



AVANTIUM VFB HAPPENING

19 September 2020

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Avantium: experienced leadership team

Proven track record of technological and operational excellence

Management Team

Today's presenter



Tom van Aken
CEO
(@Avantium since 2002)

Education:
Economics (Amsterdam) and Chemistry (Utrecht)

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



Bart Welten
CFO
(@Avantium since 2020)



Gert-Jan Gruter
CTO
(@Avantium since 2000)



Carmen Portocarero
General Counsel
(@Avantium since 2012)



Zanna McFerson
Managing Director
Renewable
Chemistries
(@Avantium since 2017)



Steven Olivier
Managing
Director
Catalysis
(@Avantium since 2015)

Supervisory Board

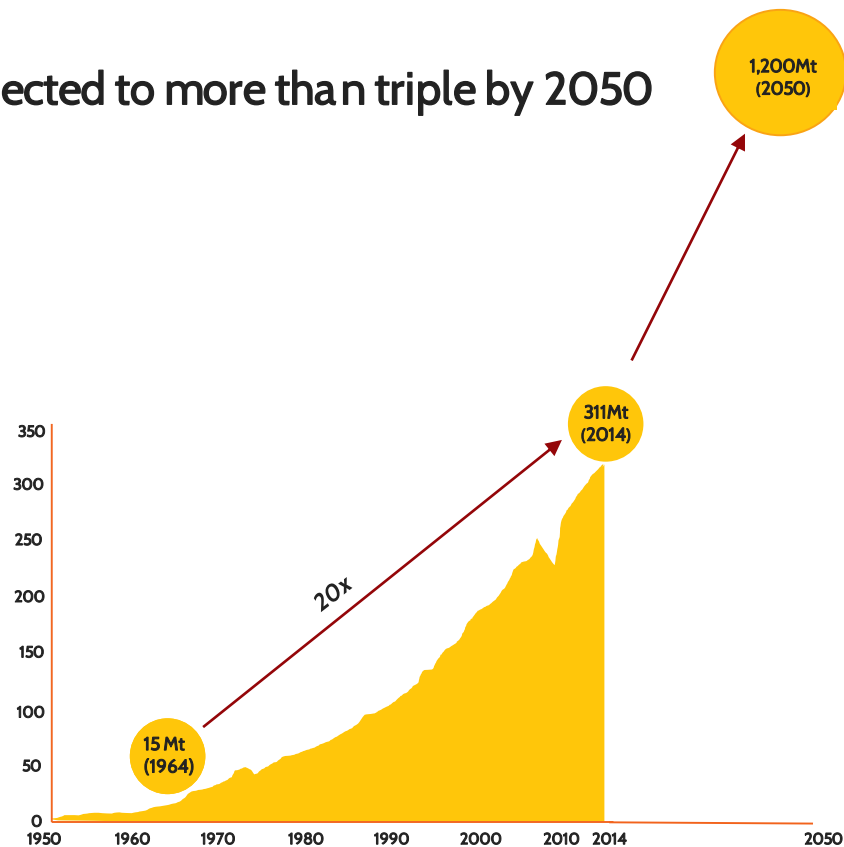
- Edwin Moses, Chairman
- Margret Kleinsman
- Denis Lucquin
- Michelle Jou
- Cynthia Arnold (nominee)
- Trudy Schoolenberg (nominee)

Former CEO Ablynx NV and Oxford Asymmetry International
CFO Agrifirm
Managing Partner Sofinnova Partners
President Covestro Polycarbonates Business
Former CTO Sun Chemical and Valspar
Held various senior management positions at Shell and AkzoNobel



Plastic is a 'success' story

20x increase over the last 50 years - expected to more than triple by 2050



Sources: Ellen MacArthur Foundation, Plastics Europe; World Economic Forum; Nova Institute 2020

Production, use and waste cause major environmental problems

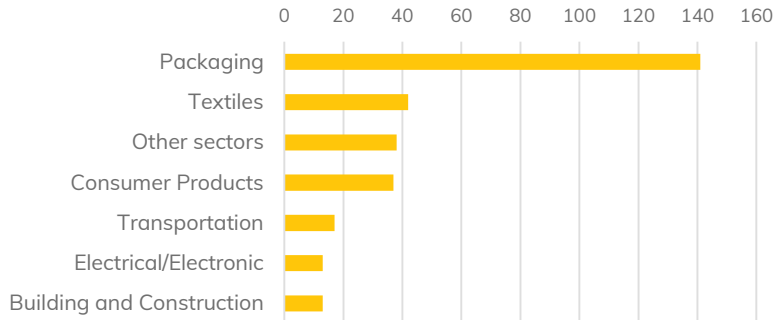


Source: OECD, background report G7 (2018)

