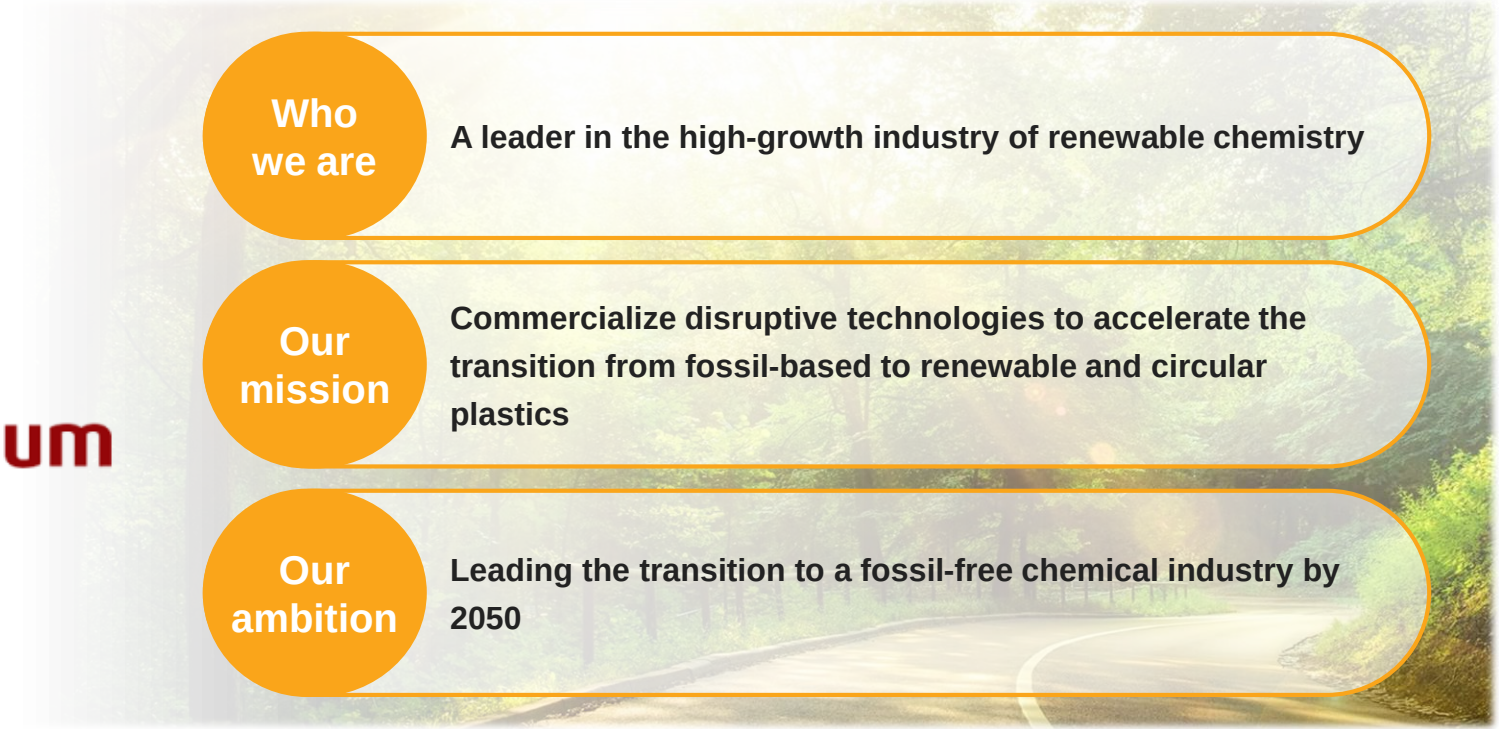
# The journey of renewable feedstock

Tom van Aken, CEO Avantium NV

BISCI Conference, 2 March 2023, Maastricht

“Dare to be circular”

