd Generation Feedstock Innovations

Textile waste

Wood chips

- Feedstock availability crucial for effective global licensing strategy
- Avantium's Dawn Technology develops strategic diversifying feedstock options
- Recent breakthrough polycotton textile waste recycling

2nd generation feedstock: Dawn/Yukon technology enabling to use polycotton textile waste for feedstock

The technology

- Avantium (together with the University of Amsterdam) developed a patented technology to break down the cotton in polycotton textile waste into glucose (2nd generation feedstock source for FDCA/PEF), while leaving the polyester intact for fiber-to-fiber recycling

Business case

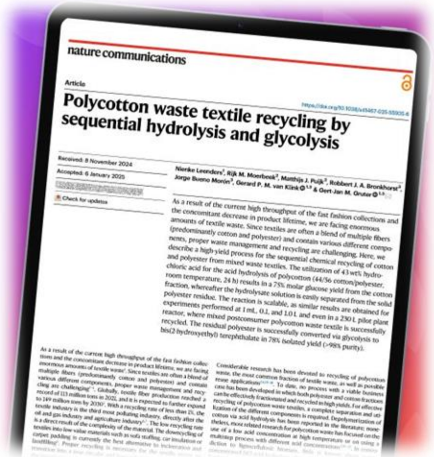
- Scalable and cost competitive: successful Avantium Dawn pilot plant tests demonstrate high glucose yields from polycotton waste, proving the method's scalability and cost-effectiveness

Textile waste management

- Addressing global waste problem: with global textile production expected to reach 149 million tons by 2030 and a recycling rate of currently less than 1%, this technology can address a major textile waste problem
- Aligned with new regulations: Avantium's technology aligns with new regulations that make textile producers responsible for waste management

Strategic importance

- Feedstock agnostic approach: reinforces the commercial potential of FDCA / PEF, supports Avantium's licensing strategy


nature communications

Article

Polycotton waste textile recycling by sequential hydrolysis and glycolysis

Received: 8 November 2024

Accepted: 6 January 2025

Check for updates

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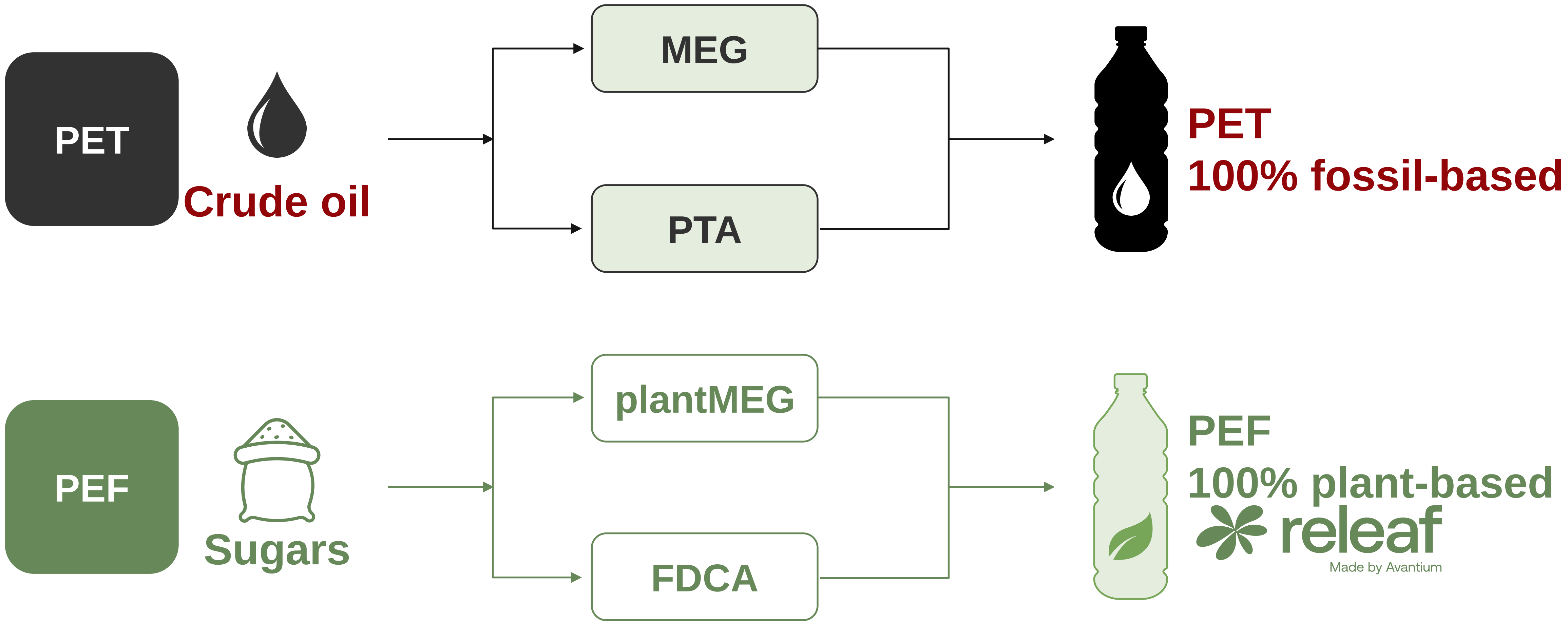
As a result of the current high throughput of the fast fashion collections and the concomitant decrease in product lifetime, we are facing enormous amounts of textile waste. Since textiles are often a blend of multiple fibers (predominantly cotton and polyester) and contain various different components, proper waste management and recycling are challenging. Here, we describe a high-yield process for the sequential chemical recycling of cotton and polyester from mixed waste textiles. The utilization of 43 wt% hydrochloric acid for the acid hydrolysis of polycotton (44/56 cotton/polyester, room temperature, 24 h) results in a 75% molar glucose yield from the cotton fraction, whereafter the hydrolysate solution is easily separated from the solid polyester residue. The reaction is scalable, as similar results are obtained for experiments performed at 1 mL, 0.1 L and 1.0 L and even in a 230 L pilot plant reactor, where mixed postconsumer polycotton waste textile is successfully recycled. The residual polyester is successfully converted via glycolysis to bis(2-hydroxyethyl) terephthalate in 78% isolated yield (>98% purity).

