



avantium

Investor Presentation

January 2023

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Today's speakers



Tom van Aken

CEO

 Since 2002

25y of industry experience

Selected previous experience:



Boudewijn van Schaik

CFO

 Since 2023

20y of finance experience

Selected previous experience:



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

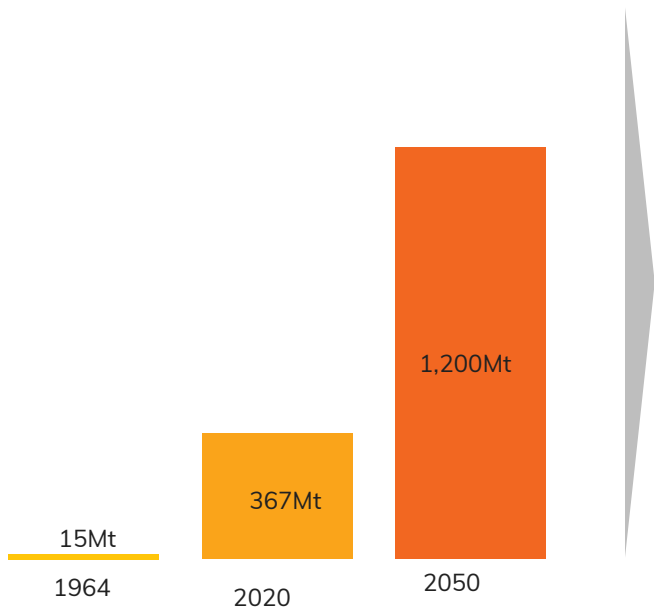
Our
ambition

Leading the transition to a fossil-free chemical industry by 2050



Increasing worldwide use of plastics causes major environmental challenges

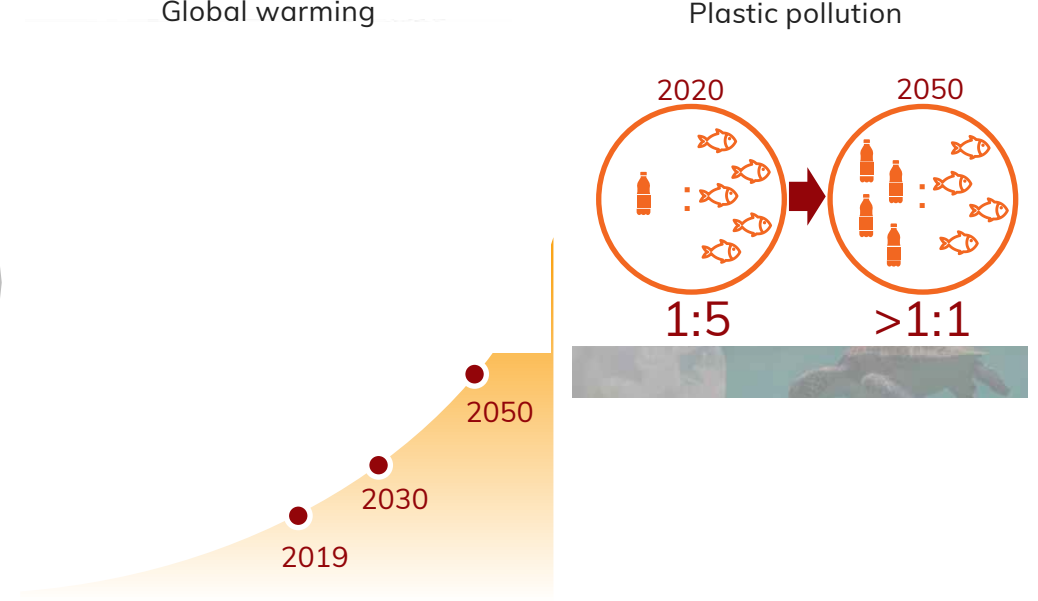
Global plastics production will triple by 2050



Plastic production and waste cause major environmental problems

Global warming

Plastic pollution



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 CO₂ 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⁾

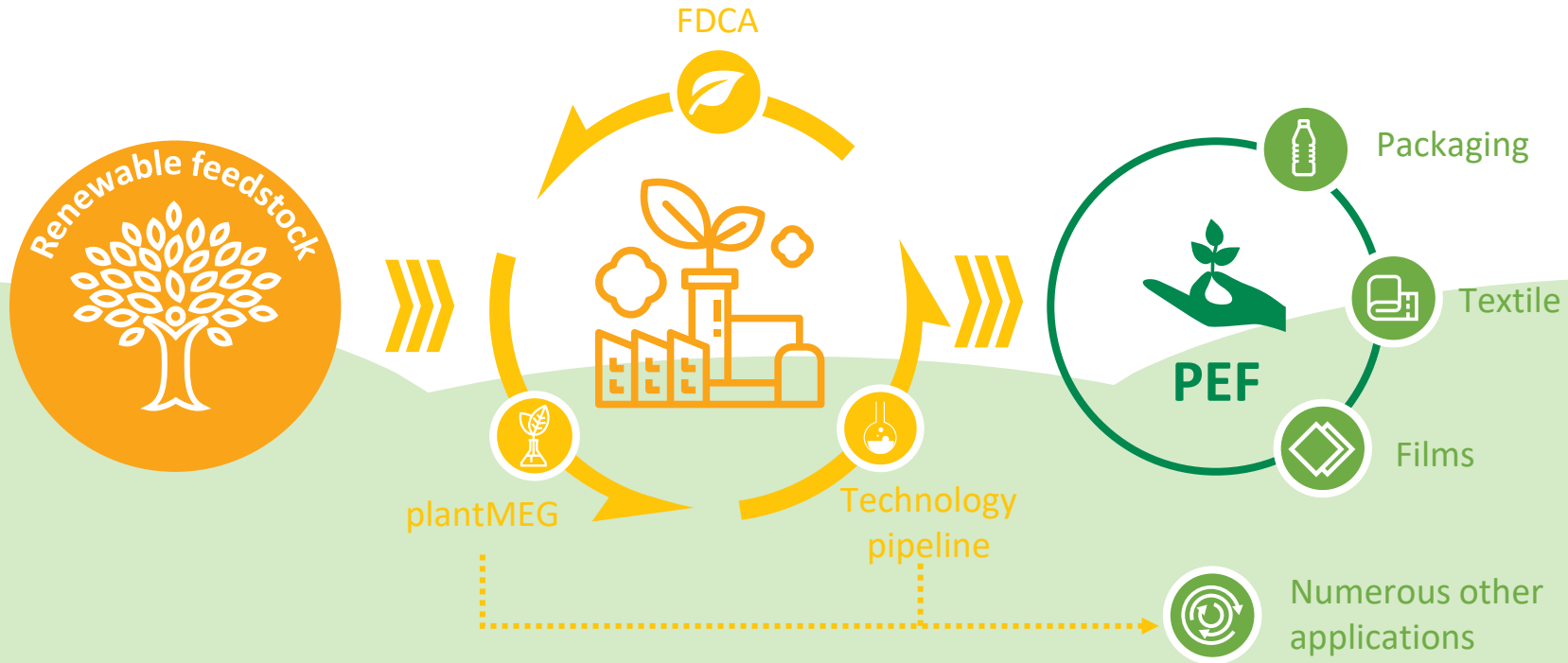
“ **We won't recycle or dispose our way out of plastic pollution...** Future scenarios focused on collection, recycling, and disposal alone have been shown to fall short, with high ocean leakage and GHG emissions... **Upstream innovation offers opportunities** to rethink how products can be delivered to users without the need for single-use packaging. ”