# Avantium at a glance: a leader in renewable chemistry



**Who we are**

A leader in the high-growth industry of renewable chemistry

**Our mission**

Commercialize disruptive technologies to accelerate the transition from fossil-based to renewable and circular plastics

**Our ambition**

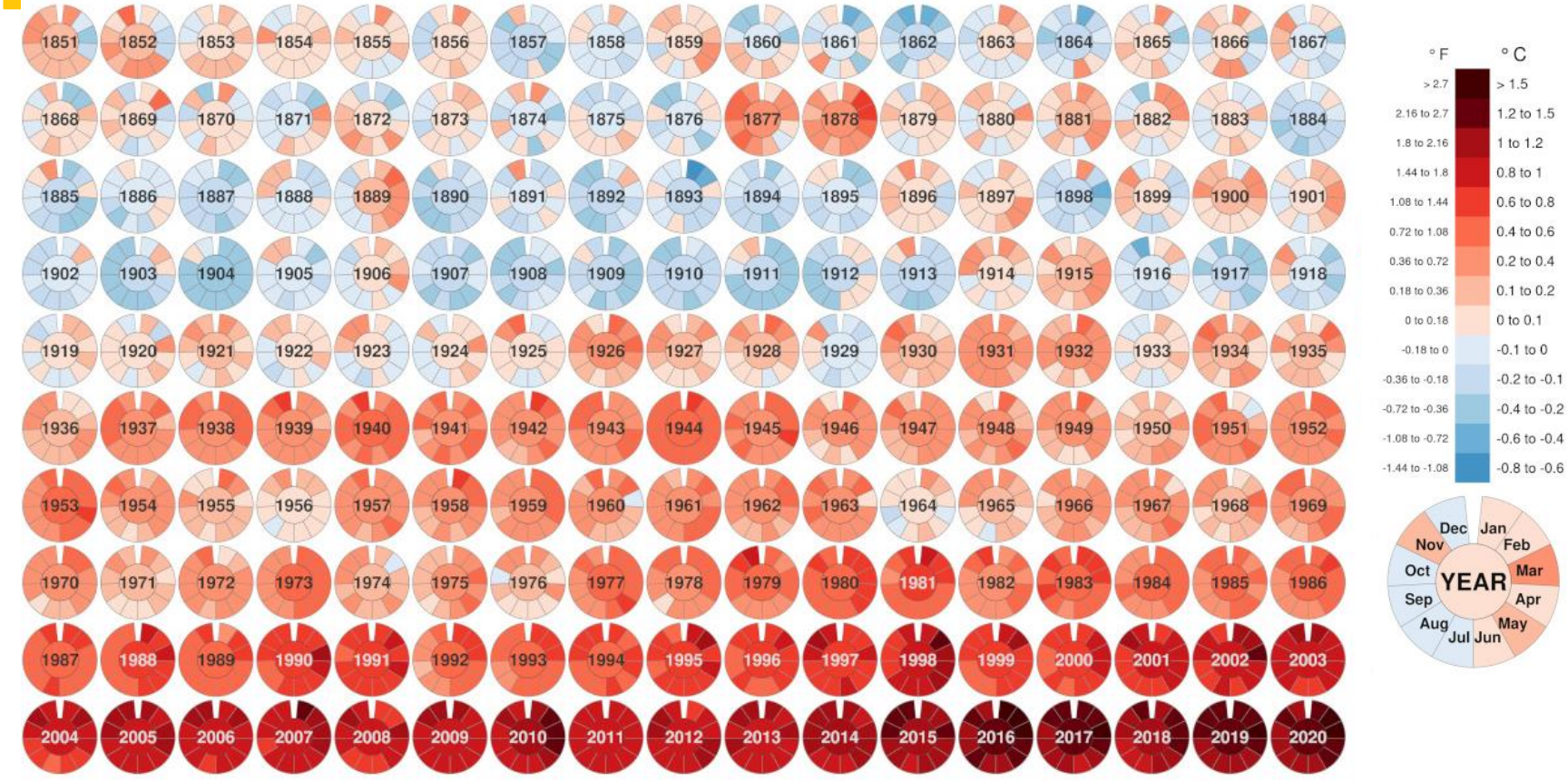
Leading the transition to a fossil-free chemical industry by 2050


