
avantium
Investor Presentation
February 2023

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Today's speakers

Tom van Aken

CEO

Since 2002

25y of industry experience

Selected previous experience:

DSM

Boudewijn van Schaïk

CFO

Since 2023

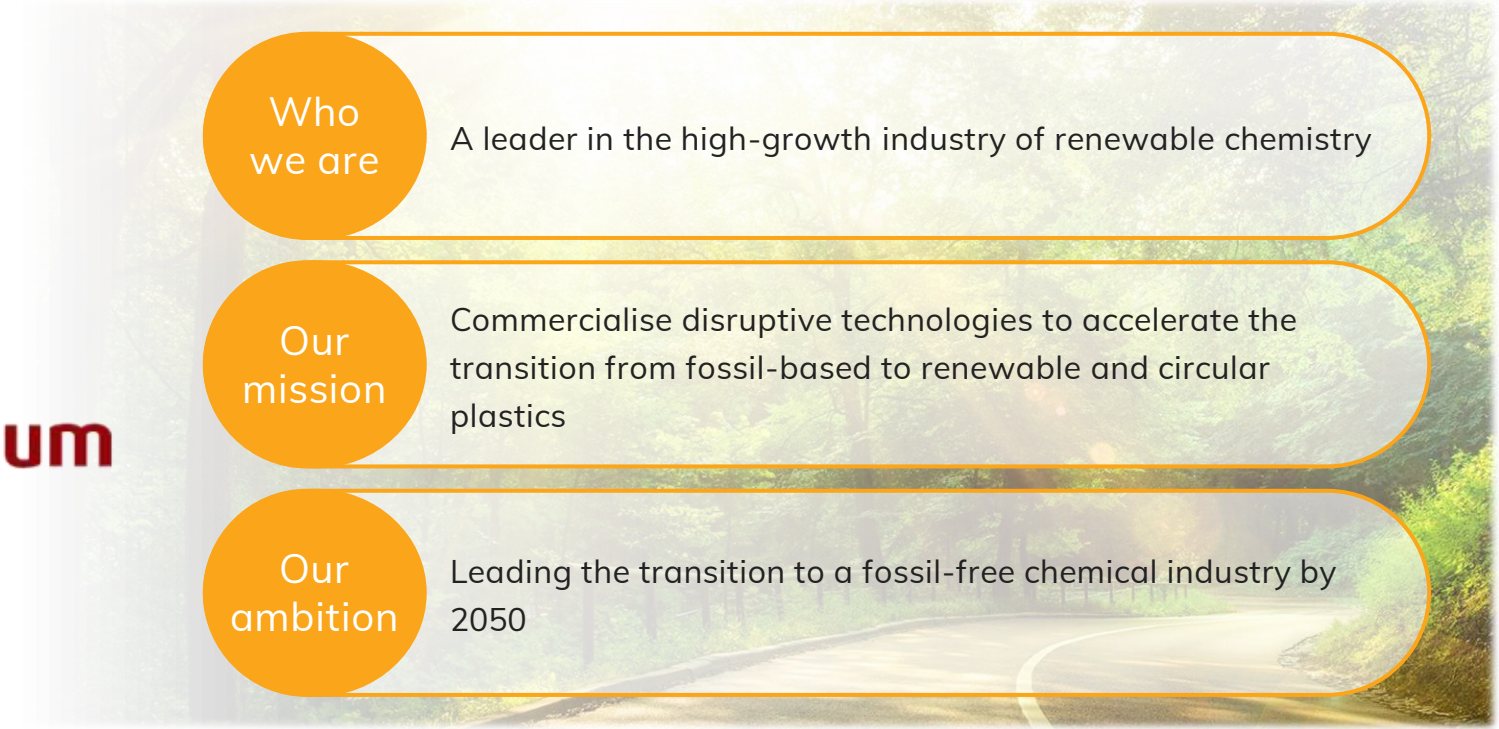
20y of finance experience

Selected previous experience:

SBM OFFSHORE · NIBC · ABN·AMRO

Introduction

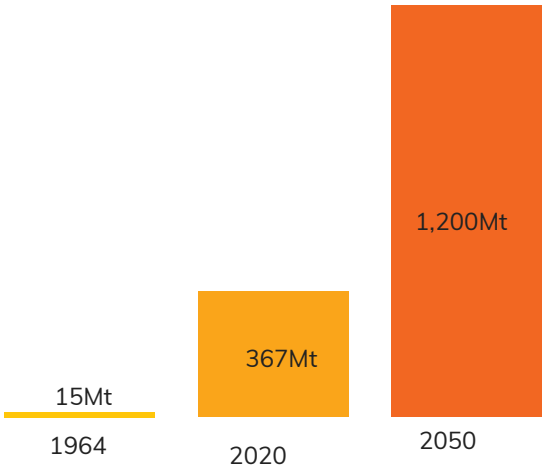
Avantium at a glance: a leader in renewable chemistry



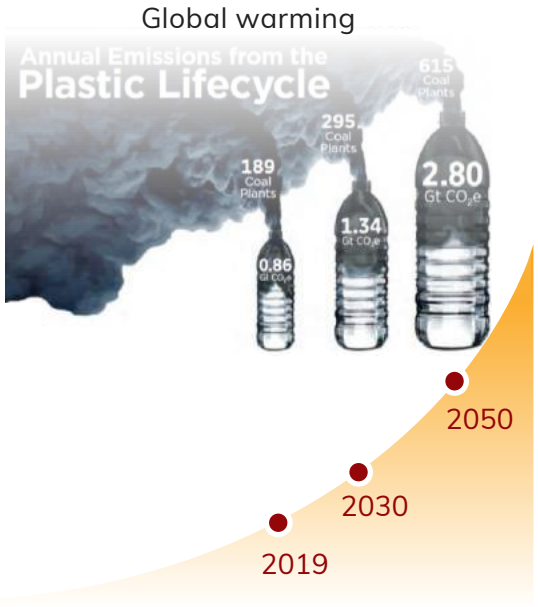
Who we are	A leader in the high-growth industry of renewable chemistry
Our mission	Commercialise disruptive technologies to accelerate the transition from fossil-based to renewable and circular plastics
Our ambition	Leading the transition to a fossil-free chemical industry by 2050

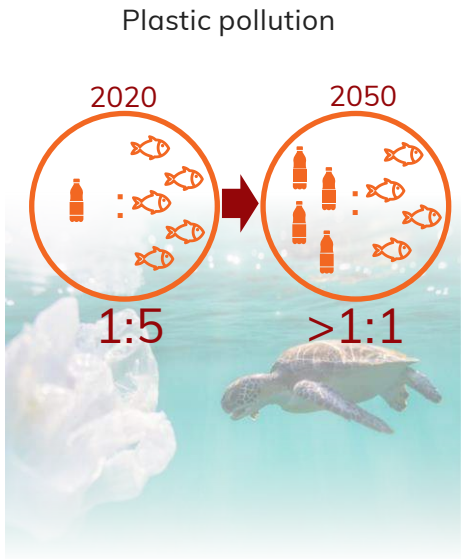
Increasing worldwide use of plastics causes major environmental challenges

Global plastics production will triple by 2050



Plastic production and waste cause major environmental problems





Sources: Ellen MacArthur Foundation; Center for International Environmental Law (CIEL)

Fossil-based products will ultimately phase out

Key market drivers

- Demographic growth and increasing purchase power of a growing worldwide middle class
- Tougher regulations geared towards recycling and/or bio-based feedstock, combined with neutral carbon footprint via CO_2 taxation
- Increasing industry commitment towards sustainable products
- Product performance determines size of market, speeds of adoption and price level