The global commitment 2021 Progress Report



Pipeline of disruptive technologies in renewable chemistry

Focused on plant-based plastics, advancing towards commercialisation





From technology development to commercialisation

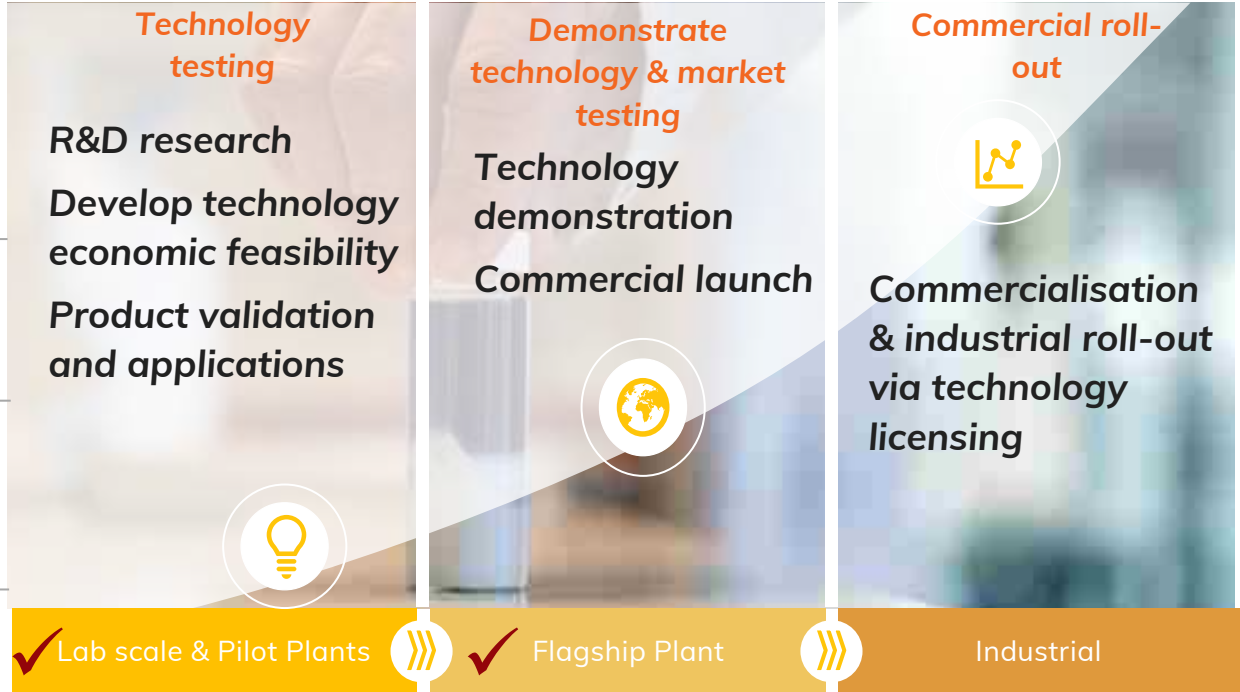
FDCA Pilot Plant (since 2011)



PlantMEG Pilot Plant (since 2019)

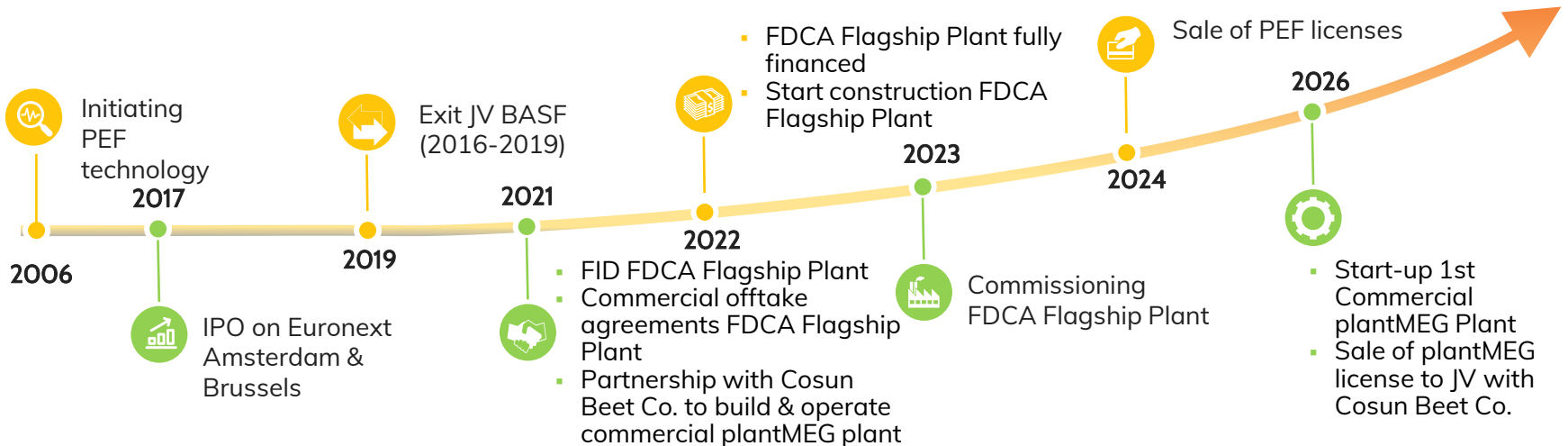


Pilot Biorefinery (since 2018)

