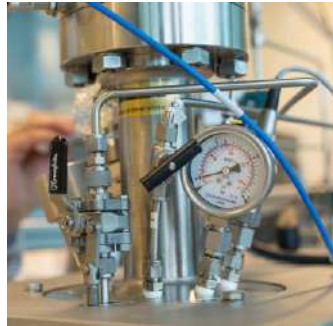


Technology & Markets Day

Path to a Fossil-Free World

6-June-2019



Welcome and Agenda

14:30 – 16:00 Plenary presentations:

- Path to Commercialization: Strategy of Avantium – Tom van Aken
- Path to Flagship Plant: Deep Dive Synvina – Marcel Lubben
- Q&A session

16:00 – 16:15 Break

16:15 – 17:15 Breakout sessions:

- Path to the Future – Gert-Jan Gruter (Palladium)
- Path to Products Synvina – Marcel Lubben (Silver)
- Path to Partners Renewable Chemistries – Zanna McFerson (Magnesium)

17:15 Wrap up & Networking Drinks

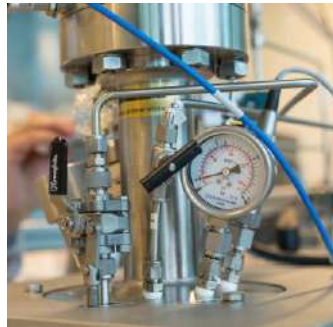
Disclaimer

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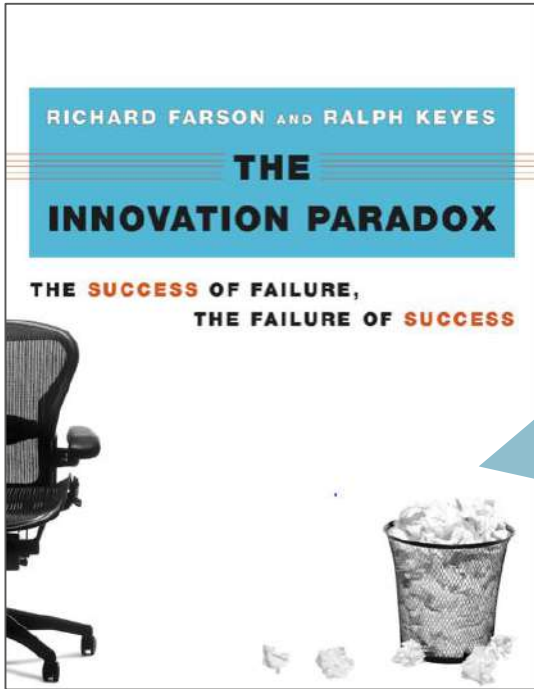
Some of the statements in this Presentation constitute forward-looking statements. These statements involve known and unknown risks, uncertainties and other factors that may cause the Company’s actual results, levels of activity, performance or achievements to be materially different from any future results, levels of activity, performance or achievements expressed or implied by such forward-looking statements. Forward-looking statements relate to future events or the Company’s future financial performance. In some cases, forward-looking statements can be identified by terminology such as “may,” “will,” “should,” “expects,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “potential” or “continue” or the negative of such terms or other comparable terminology. These statements are only predictions. Actual events or results may differ materially. In evaluating these statements, various risk factors should be taken into account. Risk factors may cause actual results to differ materially from any forward-looking statement. Although the Company believes that the expectations reflected in the forward looking statements are reasonable, the Company cannot guarantee future results, levels of activity, performance or achievements. Moreover, neither the Company nor any other person assumes responsibility for the accuracy and completeness of such statements. The Company is under no duty to update any of the forward-looking statements after the date of this Presentation or to conform such statements to actual results.