Challenges cannot be solved by recycling only

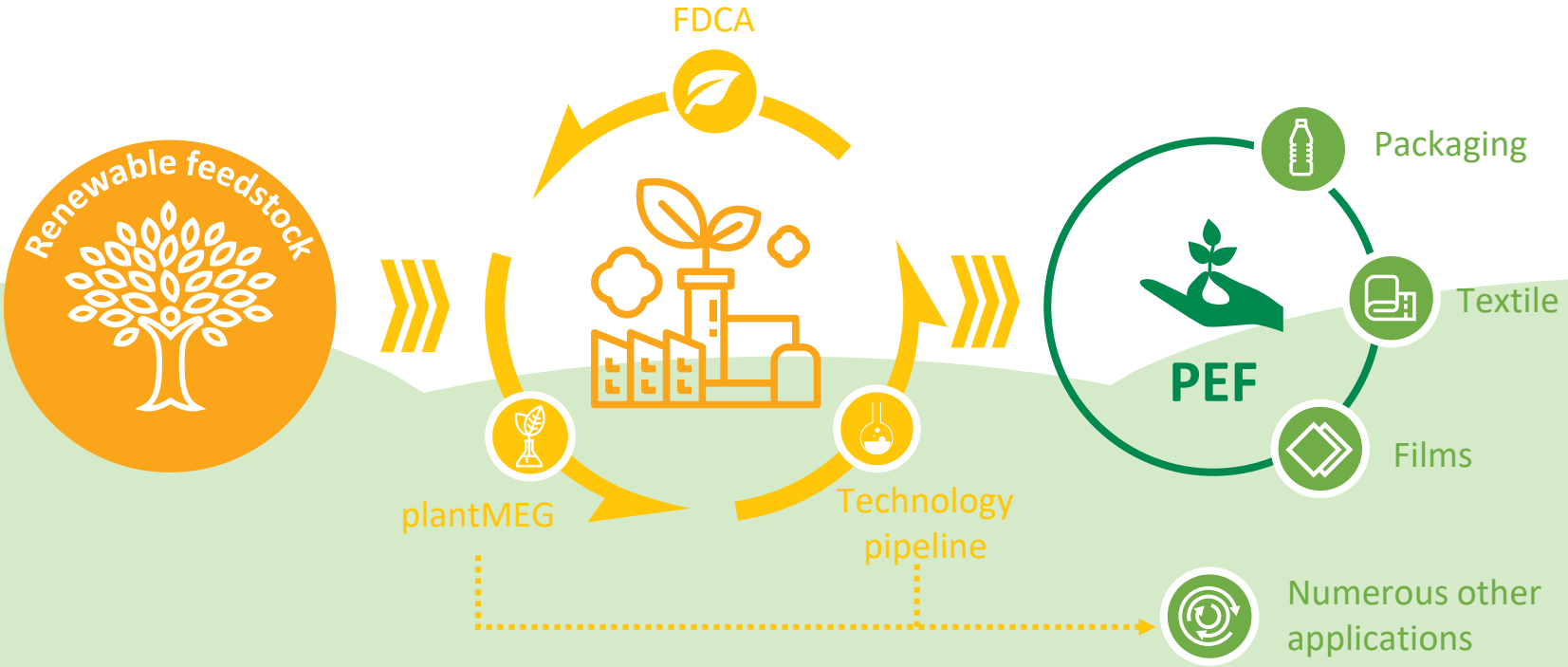
> *America simply **does not have enough recycled PET** supply or processing capacity **to satisfy commitments being made by brand owners** to increase recaptured resin content in their bottles.*
>
> NAPCOR(1)

> ***We won't recycle or dispose our way out of plastic pollution**… Future scenarios focused on collection, recycling, and disposal alone have been shown to fall short, with high ocean leakage and GHG emissions… **Upstream innovation offers opportunities** to rethink how products can be delivered to users without the need for single-use packaging.*
>
> The global commitment 2021 Progress Report
>
> ELLEN MACARTHUR FOUNDATION UN environment

Note (1) National Association for PET Container Resources

Pipeline of disruptive technologies in renewable chemistry

Focused on plant-based plastics, advancing towards commercialisation



From technology development to commercialisation

FDCA Pilot Plant (since 2011)

PlantMEG Pilot Plant (since 2019)

Pilot Biorefinery (since 2018)

Technology testing

- *R&D research*
- *Develop technology economic feasibility*
- *Product validation and applications*

Demonstrate technology & market testing

- *Technology demonstration*
- *Commercial launch*

Commercial roll-out

- *Commercialisation & industrial roll-out via technology licensing*

✓ Lab scale & Pilot Plants → ✓ Flagship Plant → Industrial

Mission: create & commercialise disruptive technologies & products to accelerate the transition to renewable & circular plastics

Avantium's succesful trajectory towards growth

20+
Years of R&D

144+
Patent families

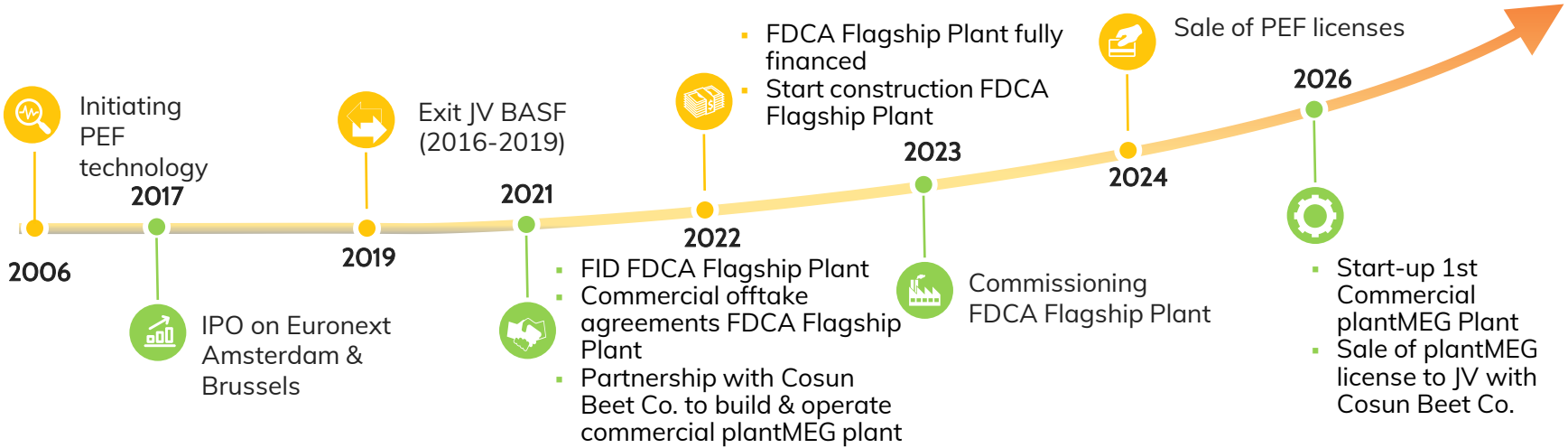
€192m
Funding for Flagship Plant secured

2
Core products (FDCA and plantMEG)

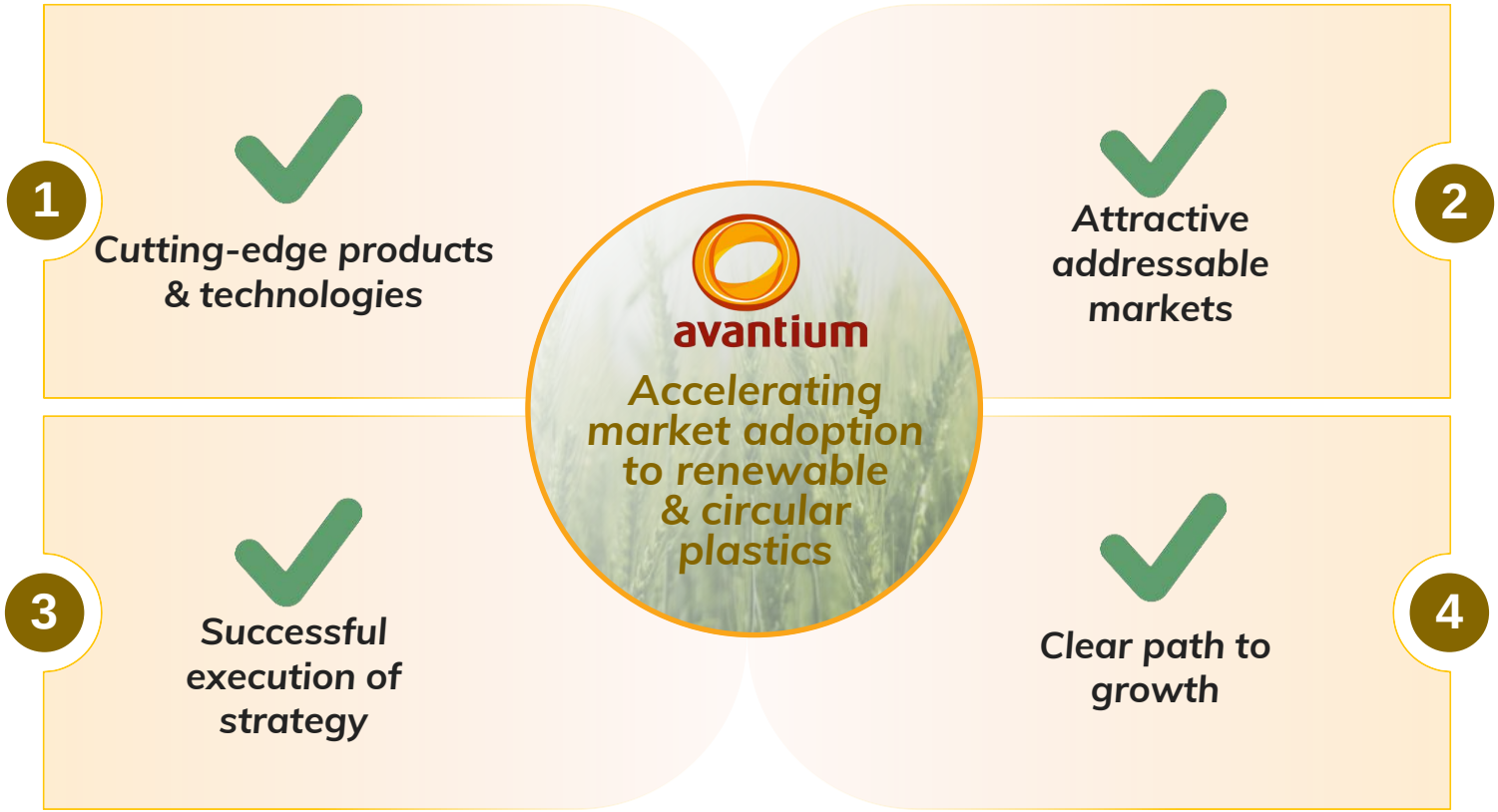
Strategic & commercial partners

250+
Employees

3 pilot plants & 1 commercial plant under construction



Key investment highlights



Part 1:

CUTTING-EDGE PRODUCTS & TECHNOLOGIES

PEF is a 100% plant-based plastic made from our two core products FDCA and plantMEG

Feedstock flexible

Unique technological platform centered around catalysis process

Broad range of applications

Agri crops

Agri & forestry residue

Forest residues: softwood and hardwood chips

Corn stover

Bagasse

Plant-based sugar

FDCA

plantMEG

PEF

Packaging

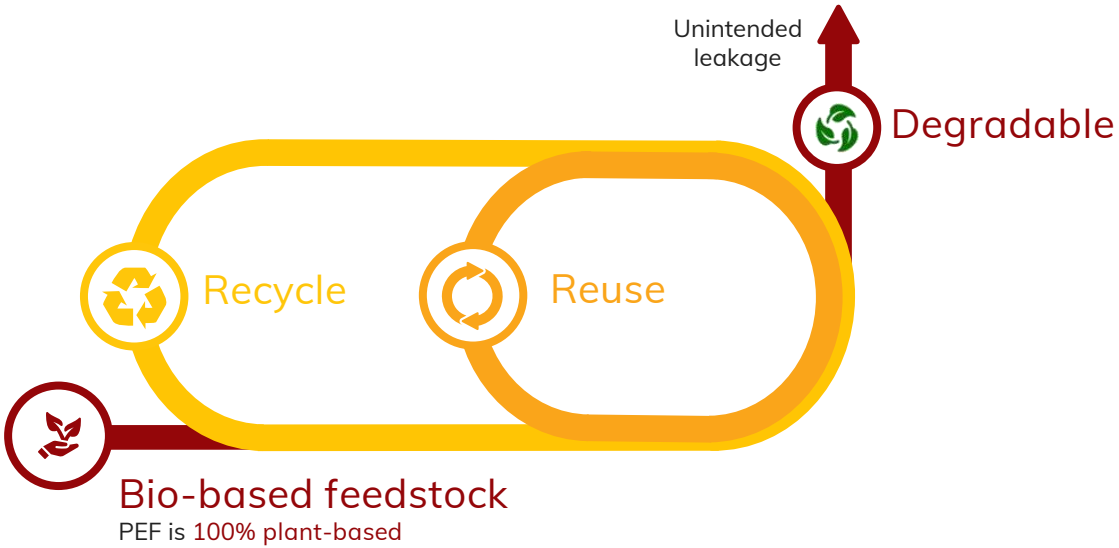
Film

Textile

Furniture | Textile | Automotiv | Packaging | Solvent & Coolants

PEF solves the challenges of today's conventional plastics

Offering solutions for plastic waste and CO_2 reduction



Renewable: PEF is plant-based instead of fossil-based, resulting in clear reductions in greenhouse gas (GHG) emissions (1)

Recycle:
- PEF has a proven fit with existing sorting and recycling facilities - endorsed by the European PET Bottle Platform
- PEF can substitute small and multi-layer packaging that cannot be recycled

Reuse: Performance potential in reuse under development

Degradable: when PEF unintentionally ends up in nature, tests show that PEF degrades
- Degradation tests show that PEF degrades much faster than PET under industrial composting conditions (250-400 days with air / oxygen @ 58°C in soil)
- Initial results from ongoing 10-year degradability field trial demonstrate that PEF degrades under ambient conditions

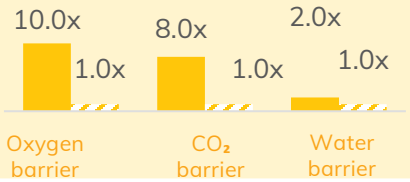
Note: (1) The 2021 ISO-certified LCA demonstrates significant improvements in carbon footprint of around 35% in GHG emissions dependent on the chosen application, compared to the incumbent fossil-based PET bottle designs; European LCA standards and methods do not allow carbon discounting based on temporary storage.

Showing enhanced performance while being cost competitive

Enhanced product properties

PEF PET

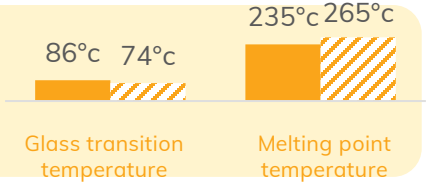
Strong gas barrier



Lightweighting

- Thinner applications
- Reducing weight by more than 20%

High heat resistance



Food contact approval(1)

Enhanced performance

Cost competitive

avantium

Fully Sustainable

Today: High-value applications €€€

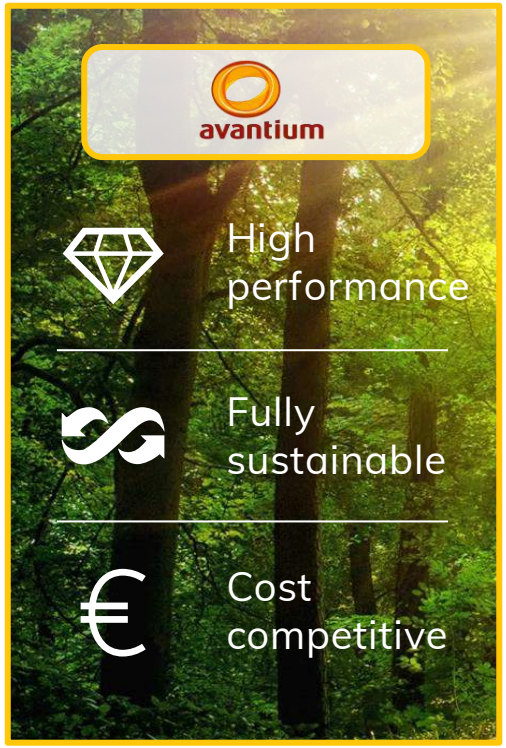
Tomorrow: Value applications €€

Longer-term: Mainstream applications €

Volume economies of scale

Note (1) In 2015, FDCA was adopted by the European Food Safety Authority (EFSA). In August 2016, FDCA was included in the Plastics Regulation as a food contact material. And in 2021, Avantium released PEF food contact grade, RP90Nx, that complies with the required regulations of food contact materials, which would allow the use of the PEF resin in direct contact with acetic foods and alcoholic drinks with an alcoholic strength less than 20% as well as with clear and cloudy drinks in the EU & UK.

Numerous strategic collaborations & offtake agreements



R&D collaborations

Development of PEF for beverage applications — DANONE, Coca-Cola

PEFerence [1] aims to establish an innovative supply chain for FDCA & PEF — PEFerence, Carlsberg Group, Nestlé, Henkel, LEGO, Tereos, kebony, LVMH, Worley

The PEF Textile Community aims to develop PEF yarn applications — ANTEX, BEKAERT DESLEE, kvadrat, CHAMATEX, SALOMON

Long-term offtake agreements

Bottles	Carlsberg Group, Refresco, Resilux, AB InBev	Major food & beverage brand owner
Film	TOYOBO, TERPHANE	
Other	LVMH PERFUMES & COSMETICS, Henkel, KAO SUNO, monosuisse	Brand owner

Note: (1) The PEFerence consortium has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation program under grant agreement No744409. The JU receives support from the European Union's Horizon 2020 research and innovation program and the Bio-based Industries Consortium.