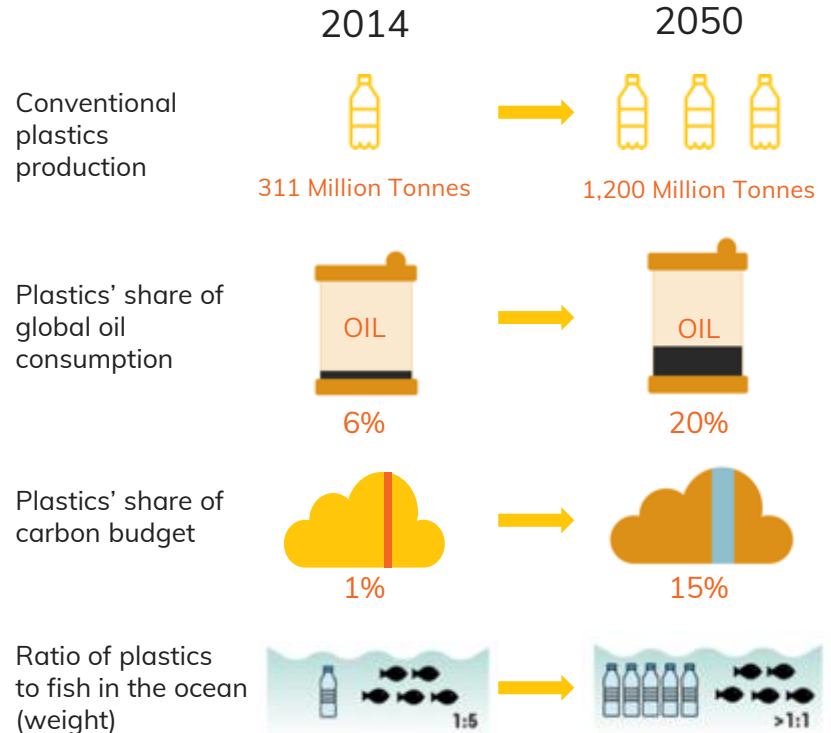
>90% of conventional plastic is not recycled (1950 - 2015):

- Many plastic applications, such as small sized bottles are not recyclable, as they include other materials (e.g. nylon) for barrier properties

Global unrecycled plastic waste by industrial sector, measured in million tonnes per year, 2015



Source: Our World in Data: Geyer et al.



Source: Ellen MacArthur Foundation, Plastics Europe; World Economic Forum; Nova Institute 2020





Consumers have increasing environmental concerns

Pressure on industries to shift to circularity and decouple plastics from fossil feedstock



Avantium to revolutionise the plastics industry

Picked up by numerous global media outlets and on social media



The Guardian

16 May 2020

The end of plastic? New plant-based bottles will degrade in a year

Carlsberg and Coca-Cola back pioneering project to make 'all-plant' drinks bottles



▲ A mound of plastic bottles at a recycling plant near Bangkok in Thailand. Around 300 million tonnes of plastic is made every year and most of it is not recycled. Photograph: Diego Astubi/SPA

Beer and soft drinks could soon be sipped from "all-plant" bottles under new plans to turn sustainably grown crops into plastic in partnership with major beverage makers.

A biochemicals company in the Netherlands hopes to kickstart investment in a pioneering project that hopes to make plastics from plant sugars rather than fossil fuels.

Daily Mail MORE STORIES

The end of plastic bottles? Coca-Cola and Carlsberg back new all-plant drinks containers that will rot away to nothing within a year

By Sam Baker For Mailonline
13:21 17 May 2020, updated 16:21 19 May 2020



The Weather Channel

A New Plant-Based Plastic Will Degrade in a Year

By Rachel Della Benaim · 3 days ago



Plastic waste and debris carried by the storm of the last days at sea in the gulf of Naples, Italy on December 22, 2019.

(Photo by Salvatore Laporta/KONTROLAB/LightRocket/Getty Images)

At a Glance

- Dutch company Avantium developed a fully plant-based plastic made from corn, wheat and beet sugars.

GreenBiz

This startup's plant-based plastics promise circularity. Can it deliver?