Strategy of Avantium

Path to Commercialization



The Innovation Paradox



RISKS OF DEVELOPING
DISRUPTIVE TECHNOLOGIES

VERSUS

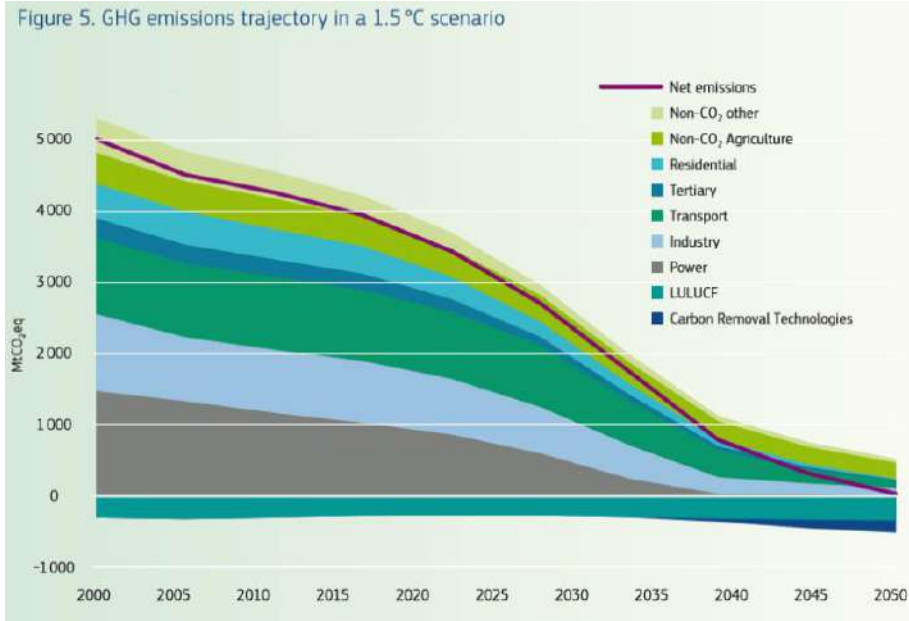
THE DESIRE TO HAVE
PREDICTABLE RESULTS

Company Strategy

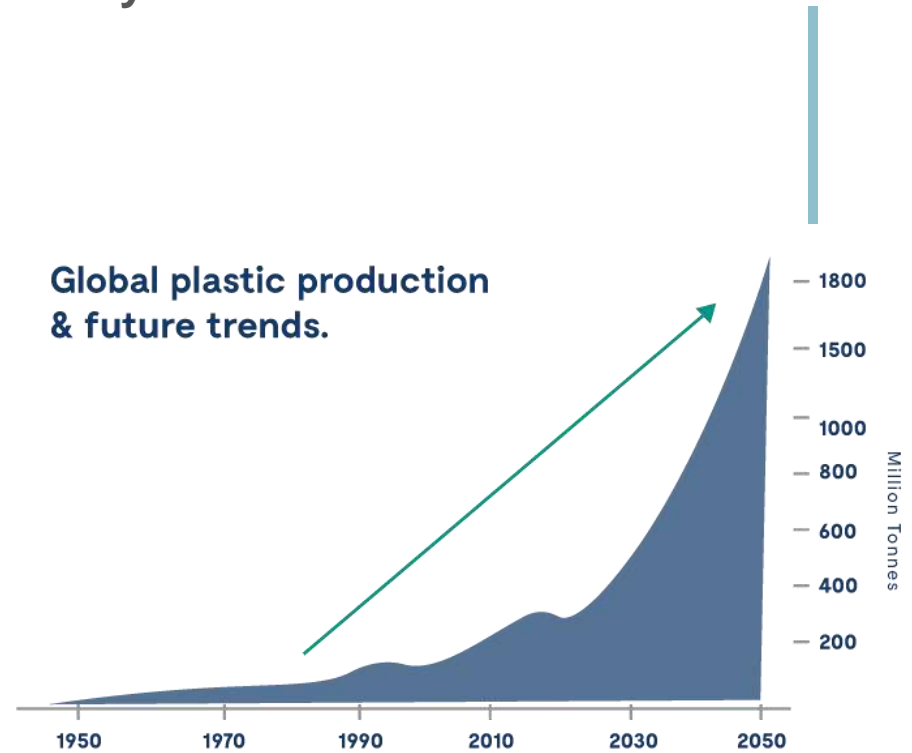
Path to a Fossil-Free World



The Dilemma: Going Climate-Neutral by 2050 vs Global Plastics Production



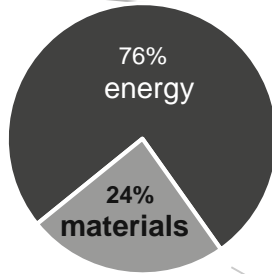
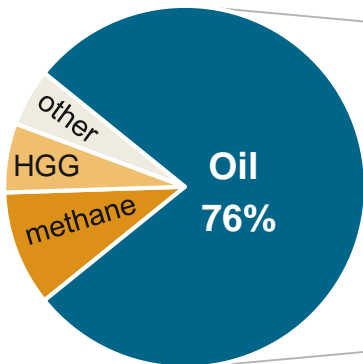
Source:
 European Commission, brochure on going climate-neutral by 2050 – a strategic long-term vision for a prosperous, modern, competitive and climate-neutral EU Economy (2018).



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.