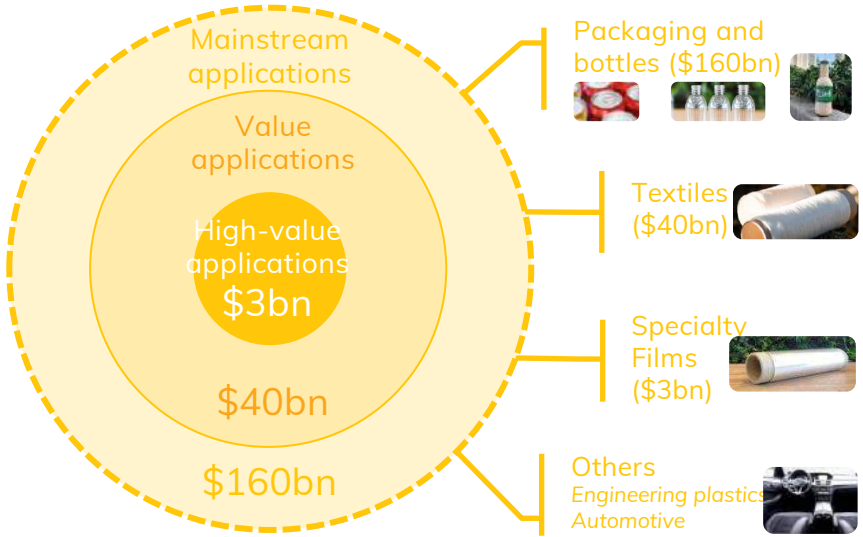
Part 2:

ATTRACTIVE ADDRESSABLE MARKETS

Avantium targets large and diverse PEF and MEG markets

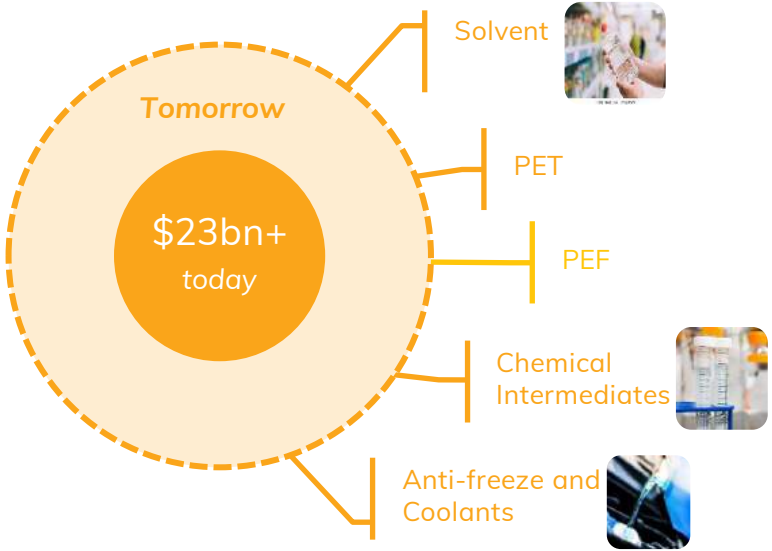
PEF addressable market – 100mt+

Total expected value $200bn+



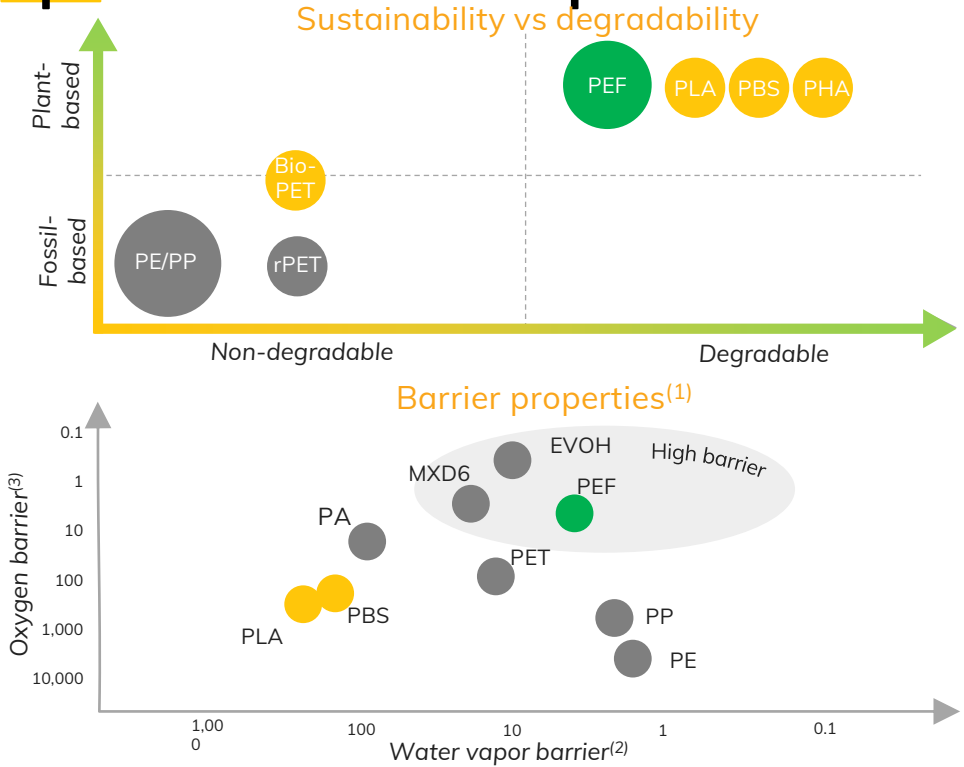
MEG addressable market – 35mt+

Total value today $23bn+



Sources: Chapter 12 Avantium IPO prospectus (March 2017); MEG values calculated based on market data of Wood Mackenzie (2021), Nexant (2020) and Tecnon Orbichem (2022)

PEF has enhanced product performance and FDCA / PEF is protected with 60+ patent families



Source: European Bioplastics; Company Assessment based on: Markus Schmidt et al, Properties of Whey-Protein-Coated Films and Laminates as Novel Recyclable Food Packaging Materials with Excellent Barrier Properties (International Journal of Polymer Science, Volume 2012), https://www.mgc.co.jp/eng/products/ac/nmxd6/barrier.html, http://asuka-platech.com/wp/wp-content/uploads/2013/12/BIOPBS.pdf

Note: (1) Barrier properties for 50µm film; (2) Water vapor barrier: WTR at (39 dC 85 %RH) [mL/(m2 · day)]; (3) Oxygen barrier: OTR (23, 0%RH) [mL/(m2 · day · atm)]

Part 3:

SUCCESSFUL EXECUTION OF STRATEGY

Construction of FDCA Flagship Plant commenced in 2022

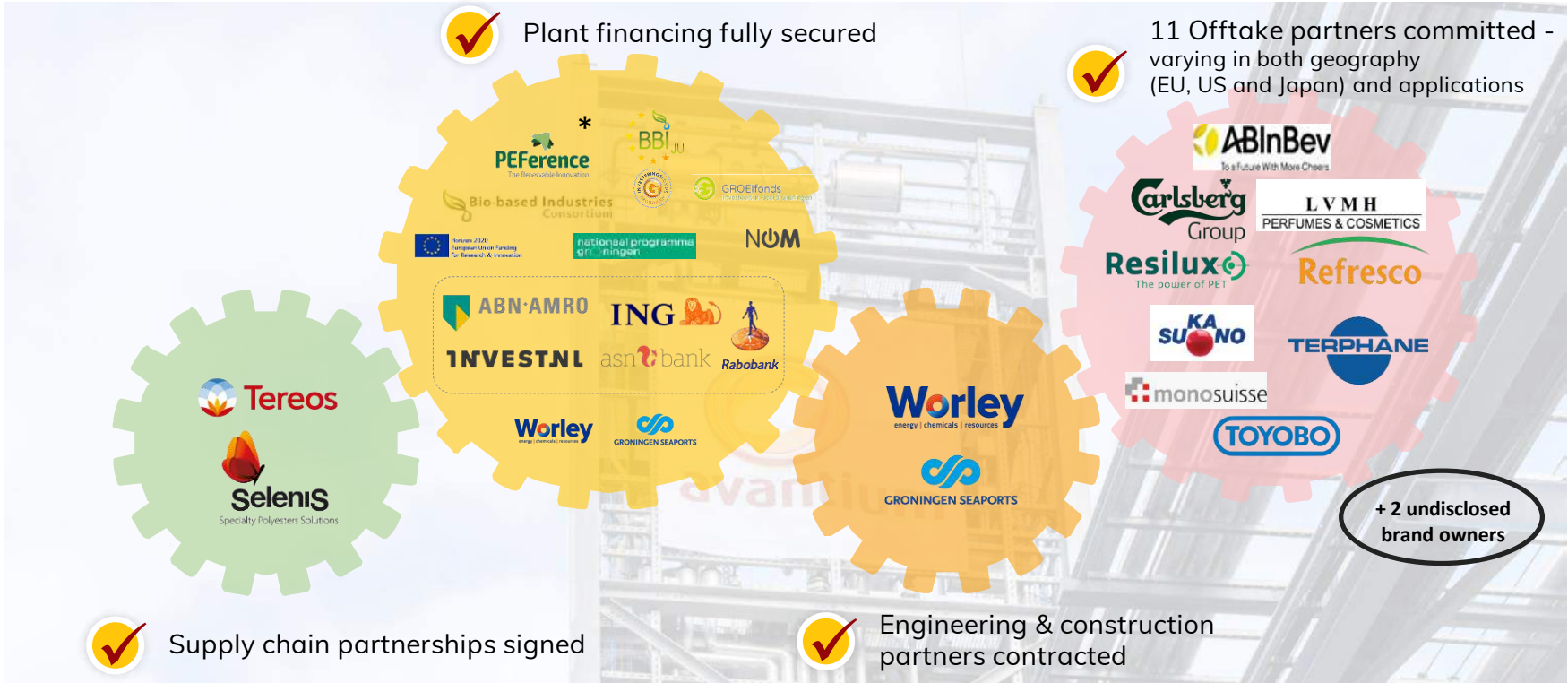
The world's first plant producing FDCA on a commercial scale