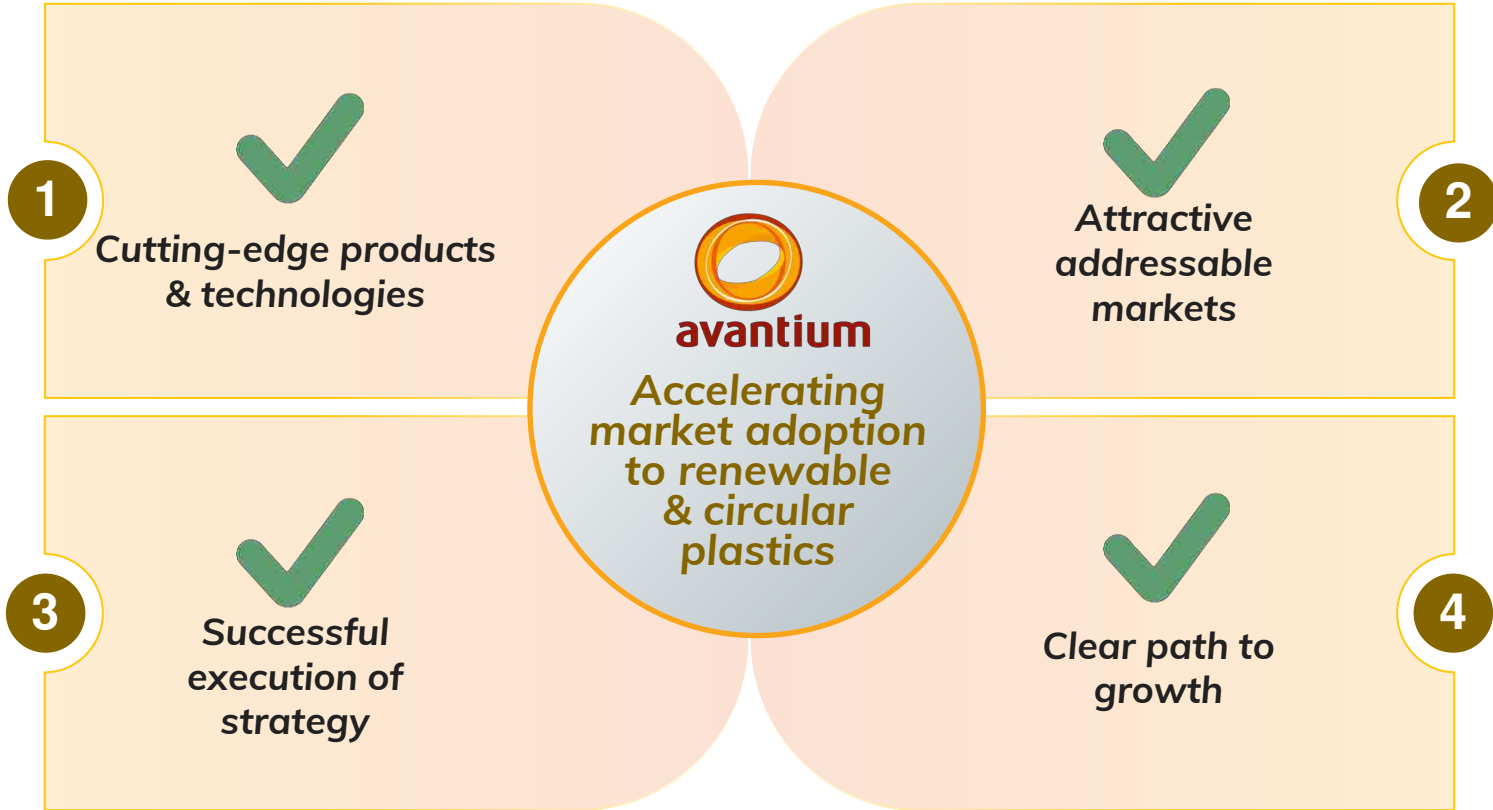


Mission: create & commercialise disruptive technologies & products to accelerate the transition to renewable & circular plastics

Avantium's successful trajectory towards growth



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

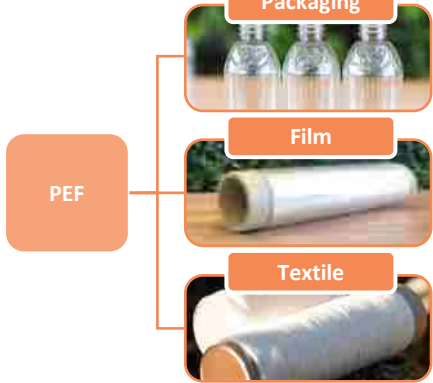
Forest residues:
softwood and hardwood chips

Corn stover Bagasse




PEF

- Packaging
- Film
- Textile

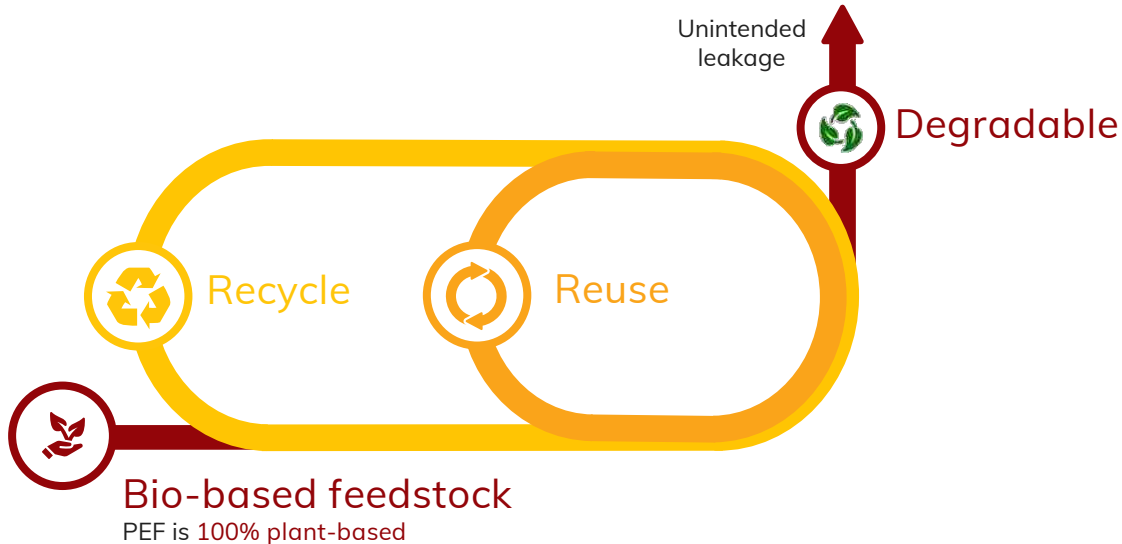


- Furniture
- Textile
- Automotiv
- Packaging
- Solvent & Coolants



PEF solves the challenges of today's conventional plastics

Offering solutions for plastic waste and CO₂ 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.





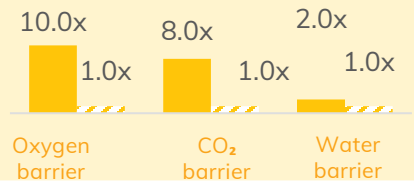
Showing enhanced performance while being cost competitive

Enhanced product properties

■ PEF ■ PET



Strong gas barrier



Enhanced performance

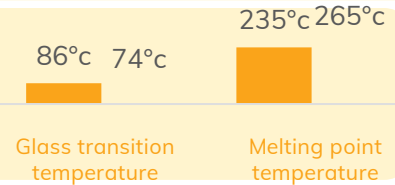


Lightweighting

- Thinner applications
- Reducing weight by more than 20%



High heat resistance



Food contact approval⁽¹⁾



Fully Sustainable



Cost competitive



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, RP90N_x, 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



High performance

Fully sustainable

Cost competitive

R&D collaborations

Long-term offtake agreements

Development of PEF for beverage applications



PEference⁽¹⁾ aims to establish an innovative supply chain for FDCA & PEF



The PEF Textile Community aims to develop PEF yarn applications



Bottles		Major food & beverage brand owner
Film		
Other		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.

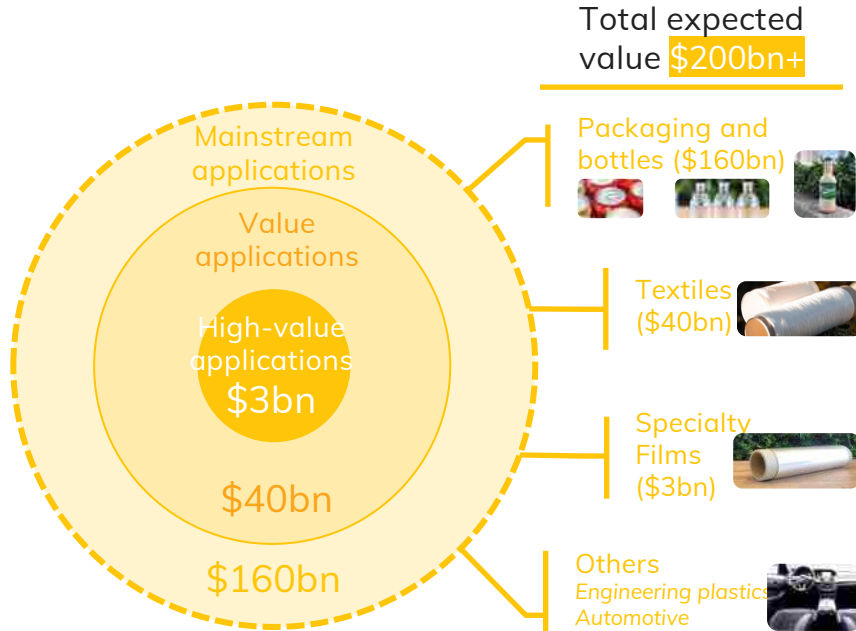
Part 2:

ATTRACTIVE ADDRESSABLE
MARKETS

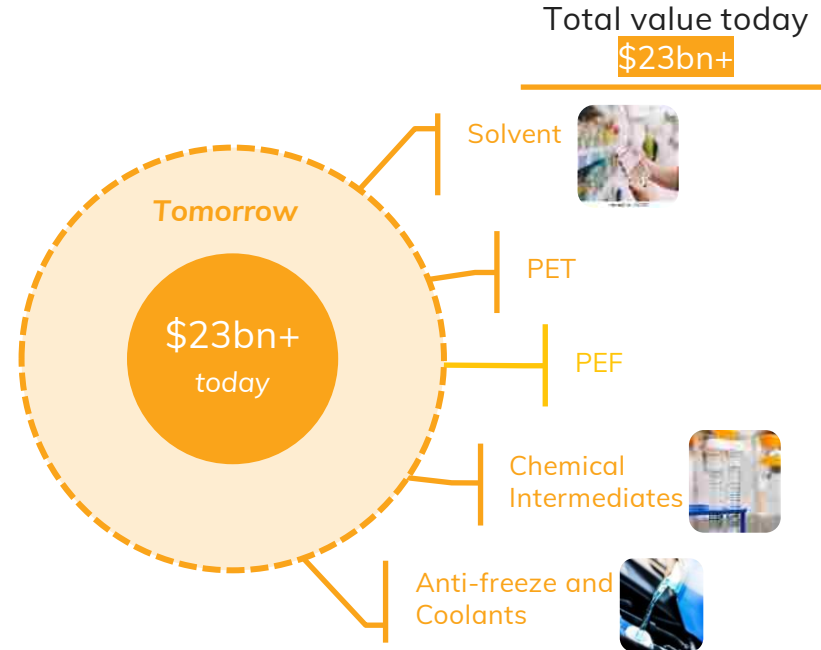


Avantium targets large and diverse PEF and MEG markets

PEF addressable market –
100mt+



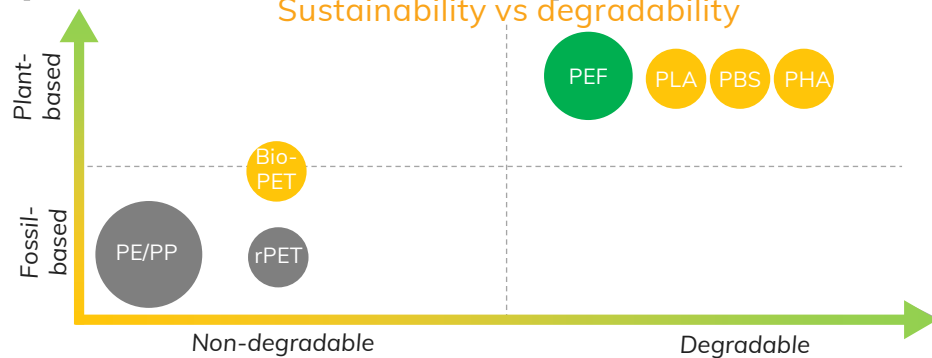
MEG addressable market –
35mt+



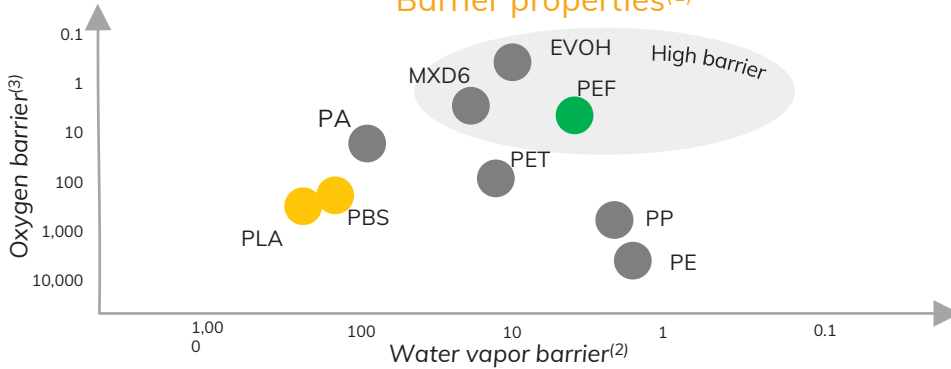


PEF has enhanced product performance and FDCA / PEF is protected with 60+ patent families

Sustainability vs degradability



Barrier properties⁽¹⁾



Selected companies	
PEF	 Most mature PEF player
PLA	
PHA	
PBS	
BioPET	
rPET	

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/nmx66/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