Publication in Nature Communications

Polyester residue of postconsumer polycotton waste textiles in the DAWN pilot plant

Appendix: FDCA & PEF

PEF: made from our focus product FDCA



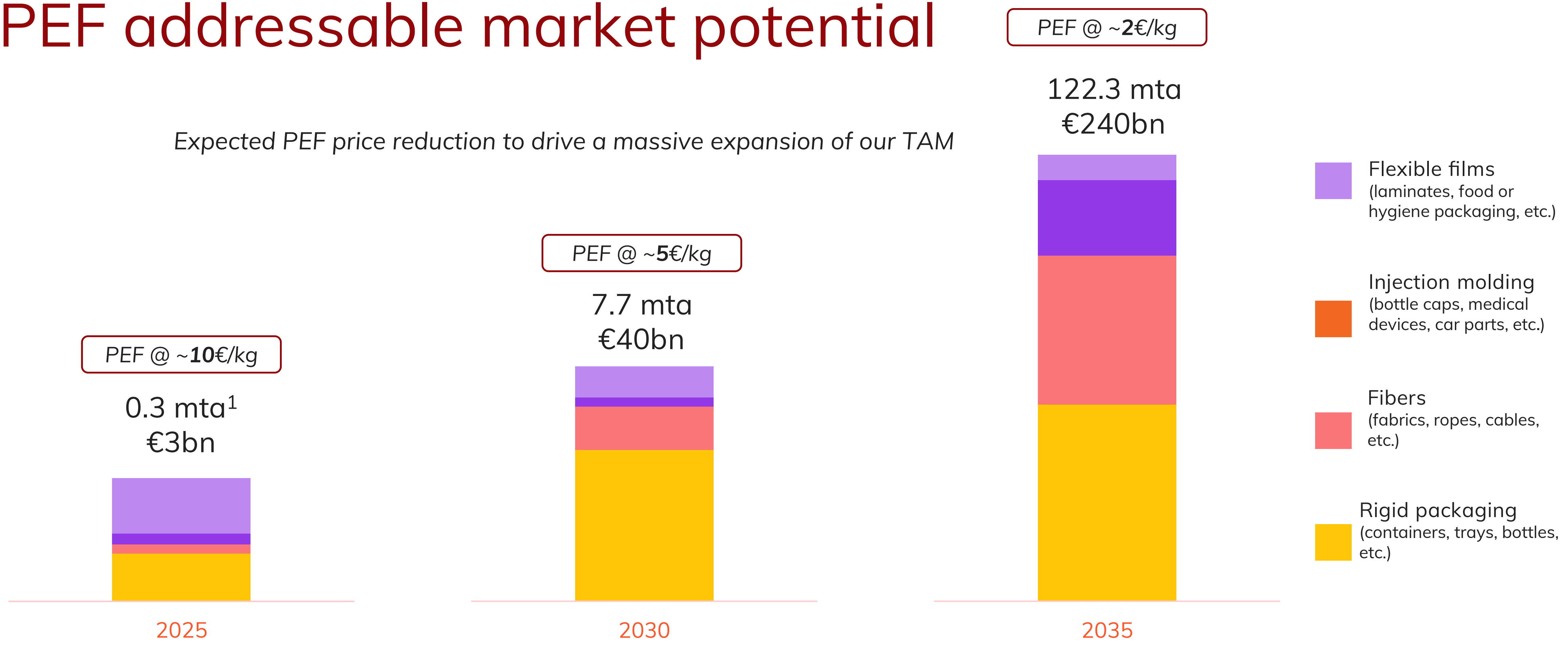
PEF can be used in a very broad range of applications