Location
Chemie Park Delfzijl (NL) –
Environmental permit in place

Timing
Construction completion 2023 & operational 2024

Objective
Prove technology at 5 KTA scale:
Sales PEF &
Unlock licensing business

Successfully de-risked across the entire value chain



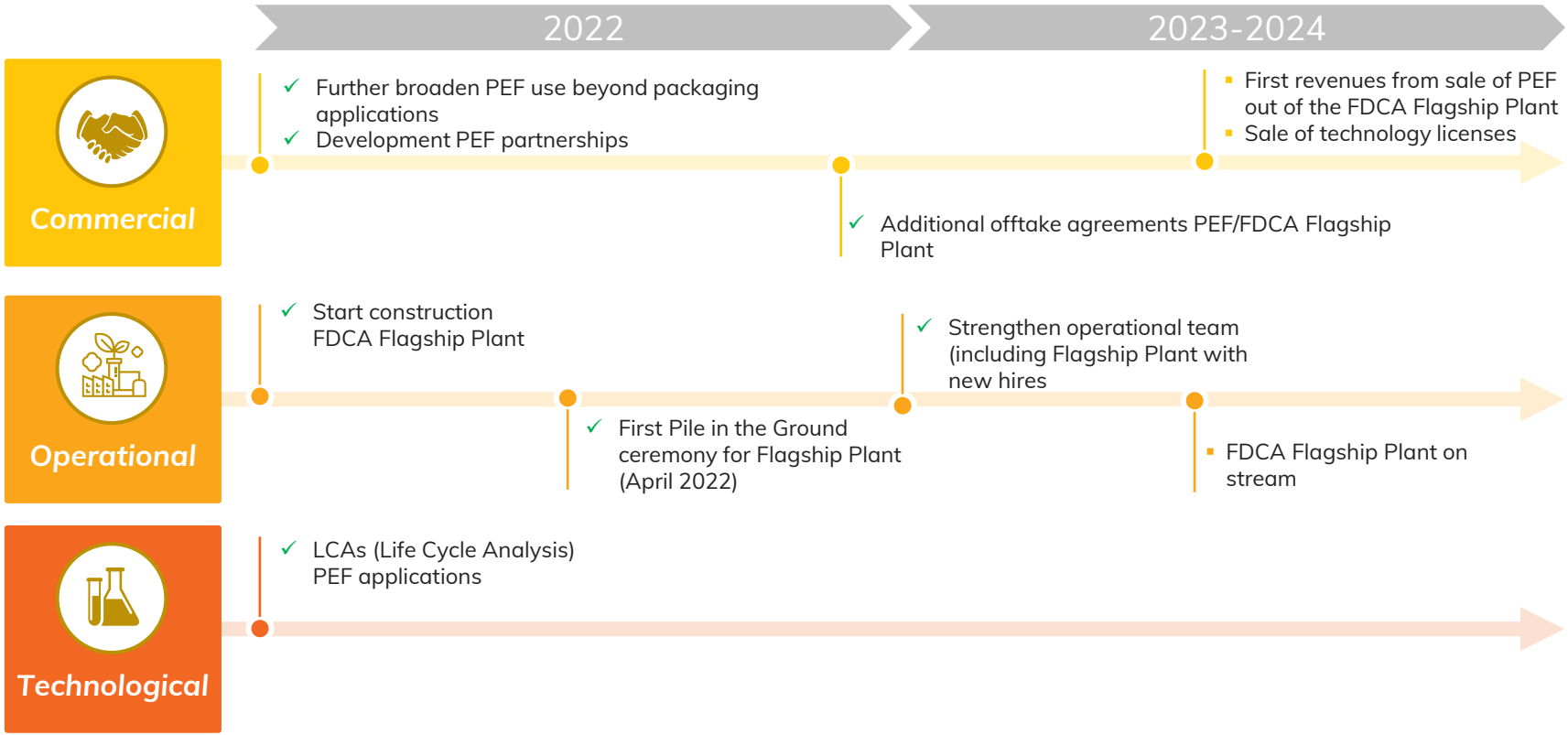
Note: (*) This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation program under grant agreement No744409. The JU receives support from the European Union's Horizon 2020 research and innovation program and the Bio-based Industries Consortium.

Avantium has a well-defined and scalable go-to-market strategy for PEF/FDCA

	Today	Tomorrow	Longer-term
Product characteristics	*Flagship Plant (5kt/a)* *In-house production* € € €	*Industrial Plant (100kt/a)* *Licensing* € €	*Industrial (>250kt/a)* *Licensing* €
Competitive positioning	*High-value applications* *Competition: multi-layer barrier materials*	*Value applications* 0.5l 0.5l *Competition: glass bottles, alumina cans*	*Mainstream applications* 1.0l 1.0l *Competition: PET, other polymers*

Initial focus on high-value applications with further volume growth to result in cost reduction, leading to a competitive offering across high volume end-markets

Momentum to accelerate in 2022 driven by increasing PEF adoption



Part 4:

CLEAR PATH TO GROWTH

plantMEG is a key drop-in ingredient for large end-markets

Avantium value proposition

plantMEG will provide brands with a sustainable & innovative ingredient

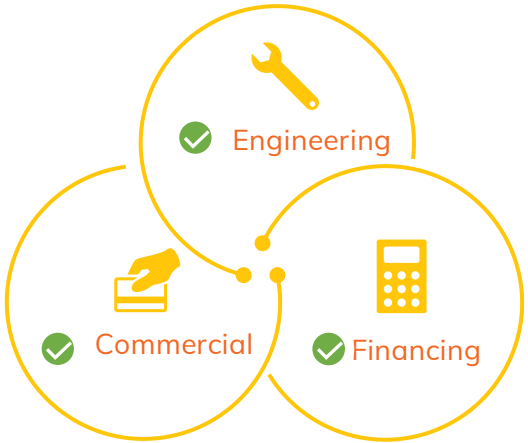
Note (1) The 2022 ISO-certified LCA shows a greenhouse gas (GHG) emission reduction of up to 83% over the life cycle when Avantium's plantMEG™ is compared with MEG based on naphtha, shale gas, natural gas or coal. European LCA standards and methods do not allow carbon discounting based on temporary storage

Construction of plantMEG Commercial Plant

Leveraging on the succesful experience in FDCA

Location Northwestern Europe	**Joint venture** Jointly owned by Cosun Beet Co & Avantium	**Size** >100kt per annum (expected)
Applications Wide range: packaging, fibers & other	avantium Cosun Beet COMPANY	**Timing** FID 2024 Operational in 2026
Technology plantMEG license sale from Avantium to JV	**Feedstock** Beet sugar from Cosun Beet Co.	**Objective** Commercial launch plantMEG

Success of FDCA strategy execution will accelerate plantMEG execution



Value drivers other technologies

Summary of milestones reached and key upcoming potential milestones

	2022-2023	2024
PlantMEG™	✓ LCA plantMEG™ and plantMPG™ • First LOIs and offtake agreements plantMEG™ • Application validation plantMEG™ (bottles, fibers, films) • Site selection Commercial Plant plantMEG™ • Financing and partnerships plantMEG™	• Engineering of Commercial Plant plantMEG™ • Financing and partnerships plantMEG™ • Final Investment Decision Commercial Plant plantMEG™
Other	✓ Proven revenue stream R&D Solutions Business • Securing of new grants • Explore partnerships to further develop and scale-up other pipeline programmes (CO_2 based polymers and biorefinery)	• Financing and partnerships for other programmes in the pipeline • Scale-up other programmes in the pipeline

Key drivers supporting Avantium's market potential

Key takeaways

Key milestones successfully achieved...