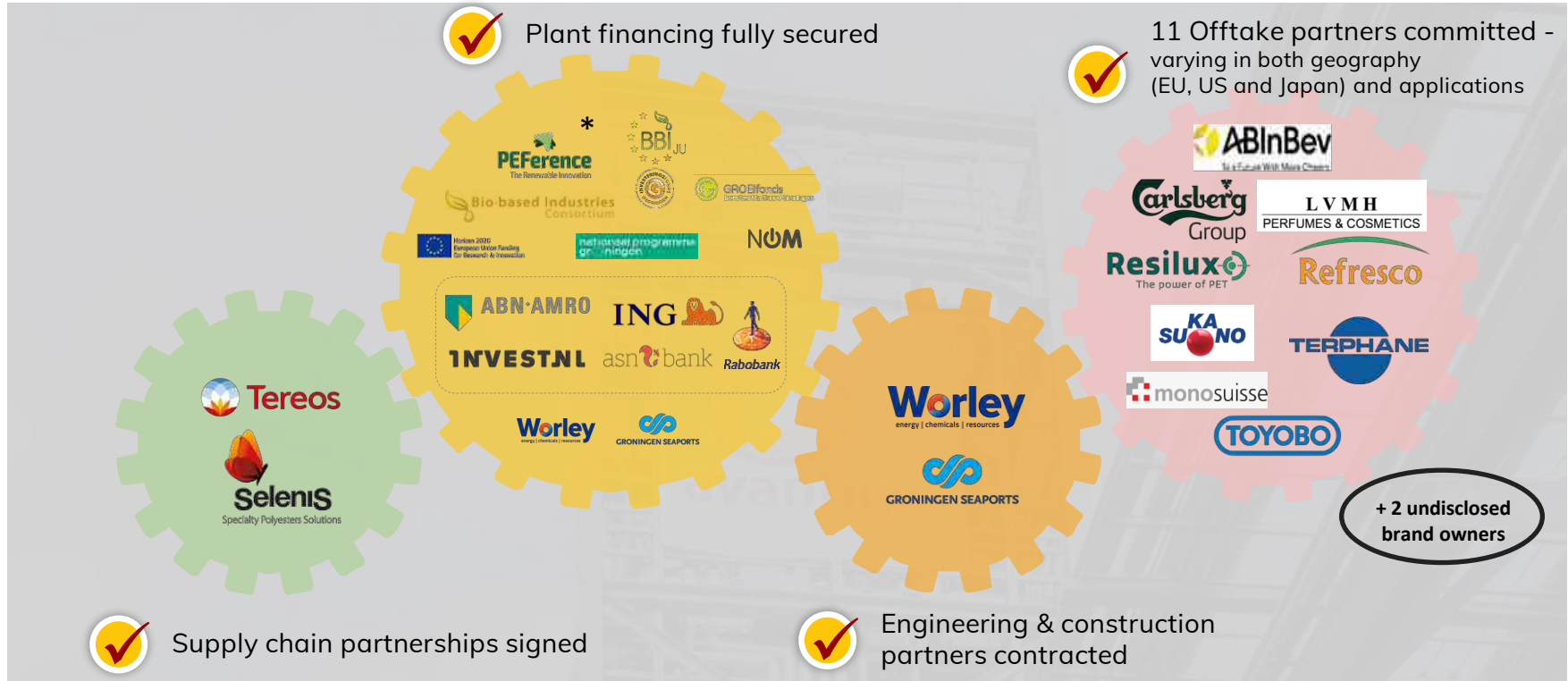


Construction of FDCA Flagship Plant commenced in 2022

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



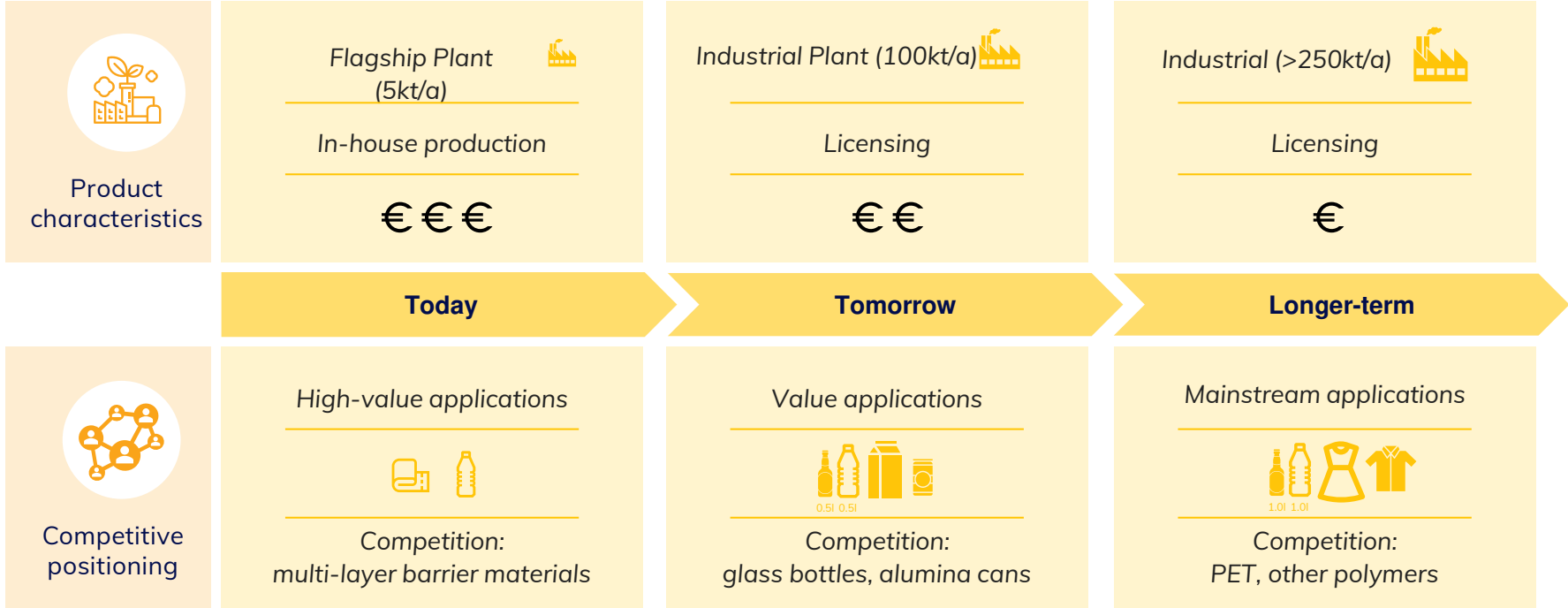
Successfully de-risked a cross the entire value chain



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.



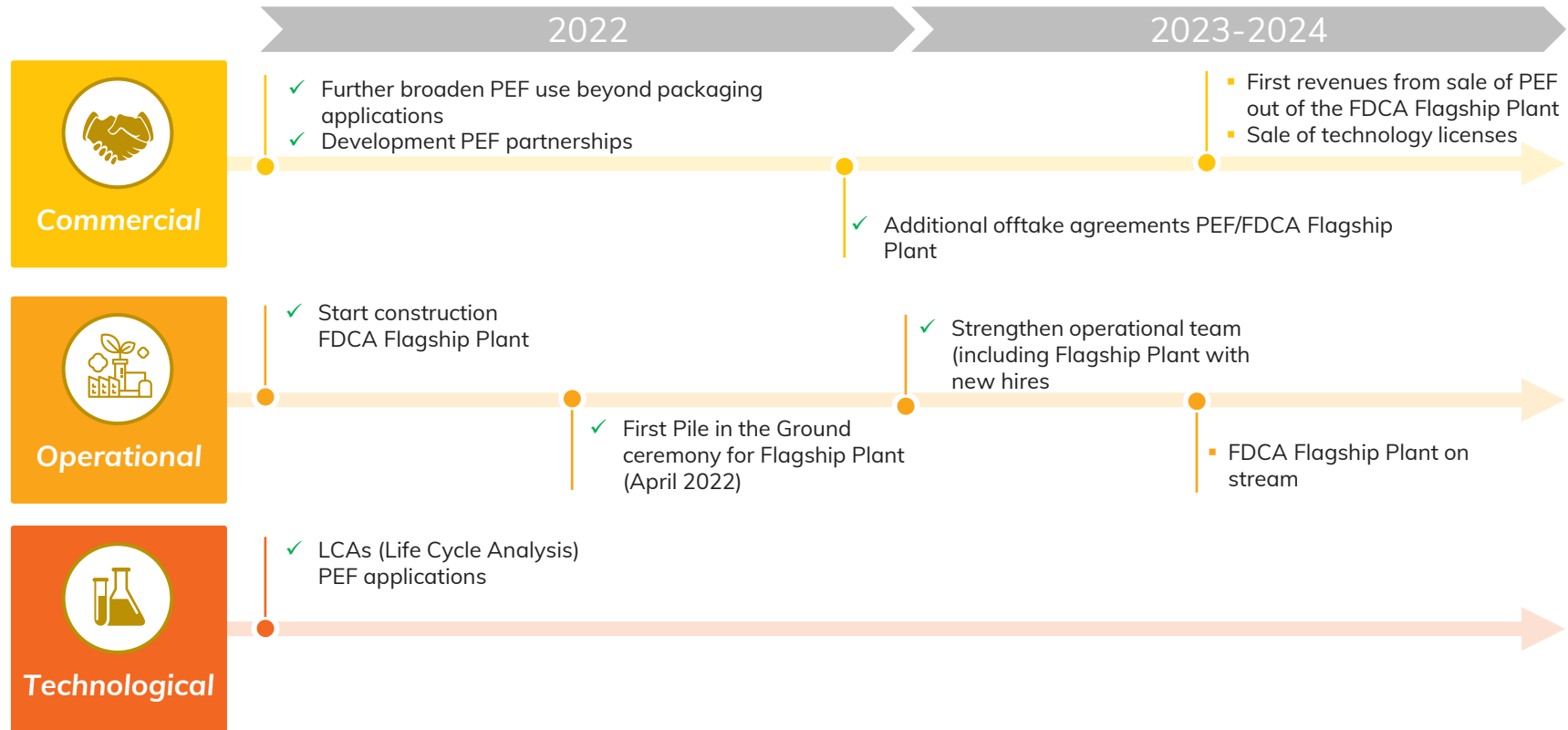
Avantium has a well-defined and scalable go-to-market strategy for PEF/FDCA