We Need Alternatives to Fossil Resources

CO₂ emissions
by source



Energy Alternatives



Wind



Solar

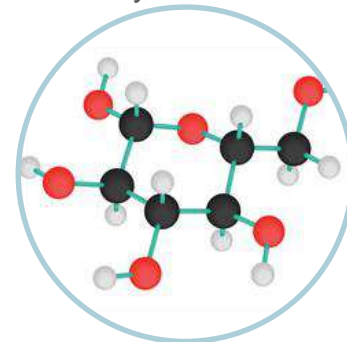


Hydro



Biomass

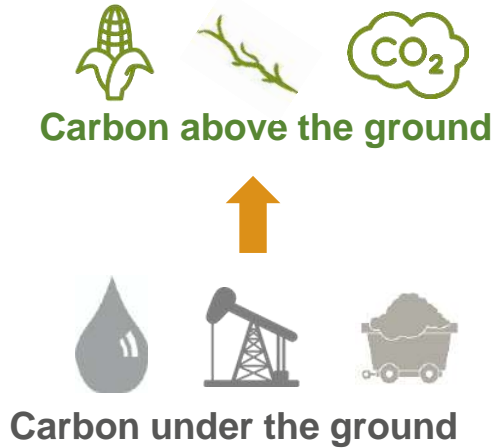
Industrial sugars: A Key Alternative



Materials Alternatives

CO₂ emissions: U.S., 2016, total 6,511 million metric tones of carbon dioxide equivalent (CO₂e)
HGG = High greenhouse warming potential gases, such as HFC, PFC, SF6, NF3; Source: U.S. Energy Information Administration (www.eia.gov)

Transition of the Chemical Industry Driven by Megatrends



A Wealth of Carbon above the Ground

The three renewable carbon sources that enable a circular economy

Plant-based carbon



Air-based carbon



Man-made carbon



Avantium's Role in this Transition

- Lead the transition of the chemical industry to renewable chemicals and polymers
- Develop breakthrough technologies to make sustainable, plant-based products that compete on performance and costs
- Commercialize these technologies in partnership with industrial companies



Company Structure



Avantium Business Units

Renewable Polymers (fka Synvina)

- Catalytic conversion of plant-based sugars into FDCA
- Polymerization from FDCA into PEF
- PEF: 100% plant-based & recyclable packaging material



Renewable Chemistries

- DAWN : industrial sugar from non-food biomass
- Mekong: 1-step conversion to plant-based MEG
- Volta: CO₂ to chemicals via electrochemistry



Catalysis

- Leading service and systems provider
- Blue chip clients



Catalysis: Tomorrow's Catalysis Today

Leading provider of superior catalysis systems and services, serving a blue chip customer base

Services

- High-throughput catalyst testing and contract R&D, heterogeneous as well as homogeneous
- Over 700 reactors, fixed bed and batch



Systems

- Accelerate screening of catalysts and chemistries with highly accurate, reliable and flexible Flowrence high-throughput catalyst testing systems



Technology

- Technology foundation
- Protected by a portfolio of 9 patent families
- Supported by extensive network of industry experts and academic catalyst R&D centers



Strategy and Organization Review Q1 2019



Focus on highest value opportunities; continuous evaluation of the development programs



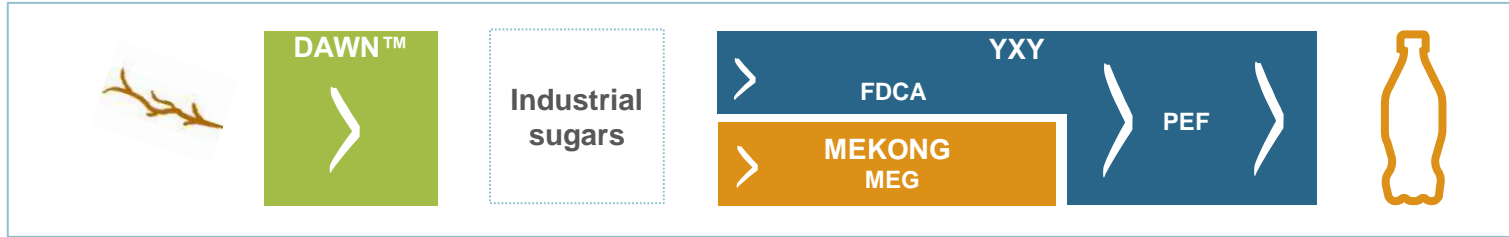
Implementation of cost reduction program to extend our financial runway