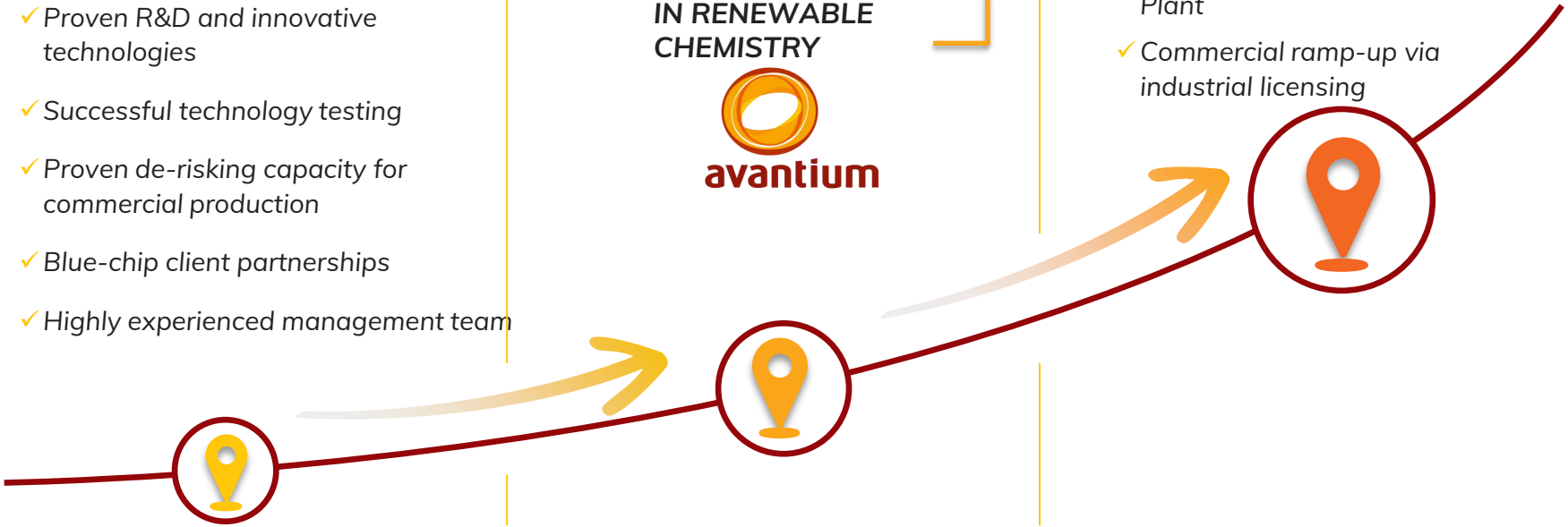
- ✓ *Proven R&D and innovative technologies*
- ✓ *Successful technology testing*
- ✓ *Proven de-risking capacity for commercial production*
- ✓ *Blue-chip client partnerships*
- ✓ *Highly experienced management team*

INNOVATION-DRIVEN TECHNOLOGY LEADER IN RENEWABLE CHEMISTRY

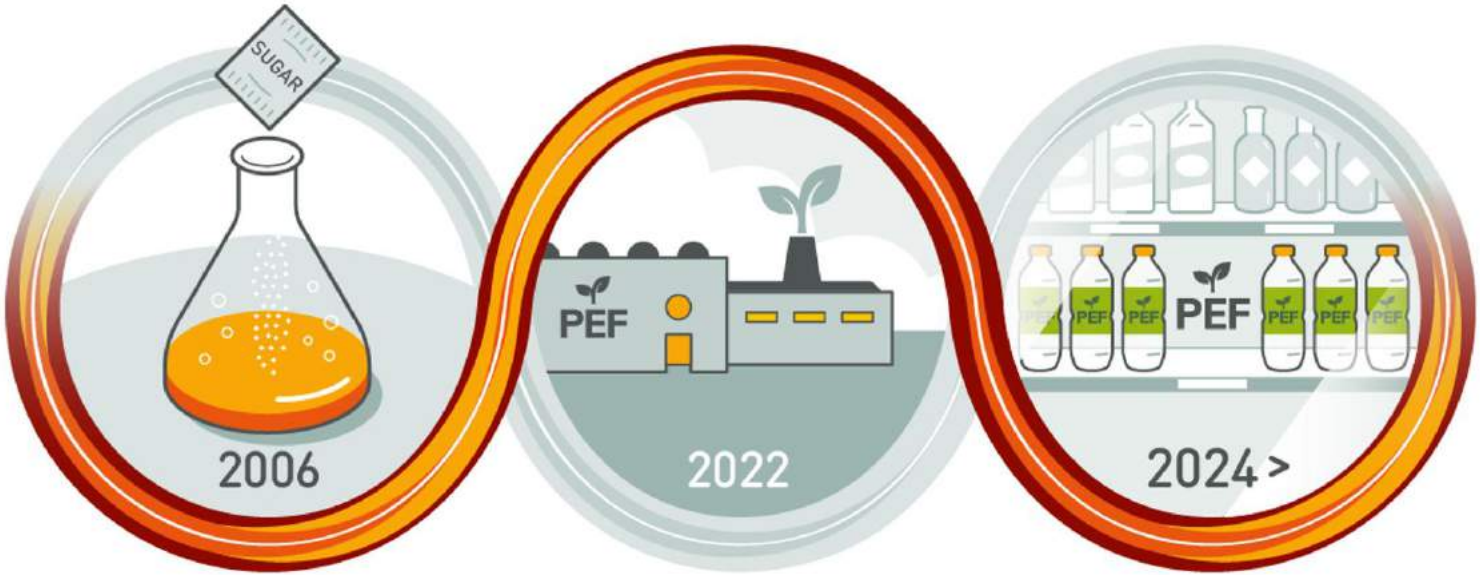
avantium

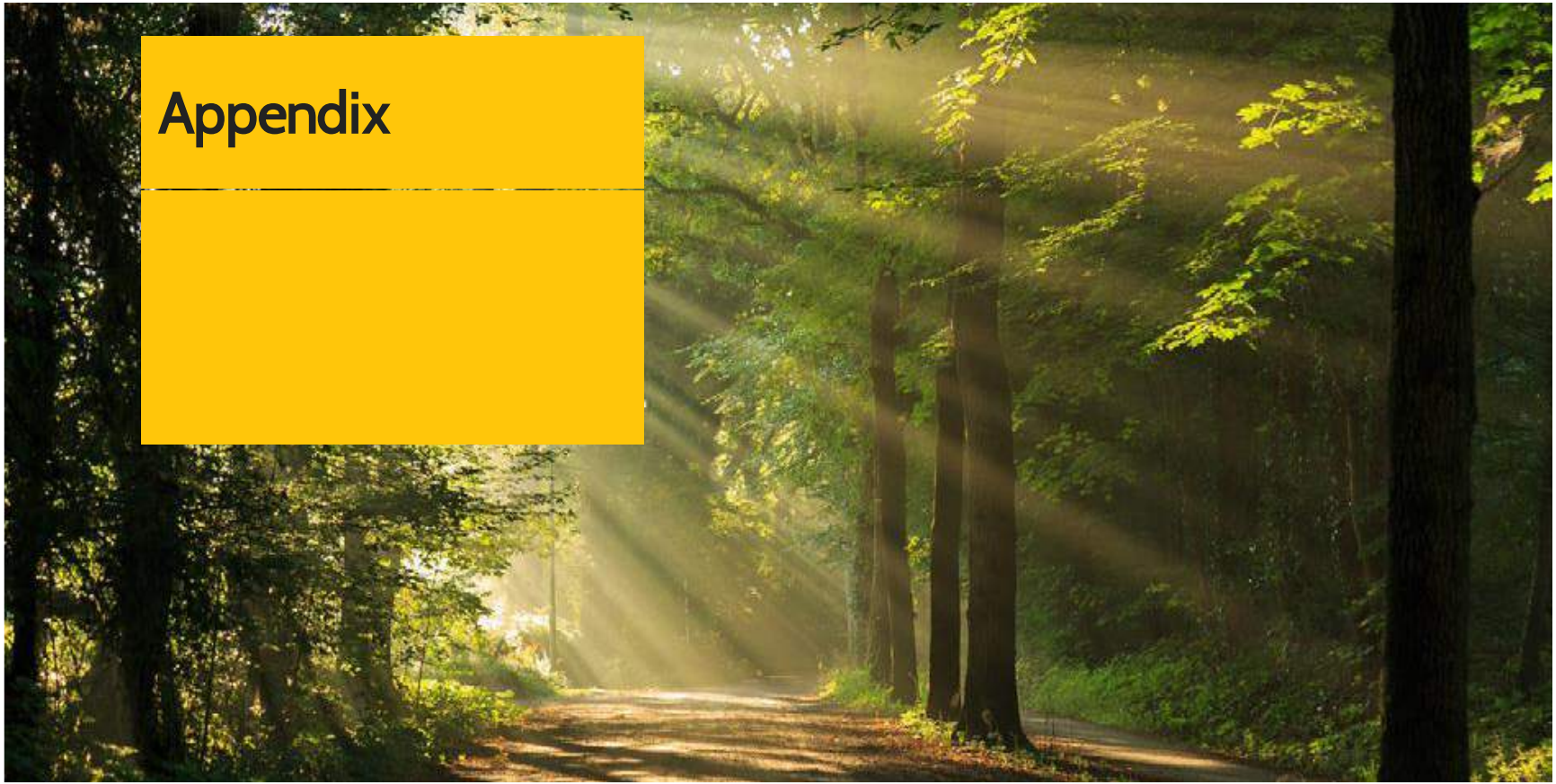
...Forming the foundation for commercialisation