By Jesse Klein

July 22, 2020

"You don't need one drop of petroleum. It's all plant-based. The carbon footprint is less than 50 percent of petroleum-based plastics. And it's fully recyclable, so it's really circular."

That's the promise Avantium CEO Tom Van Aken makes about his company's new plastic material.

L'EXPRESS

ENVIRONNEMENT

Plastique : de nouvelles bouteilles d'origine végétale dégradables en un an

Par L'EXPRESS.fr · publié le 16/05/2020 à 16:33



Une entreprise hollandaise souhaite remédier au fléau des bouteilles en plastique en lançant dans une production à

Evening Standard

Coca Cola and Carlsberg to introduce new plant-based bottles

Developers hope to deliver by 2023 18 May 2020



New Plant-Based Bottles Backed By Coca-Cola And Carlsberg Will Degrade In Just A Year

UNILAD

17 May 2020

NEW YORK POST

22 May 2020

New plastic-like product made from plant sugars only takes a year to degrade

Avantium: innovation-driven chemical technologies

Producing chemicals from renewable sources for a wide range of consumer goods

- Two lead products:
 - FDCA, the chemical building block for PEF: a novel, first-in-class plant-based polyester targeting \$200+ billion markets; entering commercial manufacturing
 - Plant-MEG: sustainable and cost-effective plant-based alternative for fossil-MEG, a key ingredient for PET and PEF; in pilot phase
- A pipeline of chemical technology programmes:
 - Biorefinery process for industrial sugars from non-food biomass
 - Conversion of CO₂ to chemicals via electrochemistry
- Supported by a revenue generating Catalysis Business
- 3 operational pilot plants in Geleen (FDCA) & Delfzijl (plant-MEG, biorefinery), NL
- Extensive R&D laboratories and partnerships with industry leaders
- 20+ years experience in renewable polymers, chemical process development and catalysis
- Cash position at €34.7 million on 30 June 2020, annual cash outflow of less than €25 million
- HQ in Amsterdam - listed on Euronext Amsterdam, Brussels (AVTX)