ALWAYS START with
WHY

# Sense of urgency…

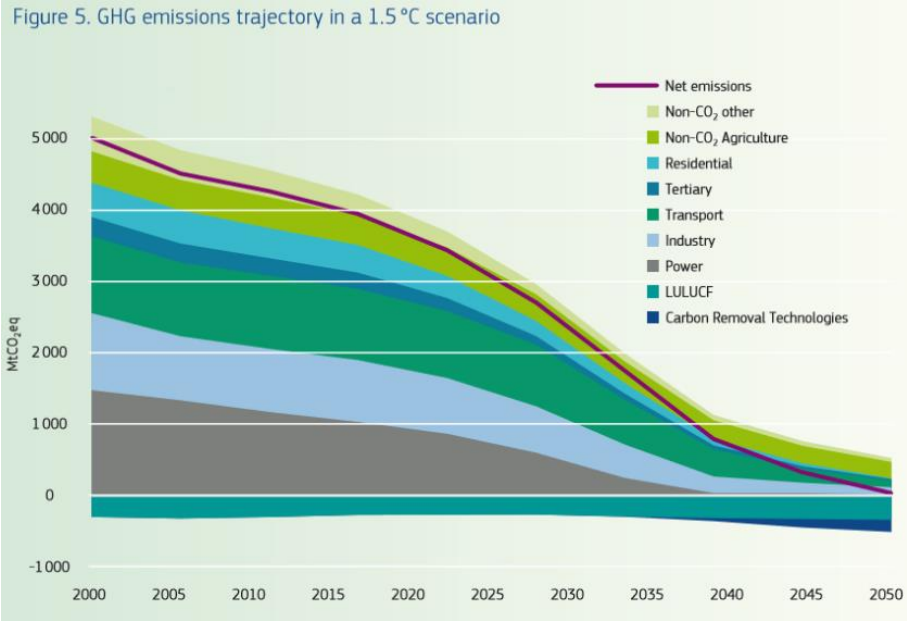
| | 1970 | 2021 |
|---|---|---|
| Petroleum production(barrels/day) | 50 million | 95 million |
| Plastic production (ton/year) | 50 million | 370 million |
| $CO_2$ concentration (atmosphere) | 325 ppm | 417 ppm |

# *Sense of urgency…*

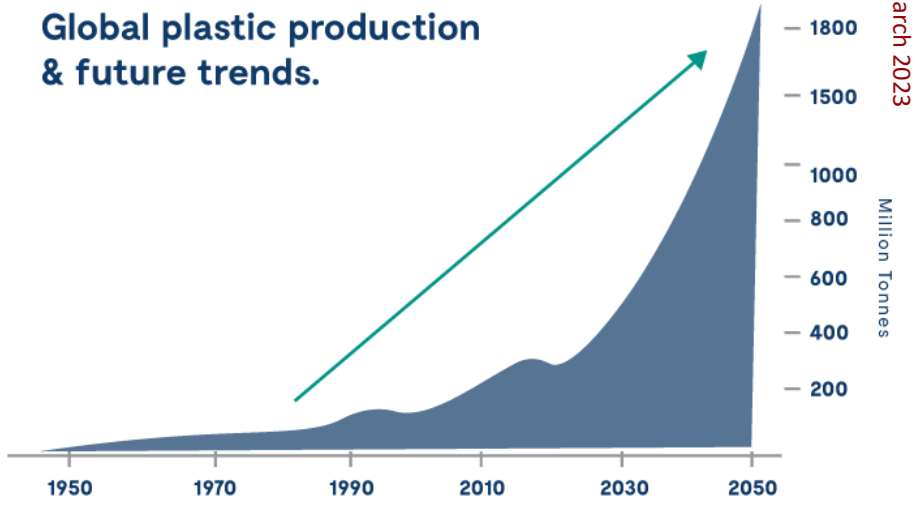



NATIONAL GEOGRAPHIC
PLANET OR PLASTIC?
18 billion pounds of plastic ends up in the ocean each year. And that's just the tip of the iceberg.