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

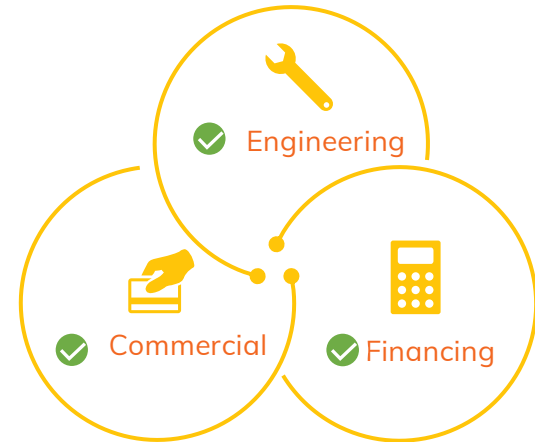


Construction of plantMEG Commercial Plant

Leveraging on the successful 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		 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™	<ul style="list-style-type: none">✓ 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™	<ul style="list-style-type: none">• Engineering of Commercial Plant plantMEG™• Financing and partnerships plantMEG™• Final Investment Decision Commercial Plant plantMEG™
Other	<ul style="list-style-type: none">✓ Proven revenue stream R&D Solutions Business• Securing of new grants• Explore partnerships to further develop and scale-up other pipeline programmes (CO₂ based polymers and biorefinery)	<ul style="list-style-type: none">• 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...

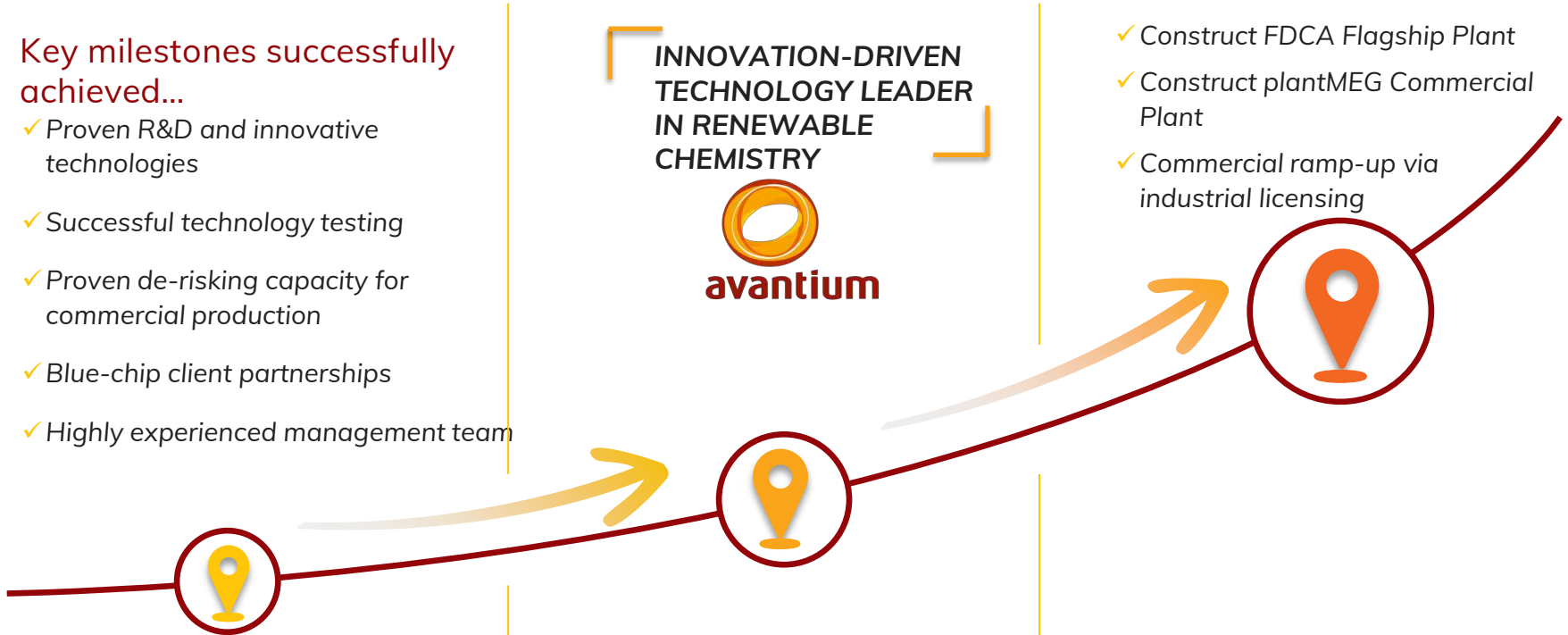
- ✓ Proven R&D and innovative technologies
- ✓ Successful technology testing
- ✓ Proven de-risking capacity for commercial production
- ✓ Blue-chip client partnerships
- ✓ Highly experienced management team