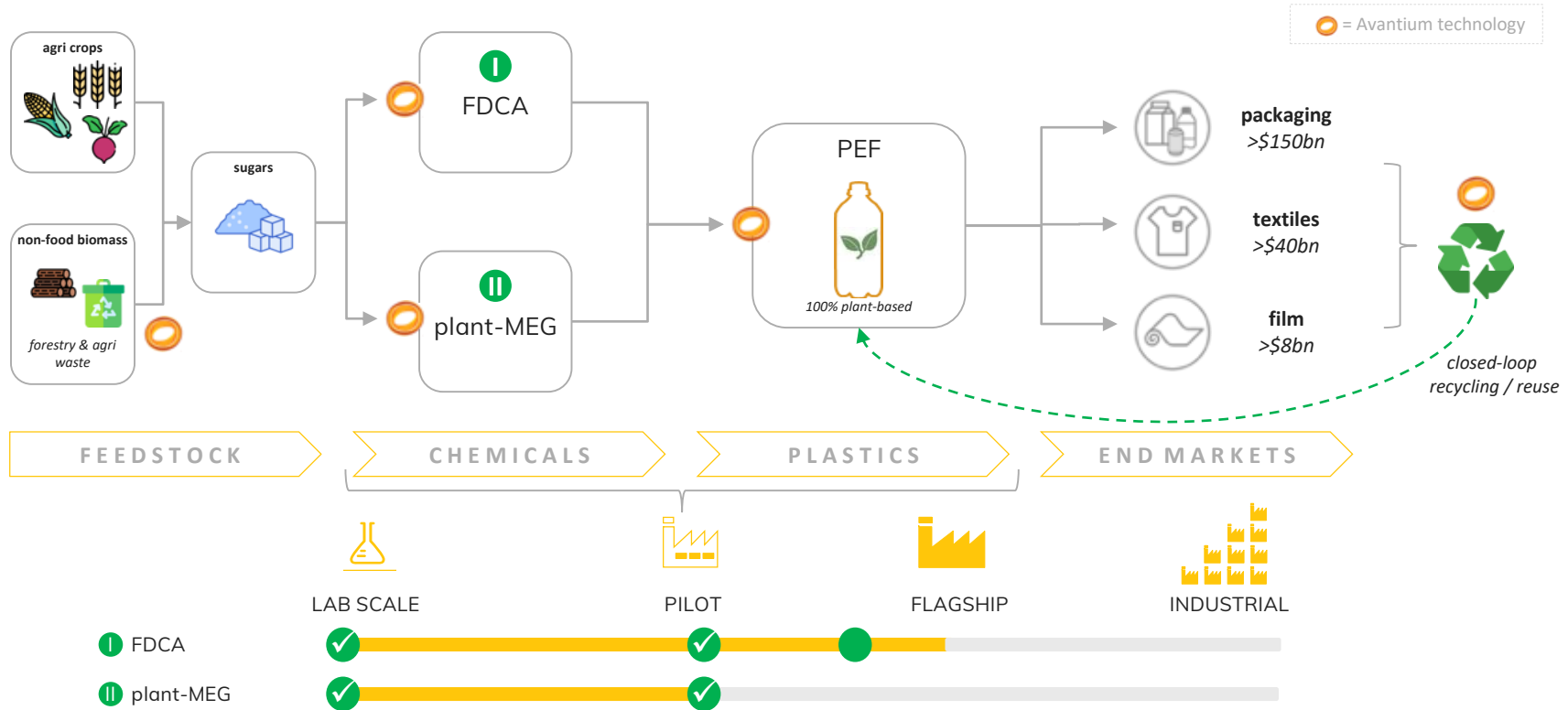


PEF = polyethylene furanoate
PET = polyethylene terephthalate
FDCA = furandicarboxylic acid
MEG = mono-ethylene glycol

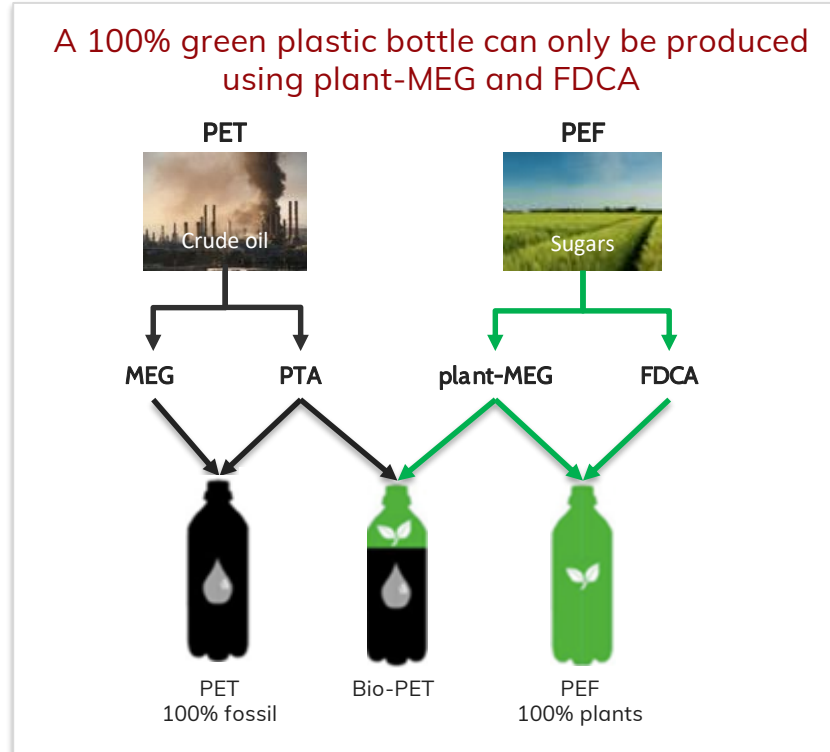


A coherent portfolio of renewable products

Focused on plant-based plastics, advancing towards commercialisation



FDCA and plant-MEG together make a 100% plant-bottle



FDCA = furandicarboxylic acid PEF = polyethylene furanoate PET = polyethylene terephthalate
MEG = mono-ethylene glycol PTA = purified terephthalic acid

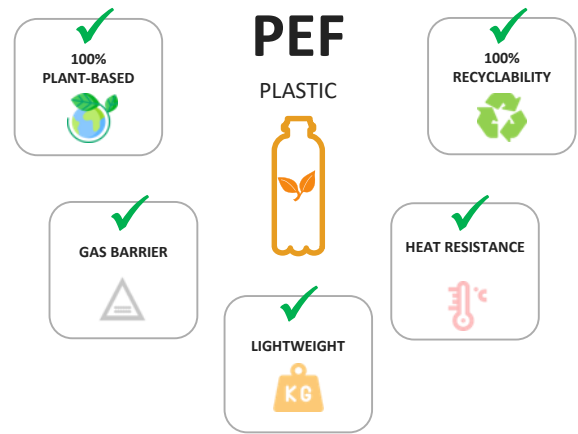




FDCA, the building block for PEF, *the* plastic of the future

Superior performance, sustainable and well positioned for (high-) value applications