# The Dilemma




*Source:*
*European Commission, brochure on going climate-neutral by 2050 – a strategic long-term vision for a prosperous, modern, competitive and climate-neutral EU Economy (2018).*




*Source:*
*Ryan, A Brief History of Marine Litter Research in M. Bergmann, L, Gutow, M, Klages (Eds.), Marine Anthropogenic Litter, Berlin Springer, 2015; Plastic Europe.*

# *Chemical industry today and tomorrow*

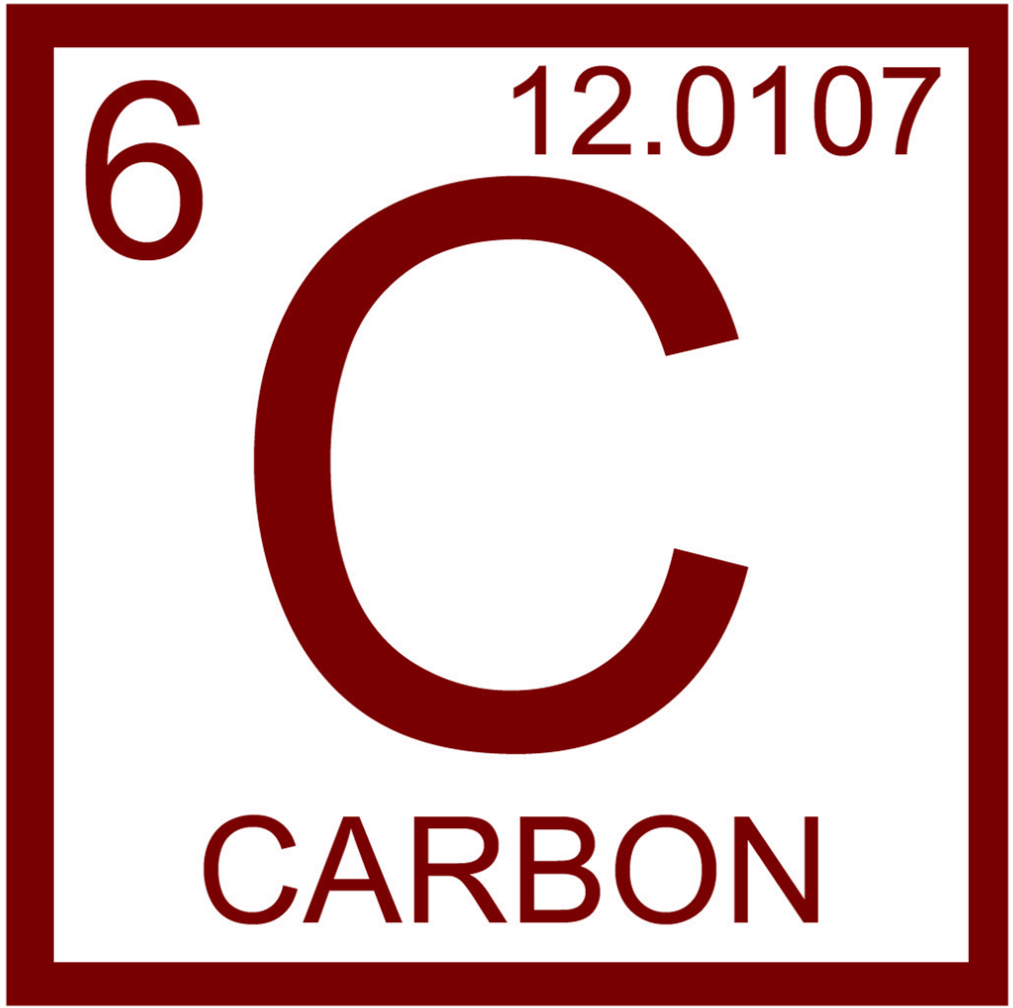
- Petrobased
- $CO_2$ intensive
- Linear