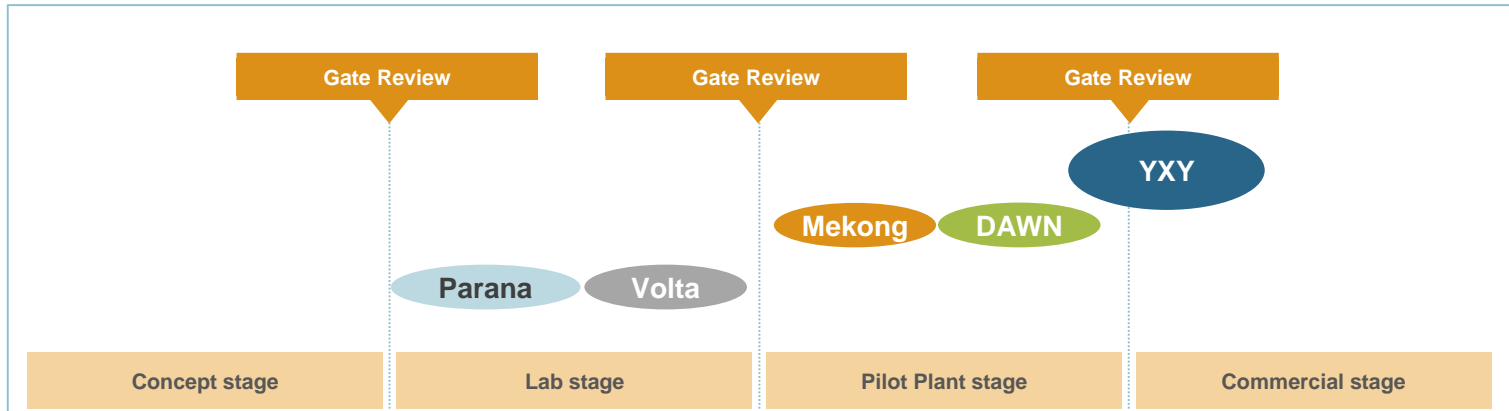
Implementation of new organizational model designed for focus and delivery