Highly differentiated performance plastic



High-value PEF applications



Multi layer bottles
PEF as barrier layer providing performance and enabling recycling



Single layer bottles
Single layer PEF in small bottles for soft drinks, beer and juice; replacing glass bottles, aluminum cans and multilayer bottles, enabling closed-loop recycling



Film
PEF film in recyclable flexible packaging or as film used in electronics applications (e.g. displays)

Example: partnership with Paboco®

Industry consortium developing the 'Paper Bottle'

- Paboco®, Paper Bottle Project, an innovation community joining leading brands



- Carlsberg presented the first prototypes of the Paper Bottle in October 2019, testing in 2020

PEF will provide the Paper Bottle with the high barrier properties needed for beverages such as beer and carbonated soft drinks



Scaling-up FDCA/PEF: first-to-market advantages

Achievements and next steps



LABORATORY

- 2008
- Amsterdam
- Kilogrammes/annum
- Innovative research



PILOT

- 2011 - today
- Geleen
- Tonnes/annum
- Technology development



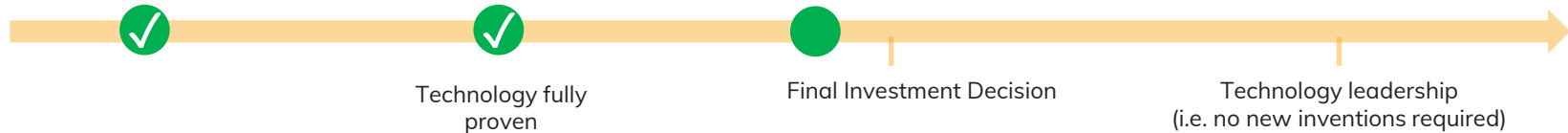
FLAGSHIP

- 2023 onwards
- Delfzijl
- 5 kilotonnes/annum
- Commercial launch



INDUSTRIAL

- 2024 and beyond
- Global
- >100 kilotonnes/annum/plant
- Licensing: cashflow and profit growth driver



FDCA flagship plant: investment decision end of 2020

Flagship plant: validate marketed products and production



Scale
5 kilotonnes of FDCA/annum



Location
Chemie Park Delfzijl



Market focus
High-value applications



Timing
Operational in 2023



Objective
Market launch



Partners
Committed partners throughout the value chain



Earnings model
Unlocking licensing business in high-volume markets



Funding
€150 million (excl. +/-20% contingency on capex)

Rendered image of the Flagship Plant design
Greenfield plot @ Chemie Park Delfzijl



Partnerships throughout the PEF value chain

Validating the commercial production and driving commercialisation

Some examples:

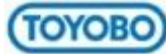
Feedstock



Engineering



Polymerisation



Converters



Brand owners



Consumers



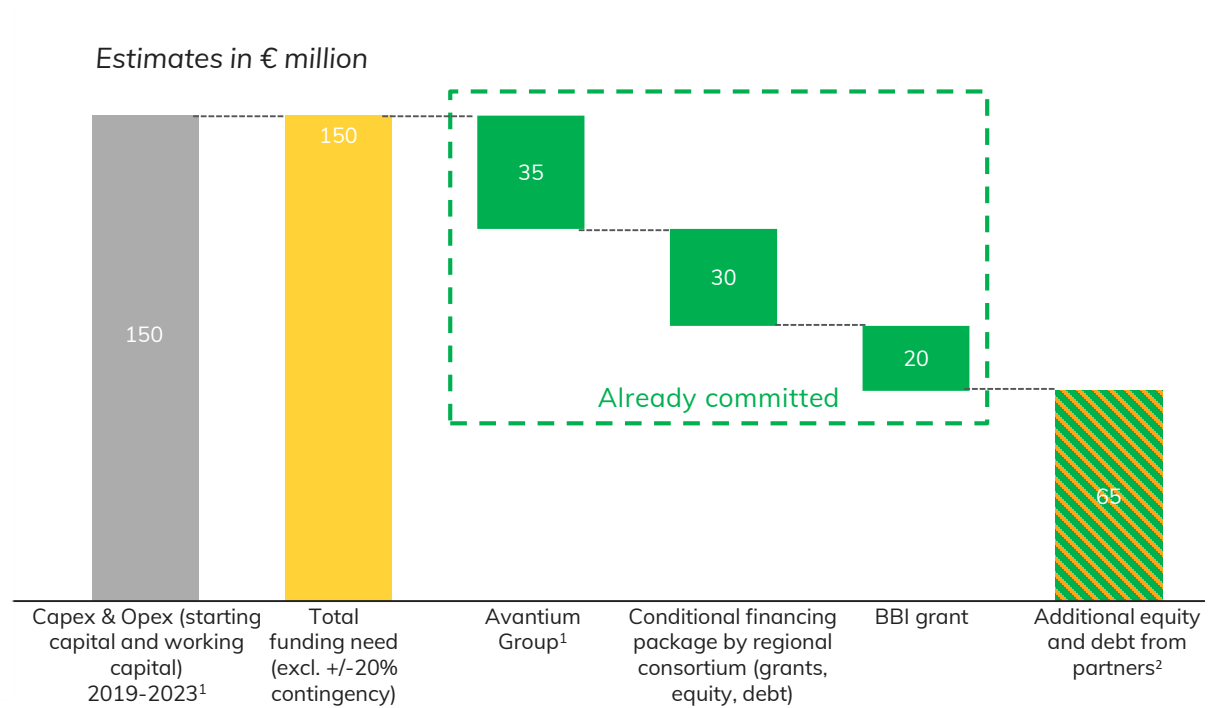
Funding partners (grants):