- ✓ *Construct FDCA Flagship Plant*
- ✓ *Construct plantMEG Commercial Plant*
- ✓ *Commercial ramp-up via industrial licensing*



Q&A





Appendix

Avantium: experienced leadership team

Management Team

Tom van Aken
CEO
(@Avantium since 2002)

Education:
Chemistry (Utrecht) and Economics (Amsterdam)

Selected previous / other positions:
- Now: several advisory positions, such as Top Team Chemie
- 1999-2002: Director Business development at DSM
- 1997-1999: Sales manager at DSM

Boudewijn van Schaïk
CFO
(@Avantium since 2023)

Education:
Business Science (Accounting and Corporate Finance) (Cape Town)

Selected previous / other positions:
- 2013-2022: Head of Corporate Finance at SBM Offshore
- 2007-2013: NIBC Bank
- 2005-2007: ABN AMRO Bank

Gert-Jan Gruter
CTO
(@Avantium since 2000)

Carmen Portocarero
General Counsel
(@Avantium since 2012)

Bas Blom
Managing Director Renewable Polymers
(@Avantium since 2021)

Yap Chie Cheung
Managing Director Renewable Chemistries
(@Avantium since 2023)

Steven Olivier
Managing Director Catalysis
(@Avantium since 2015)

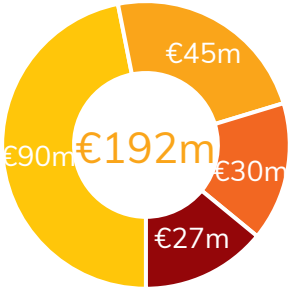
Supervisory Board

Edwin Moses (Chair)	Former CEO Ablynx NV and Oxford Assymetry International
Margret Kleinsman	CFO Agrifirm
Michelle Jou	CEO Castrol
Nils Björkman	Worked for 33 years in various senior management positions at Tetra Pak Group
Dirk Van Meirvenne (*nominee*)	Head of the Advanced Industrial Intermediates business unit at Lanxess
Peter Williams (*nominee*)	Group Technology Director and Head Of Investor Relations at INEOS

FDCA Flagship Plant financing fully secured

Financial Close reached on 31 March 2022

Funding sources



Funding uses

- CAPEX: €115m
- Running cost (OPEX): €65m
- Interest, other: €12m

Grants (€27m):

- €20m PEFerence grant(1)
- €7.5m grant from the National Programme Groningen

Third Party Equity (€30m):

- €20m equity from Bio Plastics Investment Groningen consortium (BPIG)
- €10m million equity from Worley
- Represents 22.6% of the Renewable Business equity

Avantium Equity (€45m):

- €45m investment by Avantium (increased from €35m)
- Represents 77.4% of the Renewable Business equity

Debt Financing (€90m):

- Each bank has committed €15m
- Invest-NL, government backed Dutch impact investment fund, has committed €30m
- Interest consists of three components: cash interest, accrued interest and warrants

Note: (1) This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation program under grant agreement No744409. The JU receives support from the European Union's Horizon 2020 research and innovation program and the Bio-based Industries Consortium.

Illustrative revenue and profitability model showcasing the large financial opportunity

Illustrative market targeting

	PEF	MEG
1	Estimated market sizes	
	PEF: 5-10mt *Value applications*	MEG: +35mt
2	Illustrative market share	
	5% market share	5% market share
3	Implied target market volume	
	500 kta	1,750 kta