A Coherent Portfolio of Technologies

Coherent portfolio, each targeting blockbuster markets

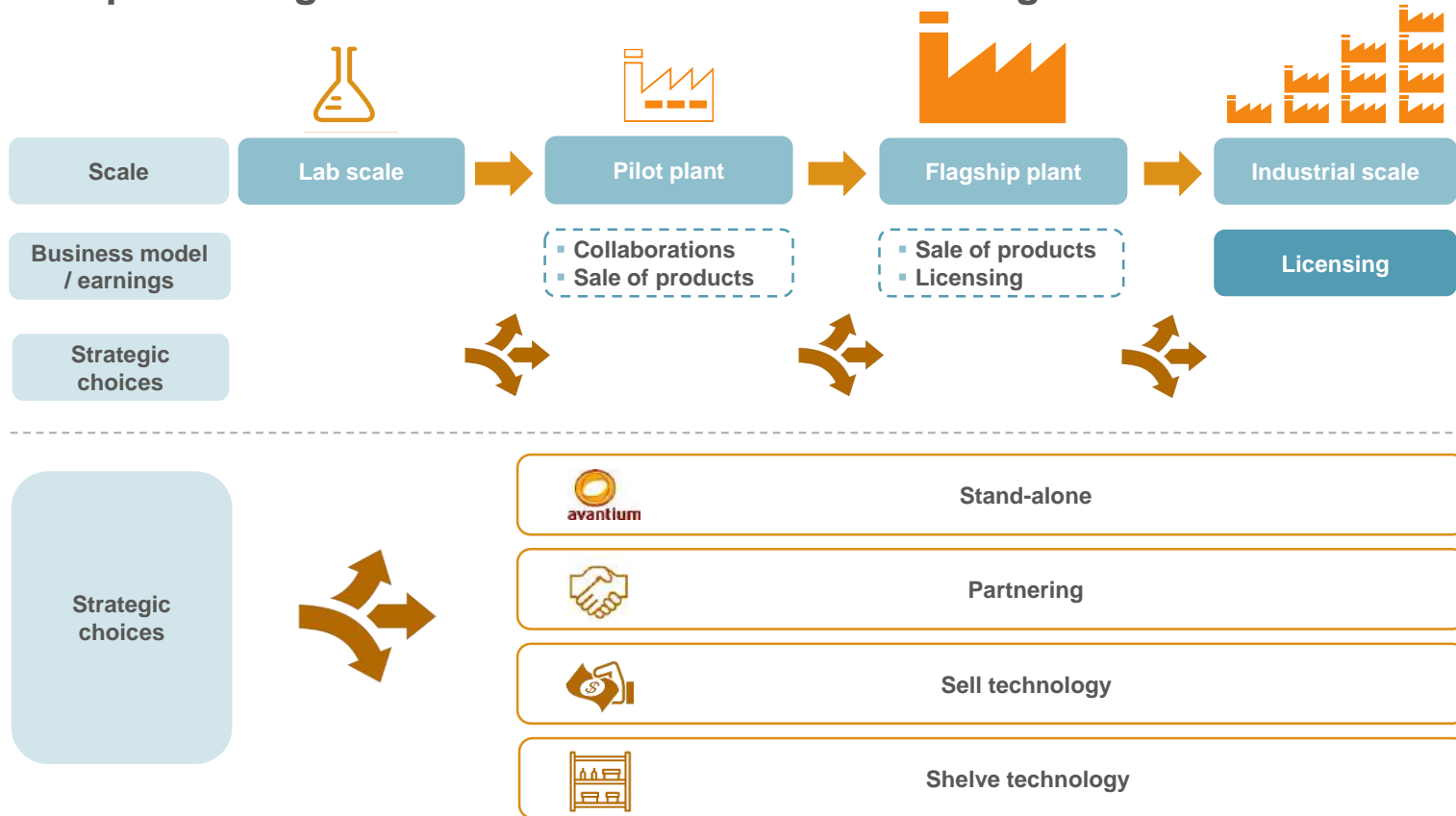


Pursuing the most attractive opportunities through stage gate process



Value Creation

Multiple Strategic Routes to Monetize Our Technologies



Introduction Avantium Technologies - video



die zich in een vergevorderd stadium
richting commercialisatie bevinden.



Avantium Renewable Polymers (fka Synvina)

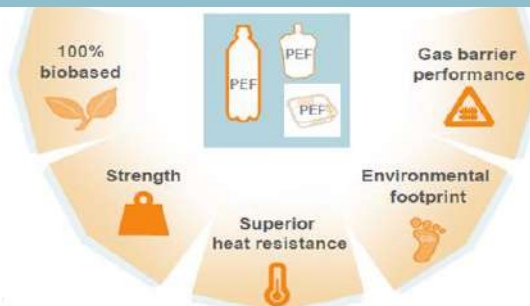


Avantium Renewable Polymers

Catalytic technology to convert plant-based sugars to FDCA and PEF



Benefits PEF



Market potential > € 200bn



PEF Benefits – in use

Performance

- Shelf life extension
- Lightweighting
- High barrier films

Circular Economy

- Reuse: enable washing
- Reduce: lightweighting
- Recycle: replace multi-layer

Renewable

- 100% plant-based
- Reducing carbon footprint



PEF Benefits – after use

- PEF is designed for recycling and reuse
 - > Proven fit with existing sorting and recycling facilities
- What happens if PEF ends up in nature?
 - > Tests Biodegradation of PEF by Organic Waste Systems (OWS), Gent, Belgium
 - > First results show that PEF degrades much faster than PET (years instead of hundreds of years)
 - > Field trials Avantium ongoing
- PEF benefits in and after use
 - > Safe and stable
 - > 100% Recyclable
 - > Faster degradation in nature to avoid future accumulation



New Commercialization Strategy Renewable Polymers

Scale-up and market launch strategy

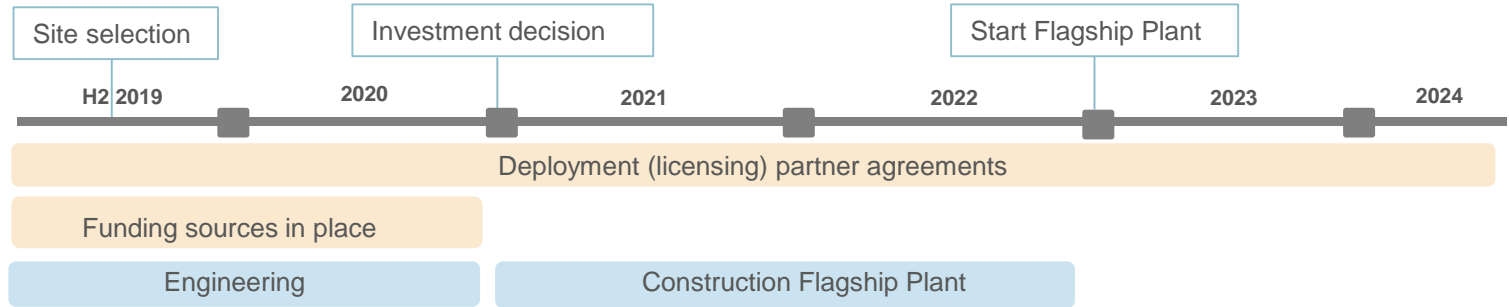
- | | |
|----------------------------|--|
| ▪ Scale of flagship plant: | 5 kiloton per year |
| ▪ Technology: | De-risked |
| ▪ Market focus: | High value / performance products |
| ▪ Financial objective: | Cash flow positive |
| ▪ Purpose: | > market launch
> enable licensing in high-volume markets |
| ▪ Partners: | Committed partners throughout the value chain |
| ▪ Timing: | Flagship plant operational in ~2023 |
| ▪ Funding: | EUR 150m |