INNOVATION-DRIVEN
TECHNOLOGY LEADER
IN RENEWABLE
CHEMISTRY

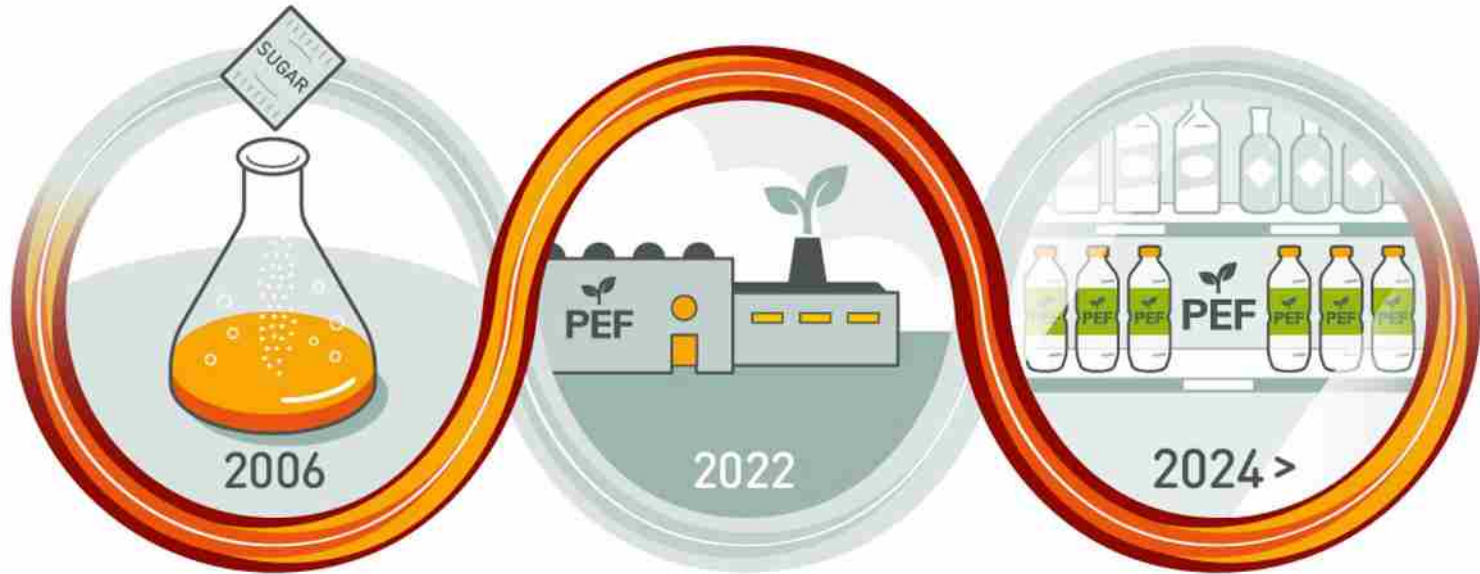


...Forming the foundation for commercialisation

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



Q&A



A photograph of a sunlit forest path. Sunbeams (crepuscular rays) are visible, filtering through the dense green foliage and trees. The path is covered in fallen leaves and leads into the distance. A large yellow rectangular box is overlaid on the left side of the image, containing the word "Appendix" in black text.

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 Schaik
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)



Tom van Aken
Managing Director Renewable
Chemistries a.i.
(@Avantium since 2002)



Steven Olivier
Managing Director
Catalysis
(@Avantium since 2015)

Supervisory Board

- Edwin Moses
(Chair)
Former CEO Ablynx NV and Oxford Asymmetry International
CFO Agrifirm
- Margret Kleinsman

- Michelle Jou
- Nils Björkman

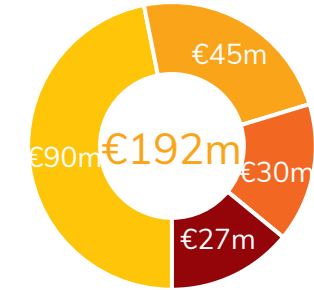
CEO Castrol
Worked for 33 years in various senior management positions at Tetra Pak Group






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

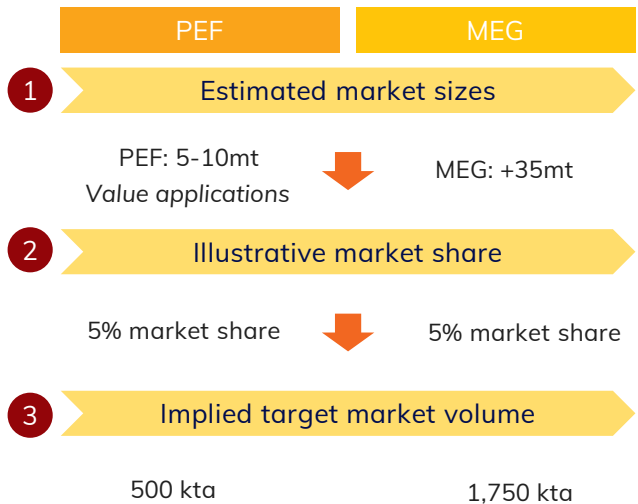


Note: (1) This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation program under grant agreement No7444409. The JU receives support from the European Union's Horizon 2020 research and innovation program and the Bio-based Industries Consortium.



Illustrative revenue and profitability model showcasing the large financial opportunity