Revenue & profitability mechanics

Avantium R&D Solutions

Continued organic growth in line with historical levels

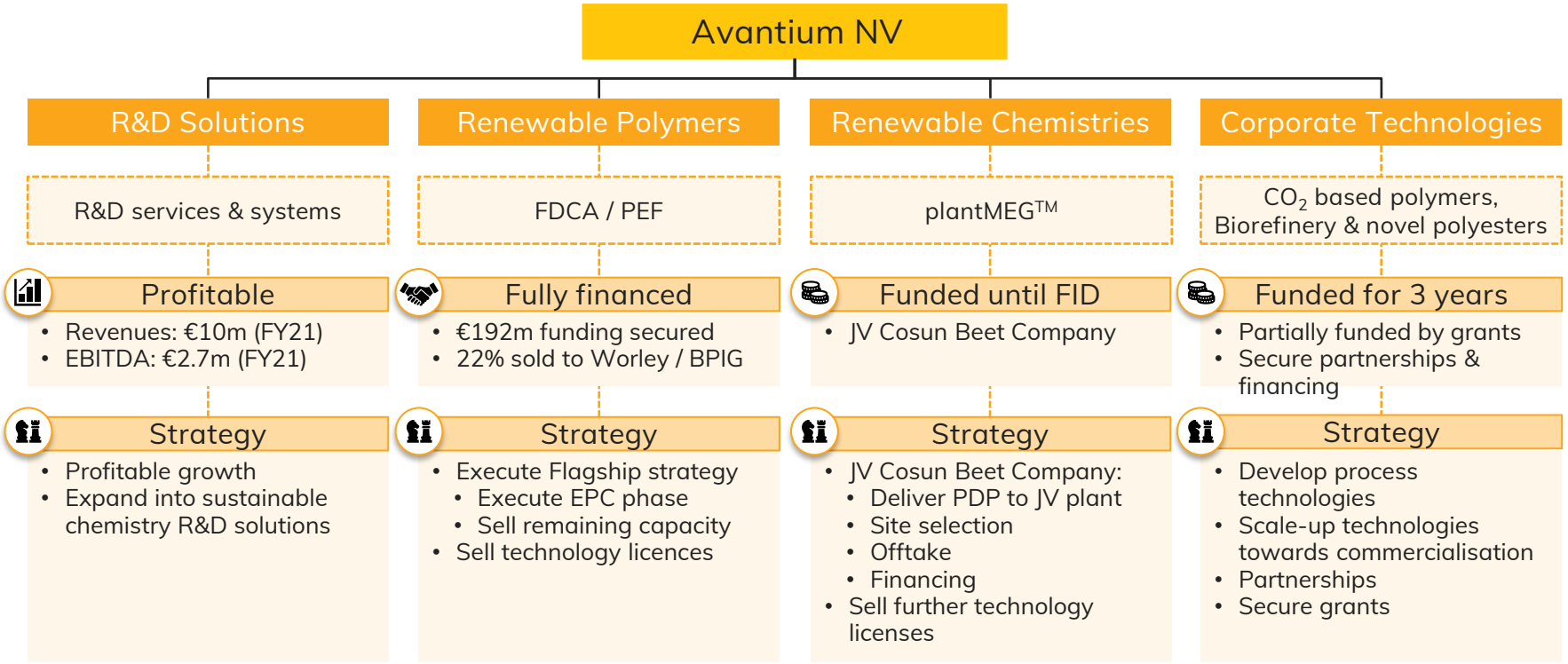
FDCA Flagship

Capacity		*Average selling price*		*Turnover*
5kta	x	~€9/kg	=	~€45m

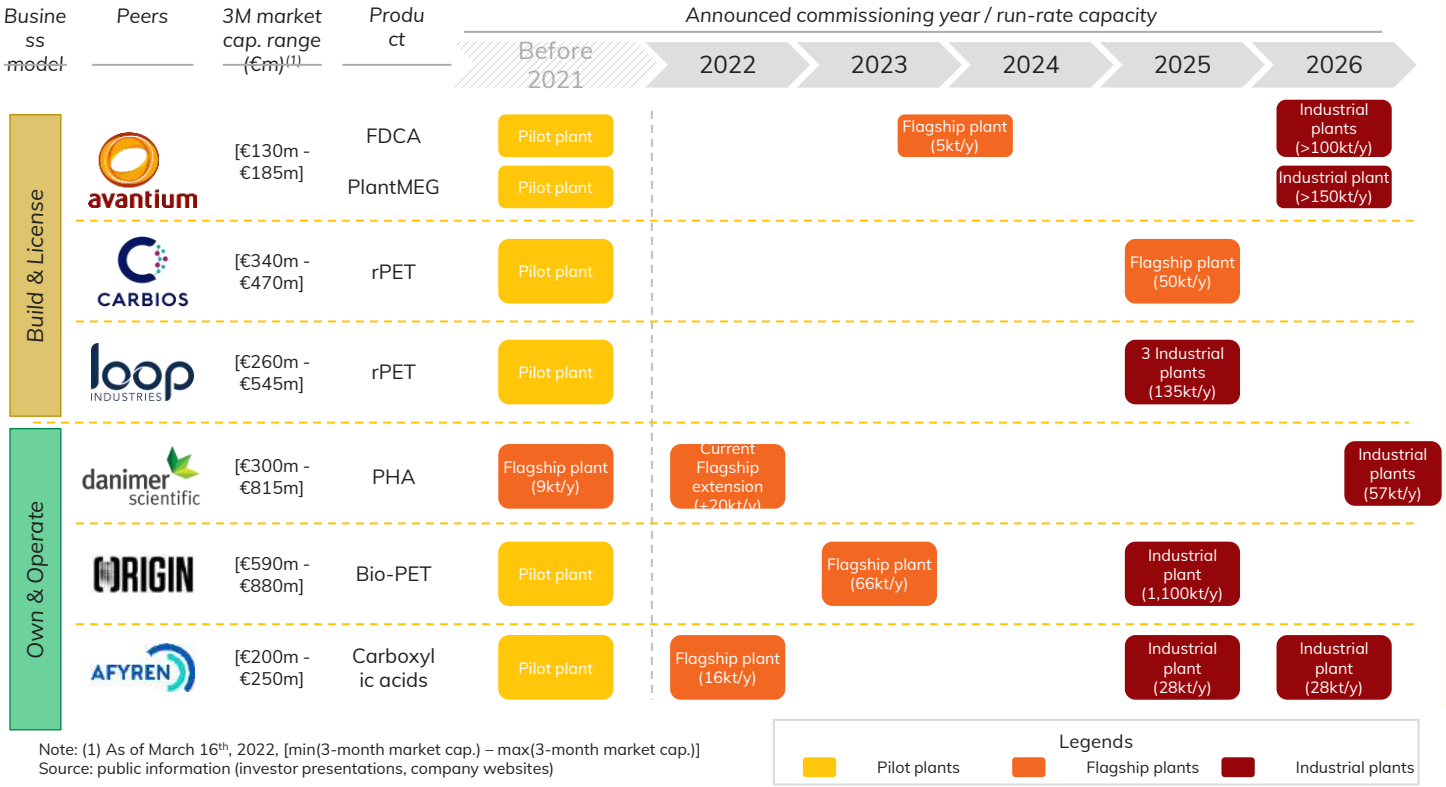
Illustrative licensing revenues

	FDCA	PlantMEG
Implied capacity	500 kta	1,750 kta
x	x	x
Average selling price	~€4.5/kg	~€1.2/kg
=	=	=
Illustrative gross sales	€2.25bn	€2.1bn
x	x	x
Illustrative royalty range	3%-6%	3%-6%
=	=	=
Illustrative annual turnover	€67.5m-€135m	€63m-€126m

Company strategy by business line



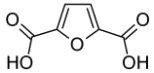
Avantium's industrial strategy compares favorably to its core peers



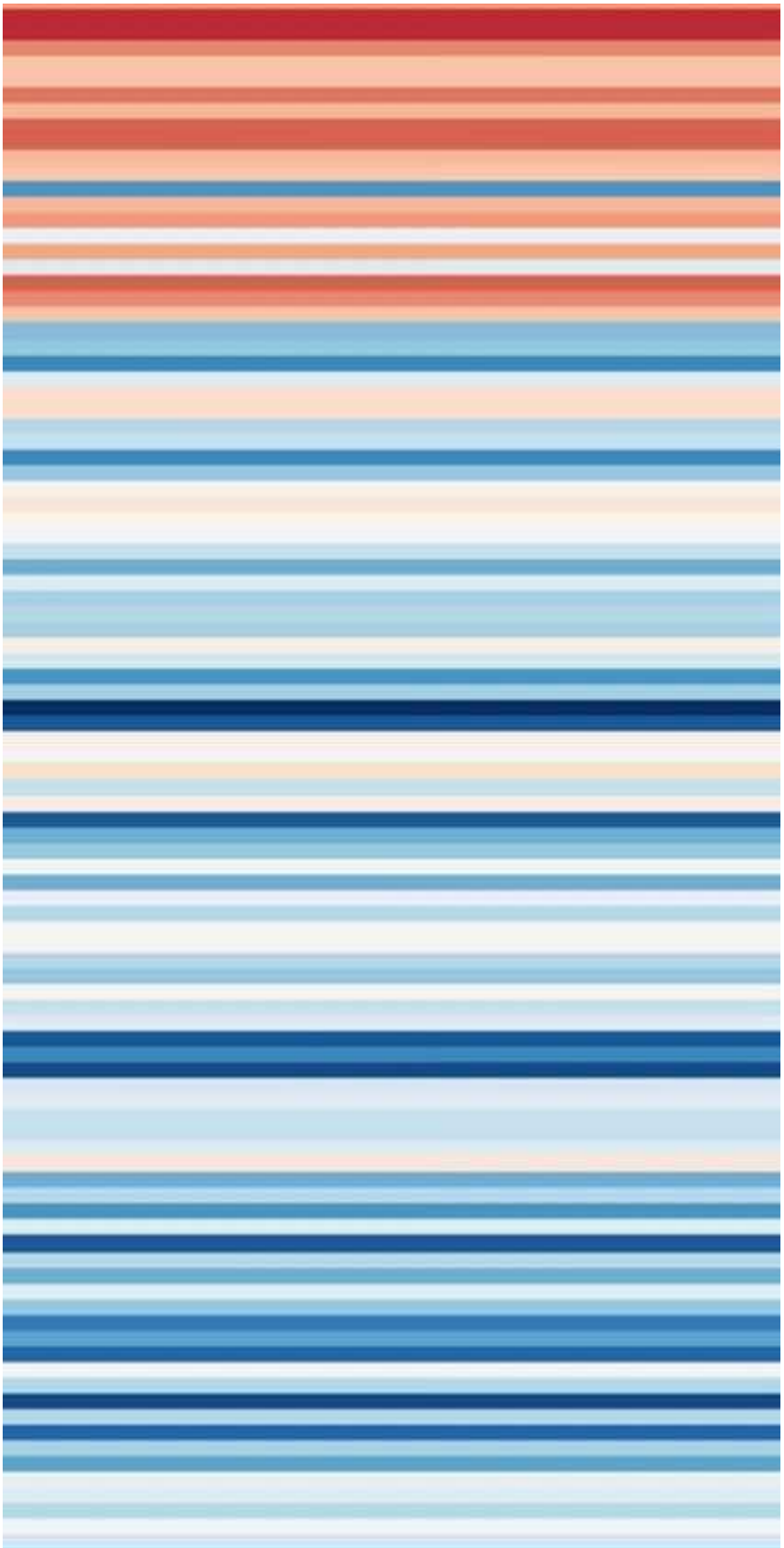
- ✓ Avantium's industrial strategy is not an exception - Exact same industrial scale-up pattern observed across all innovative industrial peers (Pilot / Flagship / Industrial)
- ✓ Avantium is actually benefiting from an industrial maturity that compares favorably to other Build & License models
- ✓ Avantium industrial phasing designed to mitigate scale-up risks by building a first 5kt FDCA capacity unit as a blueprint for further capacity increase (no scale-up risk associated with larger catalysis units)

Note: (1) As of March 16th, 2022, [min(3-month market cap.) – max(3-month market cap.)]
Source: public information (investor presentations, company websites)

Avantium tomorrow: Successfully delivering the next bio chemicals from disruptive technologies

	Today	Tomorrow		
	PEF Building blocks			
	FDCA	plantMEG	CO2 based polymers	Biorefinery
				
	Catalytic conversion of plant-based sugars into FDCA	*Conversion of sugars into plantMEG*	*Conversion of CO2 into high-value chemicals & polymers*	*Conversion of biomass via a biorefinery into industrial sugars*
Avantium value proposition	✓ *100% renewable & recyclable* ✓ *Superior performance* ✓ *Feedstock flexibility* ✓ *Initially serving value applications then volume*	✓ *Improved sustainability credentials* ✓ *Market competitive* ✓ *Drop-in*	✓ *Valorizes waste carbon* ✓ *Clean conversion process using renewable energy* ✓ *Proprietary electrochemistry platform for carbon capture and utilization (CCU)*	✓ *Valorizes biomass into valuable feedstock* ✓ *Clean and efficient conversion technology* ✓ *Significantly lower energy*
Status	• Operational Pilot Plant • Flagship Plant operational by 2024	• Operational Pilot Plant • Commercial Plant expected to be operational by 2026	• Mobile prepilot units being tested at industrial sites in Europe	• Operational Pilot Plant

Avantium's expertise in catalysis processes as development platform of disrupting biochemical technologies



Global warming stripes by climate scientist Ed Hawkins