New Commercialization Strategy Renewable Polymers

- Avantium to maintain control of flagship and licensing business
- Collaborating with committed partners throughout the value chain:
 - > Negotiations with multiple partners ongoing
 - > High level of interest in supply of raw materials, production of FDCA and PEF, and application of PEF for commercial products in multiple end markets
 - > Commitments for financial contribution to flagship plant expected prior to investment decision (2020)



Timetable New Commercialization Strategy Renewable Polymers



Site selection

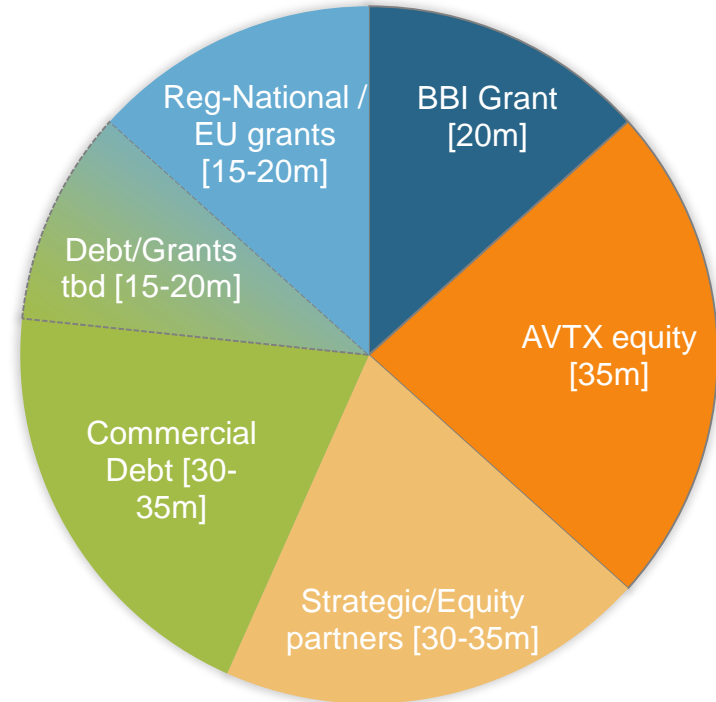
- Site for the flagship plant selected in the second half of 2019
- Site to be located in northwestern continental Europe
- Selection based on balancing operational and financial criteria

Funding Requirements Flagship Plant to Produce FDCA

Total funding need

- EUR 150 million (\pm 20% contingency)
 - > CAPEX (ISBL + OSBL)
 - > Start-up costs
 - > Working capital
 - > Ongoing Renewable Polymers expenses until cash-flow positive (2019-2023)
- Objective to have funding sources in place before end of 2020