Illustrative market targeting



Revenue & profitability mechanics

Avantium R&D Solutions
Continued organic growth in line with historical levels

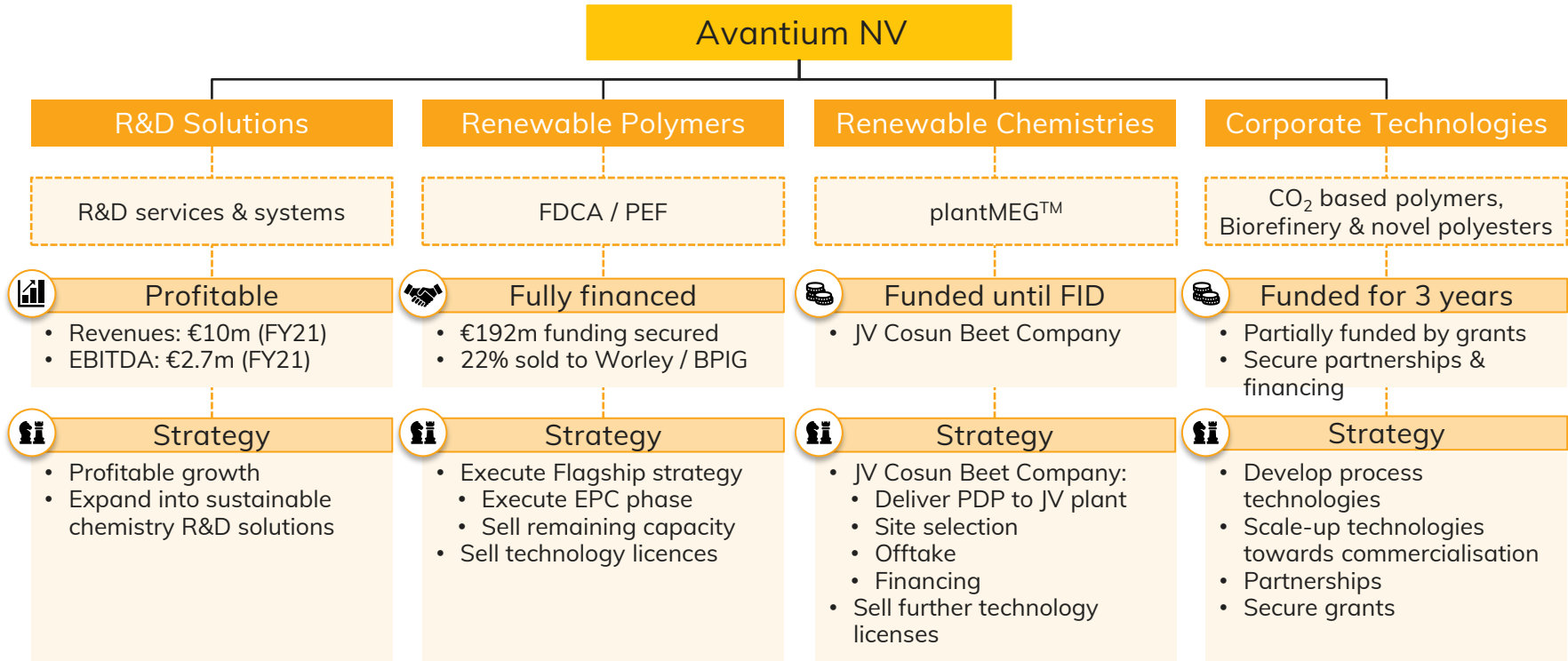
FDCA Flagship

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

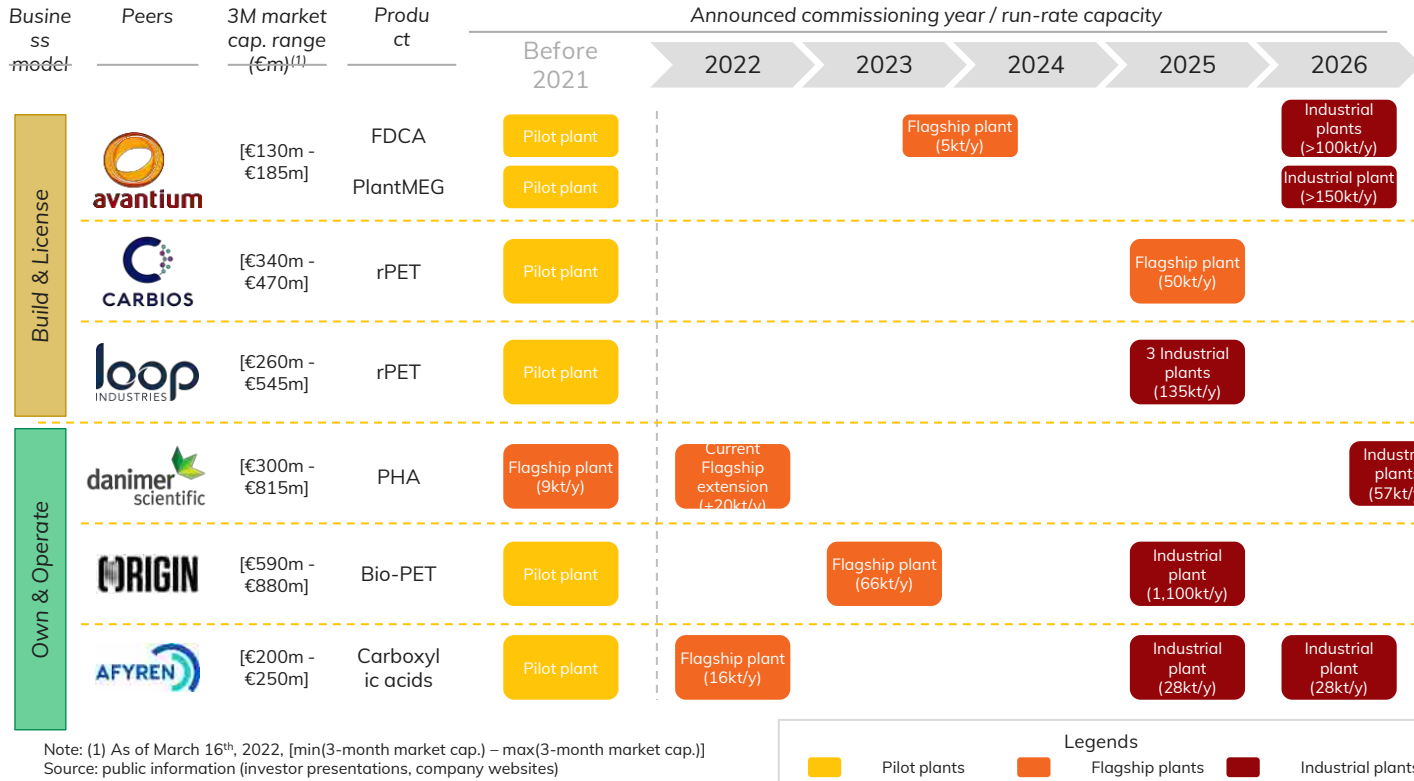
Illustrative licensing revenues

	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)



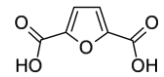


Avantium tomorrow: Successfully delivering the next biochemicals from disruptive technologies



PEF Building blocks

FDCA



Catalytic conversion of plant-based sugars into FDCA

plantMEG



Conversion of sugars into plantMEG

CO2 based polymers



Conversion of CO2 into high-value chemicals & polymers

Biorefinery



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

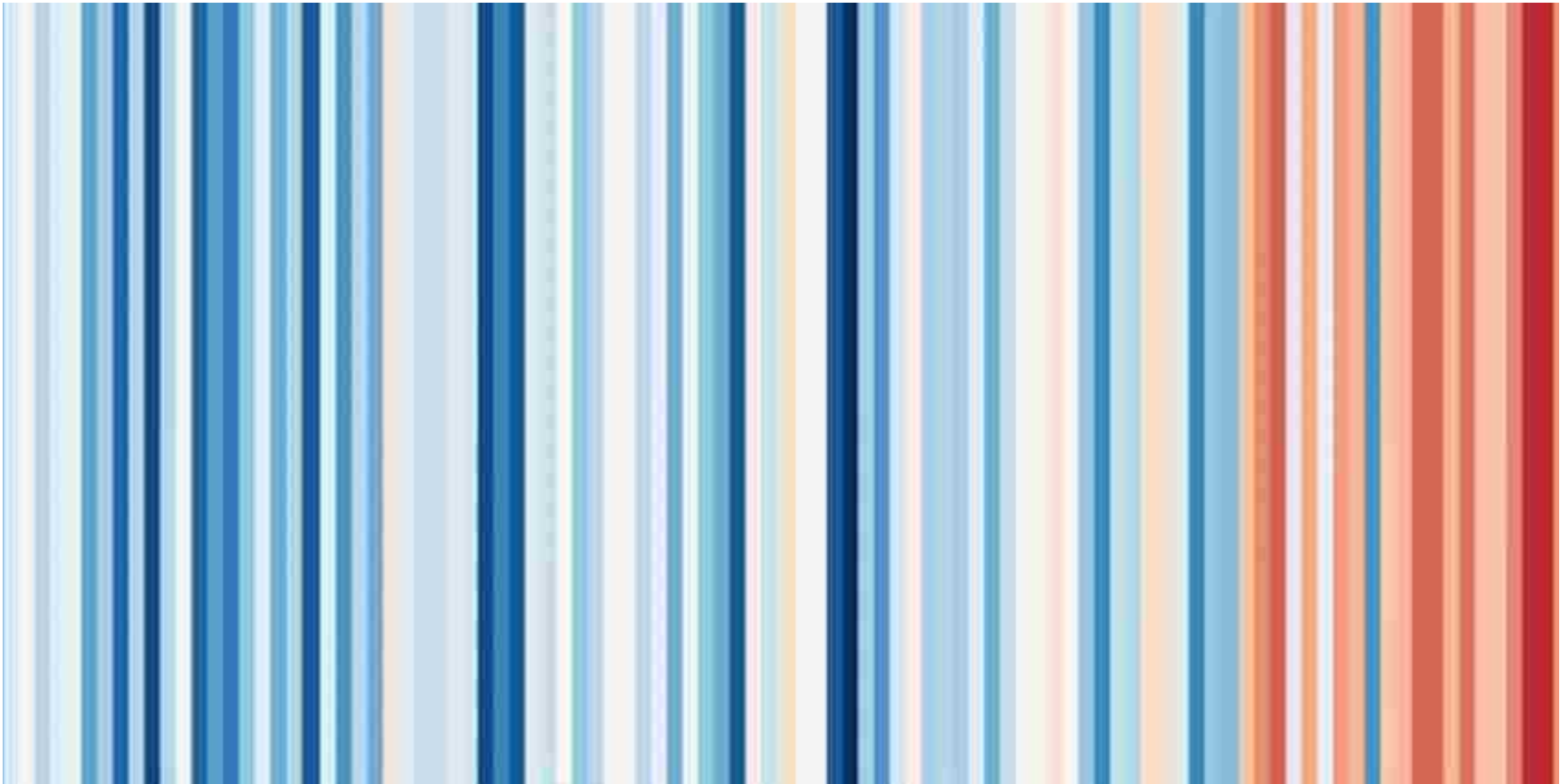
- Operational Pilot Plant
- Flagship Plant operational by 2024

- 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