- Renewable
- Carbon neutral / negative (?)
- Circular

# *The outlook of circular chemistry*

**Renewable feedstock**

**Circularity**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CARBON

# *The future of chemistry is above the ground*

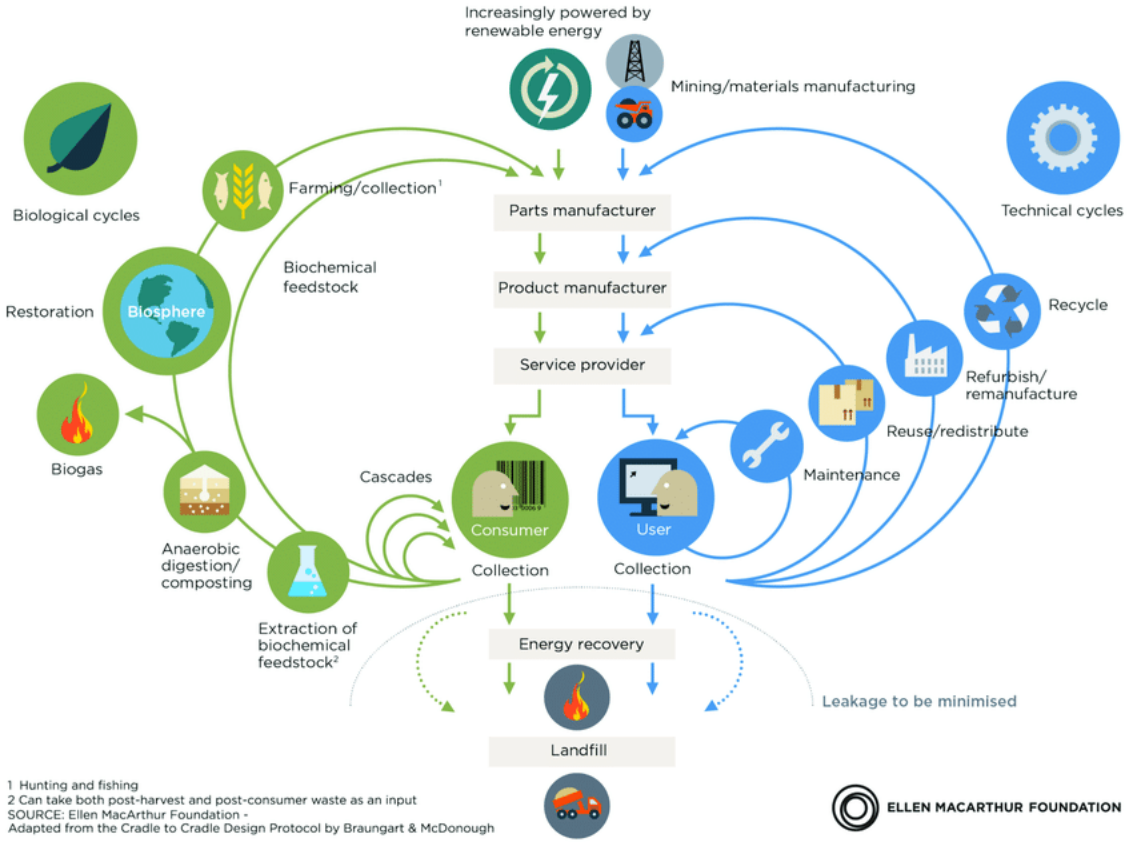
| Plant-based carbon | Air-based carbon | Man-made carbon |
| --- | --- | --- |
|  |   |  |