Total funding sources

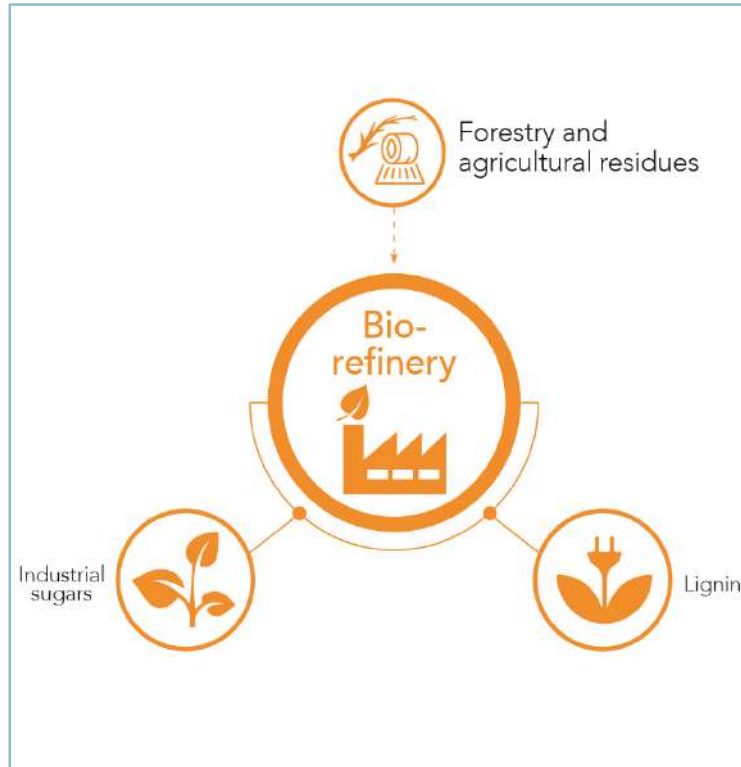


Avantium Renewable Chemistries



Avantium Renewable Chemistries Dawn Technology™

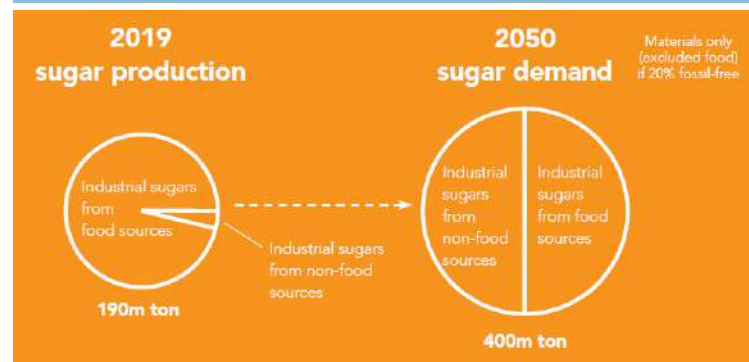
Biorefinery process for industrial sugars and lignin from non-food biomass



Benefits industrial sugars from non-food sources

- Reduce land use and environmental impact of 1G sugars
- Cascading the use of biomass for chemicals, materials and energy
- Suitable for locally sourced biomass

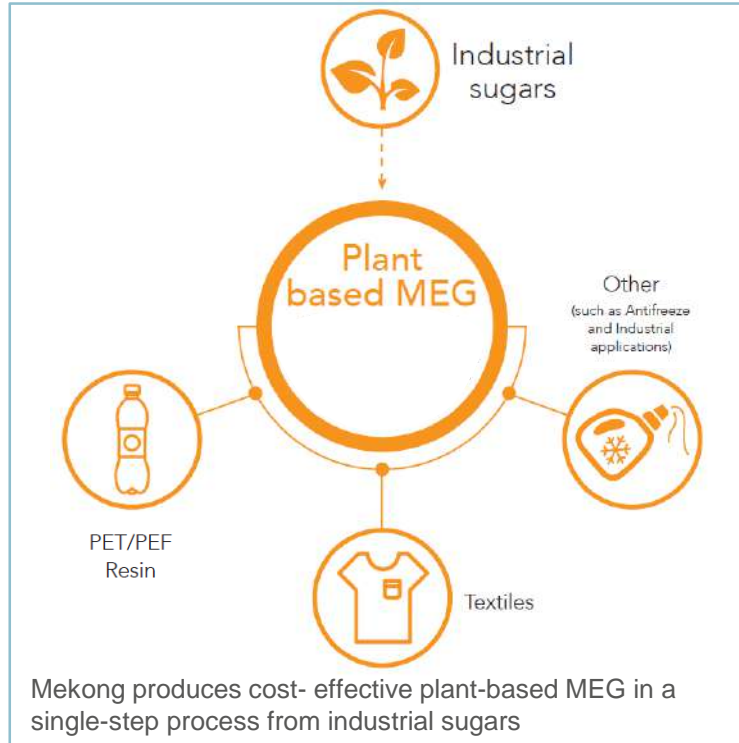
Market potential industrial sugars from plant-based feedstock



Avantium Renewable Chemistries

Mekong technology

Catalytic, single-step process for producing plant-based (MEG) from industrial sugars



Benefits Mekong technology

- Single-step process to produce plant-based mono-ethylene glycol (MEG)
- A drop-in product identical to fossil-based MEG
- Competitive in terms of cost and quality