Bottles	Fibers	Films & More
		
Beer, Juices, Waters, Soft Drinks	Textile, Upholstery, Car Tires, Industrial Fibers	Food Packaging, Non-Food Packaging
Competing materials: Glass, Aluminium, PET, Multi-layer	Competing materials: PET, Nylon, Cotton	Competing materials: Glass, Aluminium, PET, Multi-layer
>50 million ton/year[1]	>40 million ton/year[1]	>25 million ton/year[1]
Carlsberg Group, ABInBev, Refresco, Resilux, UNDISCLOSED, ah	PANGAIA, kvadrat, monosuisse	LVMH PERFUMES & COSMETICS, SUKANO, Henkel, TOYOBO, ORIGIN, ah, TERPHANE, UNDISCLOSED

Notes: (1) estimated volume reflects Total Addressable Market (TAM) in 2035
Sources: Smithers, *The future of high barrier packaging films* to 2024, 2021; Smithers, *The future of global flexible packaging* to 2026, 2021; Smithers, *The future of rigid plastic packaging* to 2026, 2021; Thermoformed Packaging Market to 2025, 2018 ; PCI Wood Mackenzie, *Abstract report global Multilayer PET bottles industry* to 2024, 2016 ; Allied Market Research

PEF addressable market potential

Expected PEF price reduction to drive a massive expansion of our TAM



Own production (5kta)
Distinctive value proposition for multi-layer bottles and EVOH films replacement

Initial licensing phase (100kta)
Clear focus on monolayer bottle, specialty fibers, glass & aluminium replacement, films and multi-layer bottles markets

Large scale licensing (250kta)
Expectation to unlock PET market including large fiber market

Notes: (1) Million Metric Tons Annually, chart is not to scale
Sources: Smithers, *The future of high barrier packaging films* to 2024, 2021; Smithers, *The future of global flexible packaging* to 2026, 2021; Smithers, *The future of rigid plastic packaging* to 2026, 2021; Thermoformed Packaging Market to 2025, 2018 ; PCI Wood Mackenzie, *Abstract report global Multilayer PET bottles industry* to 2024, 2016 ; Allied Market Research

PEF is both sustainable and price-competitive at scale

100kta
Competing with aluminium and glass at €5.0/kg PEF

PEF Bottle
33cl – 13.5g
PEF material cost[1]
€0.07 = ~7% of end price

Glass Bottle
33cl – 200g
Glass material cost[1]
€0.13 = ~13% of end price

Aluminium Can
33cl – 13g
Alu material cost[1]
€0.03 = ~4% of end price

250kta
Competing with mono-material PET at €2.5/kg PEF

PEF Bottle
50cl – 17.5g
PEF material cost[2]
€0.044 = ~3.7% of end price

rPET Bottle
50cl – 22g
rPET material cost[2]
€0.055 = ~4.6% of end price

PET Bottle
50cl – 22g
PET material cost[2]
€0.037 = ~3.1% of end price

PEF reducing Global Warming Potential

↓ **88%** ***vs. glass***

↓ **74%** ***vs. aluminium***

↓ **61%** ***vs. PET***

Notes: (1) a 33cl bottle made with PEF at €5.0/kg sold at €1.00, a 33cl glass bottle sold at €1.00 and a 33cl aluminium can sold at €0.67; (2) Assuming PEF at €2.5/kg, rPET at €2.5/kg and PET at €1.7/kg, and a 50cl sold at €1.20.
Sources: enzymatic rPET, Company's estimates; Glass, Food grade rPET & PET prices, BusinessAnalytIQ.com, average Europe & USA Aug.22-Aug.23; Aluminium prices, markets.businessinsider, average Aug.22-Aug.23, NAPCOR, *Beverage Container LCA Report 2023*, 2023; Nova Institute

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