PEF: market launch and commercialisation

Process to fund commercial scale FDCA/PEF flagship plant (Avantium subsidiary)



Note 1: Avantium has committed EUR 35m equity (of which EUR20m will have been spent by year-end 2020 and EUR 15m subject to securing funding sources) to cover operating expenses 2019 - 2023
Note 2: Discussions ongoing with strategic equity partners (into Avantium PEF subsidiary), in parallel discussions with banks re. debt funding later in 2020

Plant-MEG, a key ingredient for plastics and textiles

Meeting the needs of consumers

Consumers are increasingly making environmentally conscious choices:

Brands must adapt to their consumers:

Large end-markets:

I choose...

→ ...the way I dress



Textiles

→ ...the way I eat



Packaging

→ ...the way I move



Automotive

→ ...the way I live



Furniture

Value proposition:

The use of plant-MEG will provide brands with a sustainable, recyclable, and innovative ingredient capable of attracting environmentally conscious consumers.



Favourable global MEG market dynamics: Projected to grow from 28 million tonnes to 35 million tonnes in 2035 with a CAGR of 3.5%



Impact: Significant CO₂ reduction compared to fossil-MEG and independent from fossil feedstock



Cost competitive: Best-in-class single step catalytic process making plant-MEG cost competitive with chemical equivalence



Scalable: Demonstration plant opened in 2019 with a clear path to scale-up and commercialisation



Strong IP position and know how (10 patent families)



Scaling-up and commercialising plant-MEG

Plant-MEG has potential in existing markets and applications



LABORATORY

- 2010
- Amsterdam
- Kilogrammes
- Innovative research



PILOT

- 2020 start-up
- Delfzijl
- 10 tonnes
- Develop technology & economic feasibility



FLAGSHIP

- 2024 - 2025
- Location TBD
- Scale TBD
- Commercial launch plant-MEG



INDUSTRIAL

- TBD
- Global
- Industrial scale
- Licensing: cashflow and profit growth driver



Validation of technology and data: ~1 year after pilot plant is fully operational

Estimated timelines:

- ✓ Process Design Package 6 – 12 months
- ✓ Front-End Engineering Design 6 – 12 months
- ✓ Construction ~2 years

Technology leadership (i.e. no new inventions required)



Investment highlights

Avantium offers solutions for consumer driven renewable trends of plastic waste and CO₂ reduction



Renewable feedstock



packaging



textiles



film



Leading innovative products FDCA and plant-MEG are the key ingredients for novel polymer PEF: 100% plant-based, recyclable and degradable with superior performance



Addressing \$200B+ end-markets with consumers demanding change



Pipeline of innovative chemical technologies at various stages of commercialisation



Partnerships with industry leaders and brand owners to make innovations global successes



Scalable licensing business model with clear growth path to profitability, balancing risk and reward



Proven ability to scale with 3 operational pilot plants, state of the art R&D lab and robust portfolio of >145 patent families



Strong management, board and technical & commercial team and a proven revenue generating track record with the Catalysis business



ESG is built into Avantium's DNA and drives the company's business model





Thank You

ir@avantium.com