Market potential global MEG market consumption

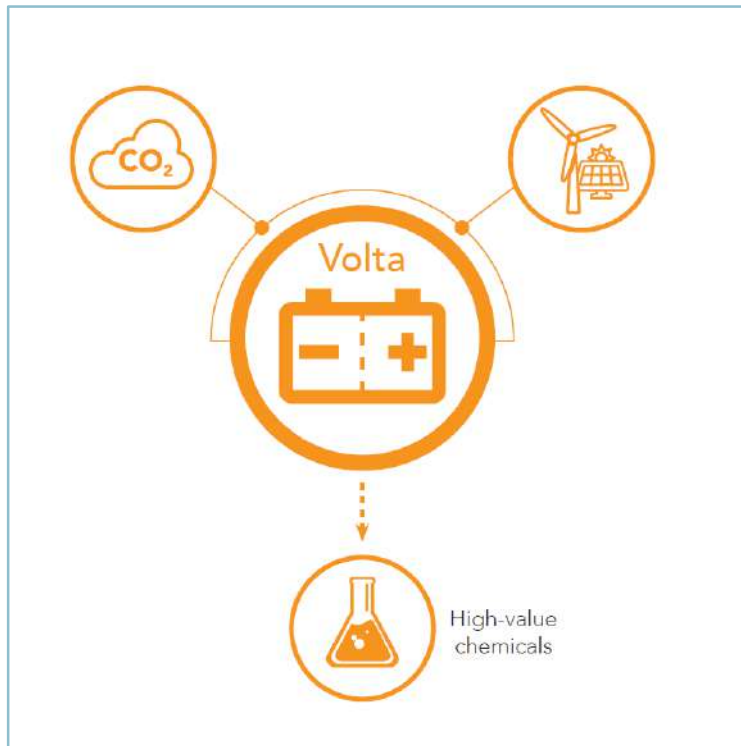


Source: Nexant report 2017

Avantium Renewable Chemistries

Volta

Converting CO₂ to high value chemicals via electrochemistry



Benefits Volta

- Preventing CO₂ emissions of industrial parties
- Unlocking a new renewable feedstock for the chemical industry
- Enabling cleaner chemical processes

Business Development

- Leading patent portfolio: global top-5 in electrochemical CO₂ conversions
- Avantium's Volta team cooperates with over 35 partners in European grant consortia, also providing Avantium with over €5m of grants
- Avantium is founding member of CO₂ Value Europe

Avantium Renewable Chemistries

Volta: Pre-pilot units in Prodock Amsterdam



Avantium Renewable Chemistries

Volta: Extensive Partnerships

Feedstock providers



Technology developers



Producers of Chemicals / products



Universities & Research Institutes



Associations



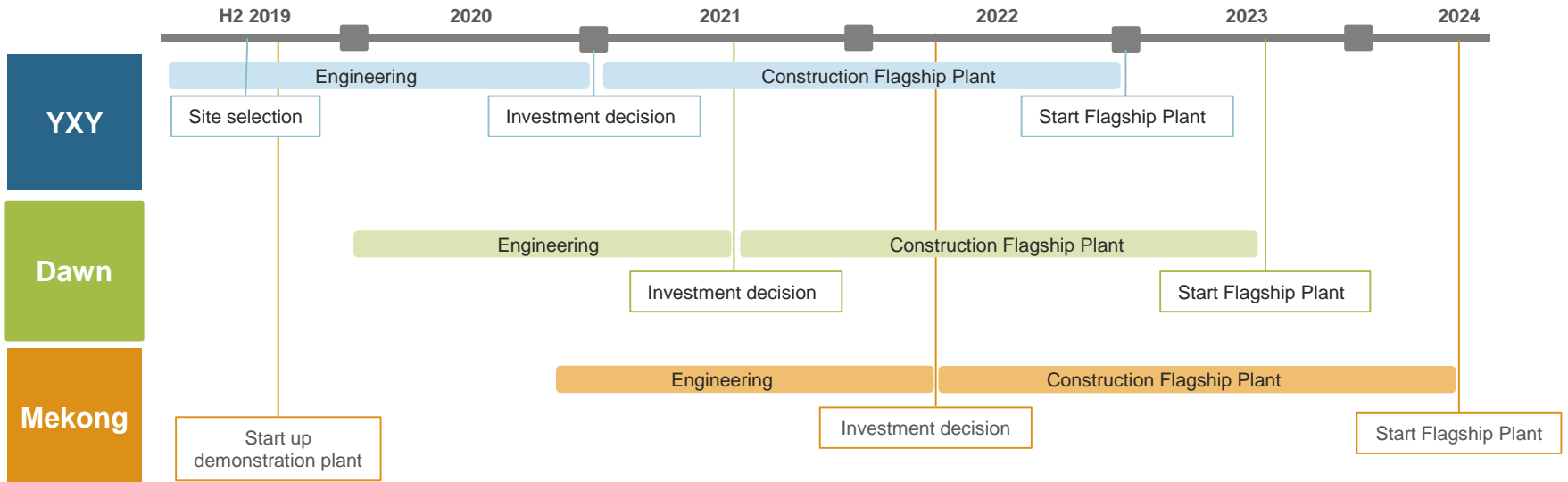
Timelines



Timelines per Technology



Clear roadmap to commercialization



Thank you