**The three renewable carbon sources that enable a circular economy**

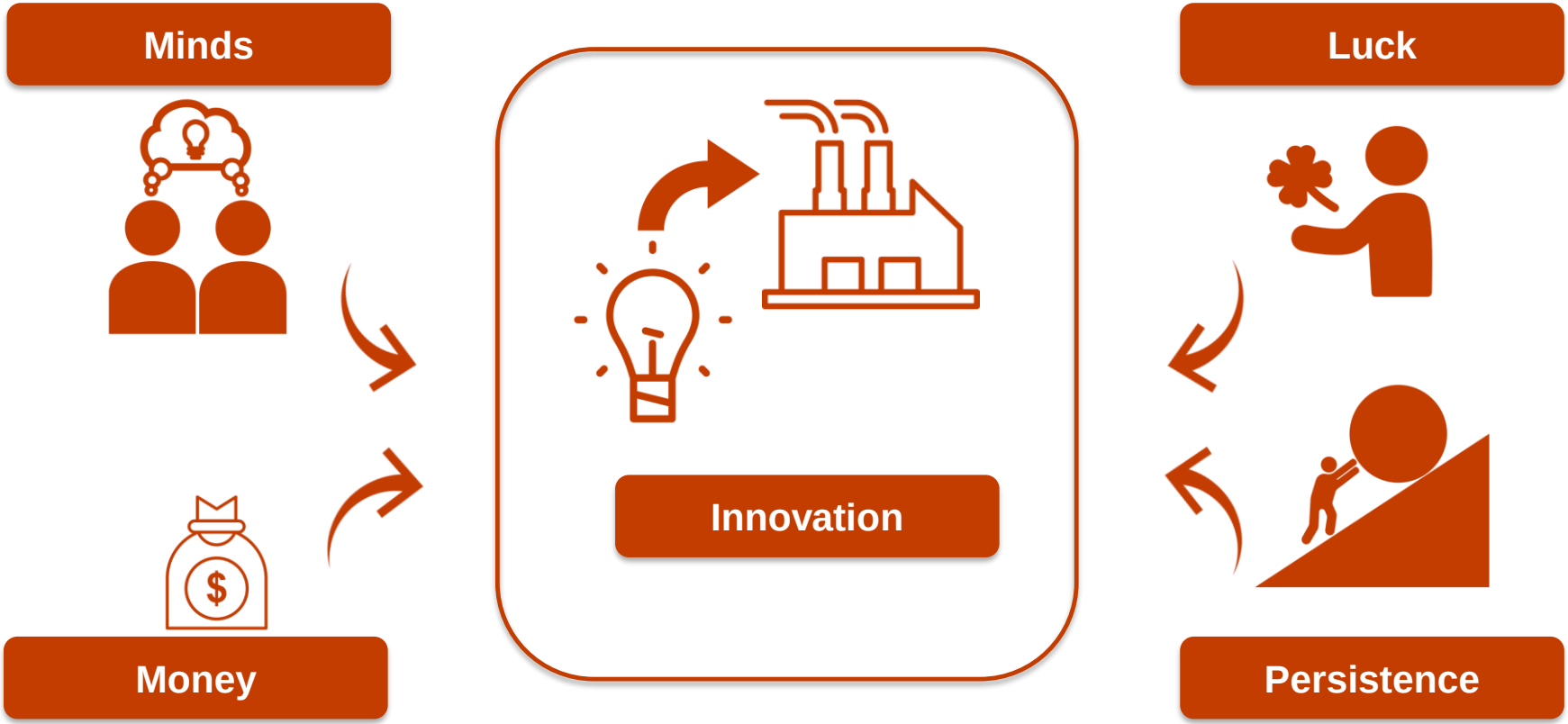
# *Each biofeedstock has its pros and cons*

- Availability
- Economics
- Sustainability
- Land use
- Public perception

# *Renewables & Circularity: a natural combination*



# *Innovation drives sustainability transition*

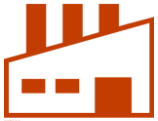


# *Sprint or marathon?*

# A new polymer from birth to adolescence to maturity

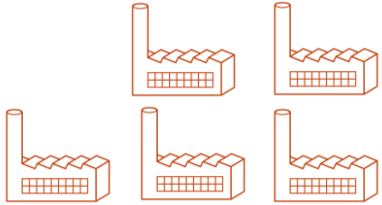


## LABORATORY



## DEMONSTRATION

## FLAGSHIP PLANT



## LICENSING

### FDCA/PEF

- 2005
- Amsterdam
- Lab-scale samples

### FDCA / PEF

- 2011
- Geleen
- Product samples (100 kg/ 1 ton)

### FDCA/PEF

- 2024 startup
- Delfzijl
- 5 kta

### FDCA / PEF

- On stream 27-29 (est.)
- Worldwide
- 100-300 kta

### PlantMEG

- 2011
- Amsterdam
- Lab-scale samples

### PlantMEG

- 2019
- Delfzijl
- 10 ton / year

### Plant MEG

- 2027 (estimated)
- TBD
- > 100 kta

### PlantMEG

- On stream 2029 (est)
- Worldwide
- >100 kta

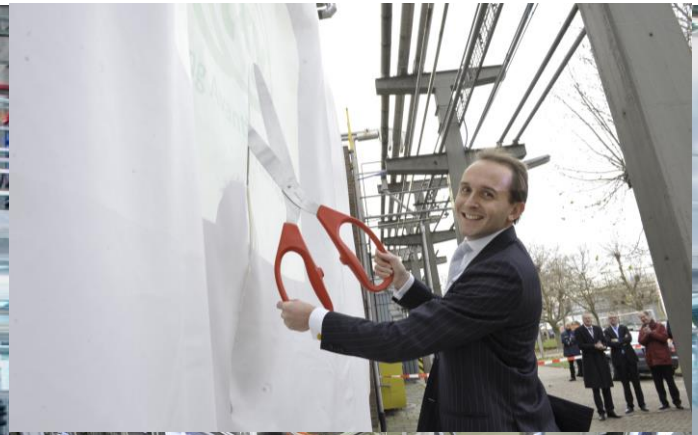
# 2006: First FDCA experiment @Avantium

GERT-JAN GRUTER (AVANTIUM):

## SLAPENDE REUS WAKKER GEMAAKT

Dit jaar start Avantium met de bouw van haar eerste commerciële fabriek. Vijftien jaar geleden werd het bedrijf opgezet als service provider voor de (petro)chemie en farmacie. Uiteindelijk ontwikkelde het bedrijf een eigen productieplatform voor FDCA, de biobased 'tegenhanger' van tereftaalzuur. 'We hebben een reus uit zijn winterslaap gehaald.'

# 2010: Opening FDCA pilot plant @Chemelot



# 2022: Start construction world's first FDCA manufacturing plant

**Location**
Chemie Park Delfzijl (NL)

**Timing**
Construction completion 2023 & operational 2024

**Scale**
5 kilotonnes of FDCA p/a

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

Avantium RNP Flagship Plant - Delfzijl

# 2023: Sale first technology license 100 kta FDCA plant



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## Avantium and Origin Materials to accelerate mass production of FDCA and PEF


No Comments

Avantium (The Netherlands) and Origin Materials (US) want to accelerate the mass production of FDCA and PEF for use in advanced chemicals and plastics. The two companies announced this on Tuesday (21 February).

Editorial office / Amsterdam

Next

Kelpi raises €3.5 million to develop coatings from seaweed

# Off-take customers Avantium Flagship










# Fiber beer bottle: enabled by PEF

# Conclusions of 20-year journey to renew the polyester industry