Avantium

Pioneering renewable chemistry

September 2019

BeleggersFair Amsterdam 2019

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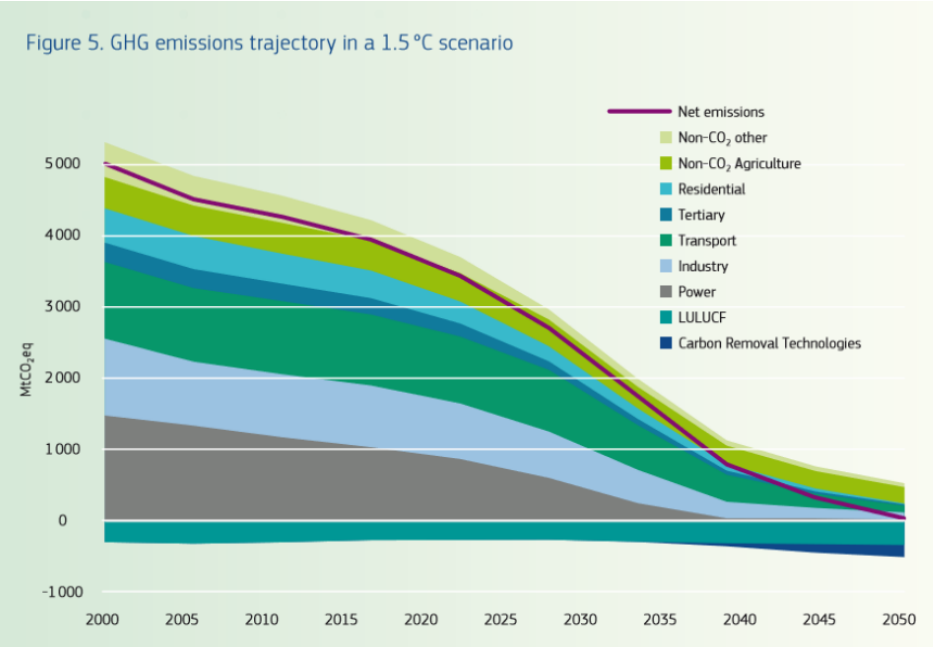
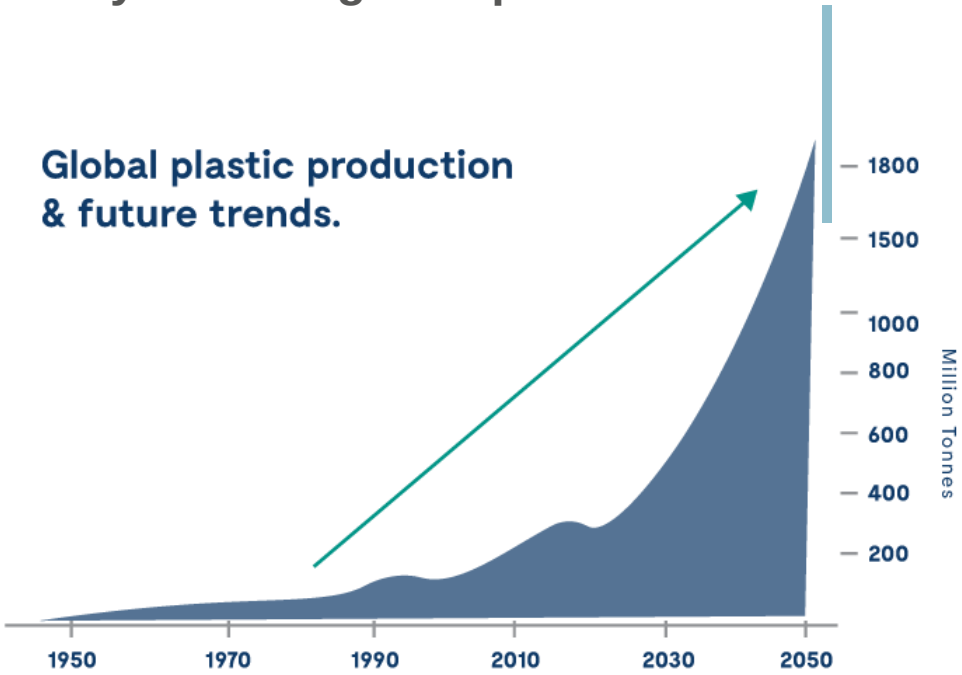
Market trends

The dilemma: going climate-neutral by 2050 vs global plastics production





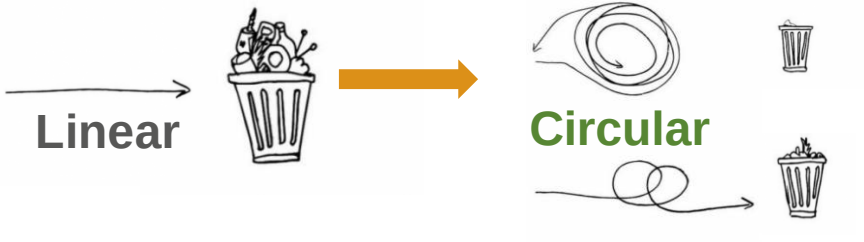
Source: Ryan, A Brief History of Marine Litter Research, in M. Bergmann, L. Gutow, M. Klages (Eds.), Marine Anthropogenic Litter, Berlin Springer, 2015; Plastic Europe.

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)

Transition of the Chemical Industry Driven by Megatrends

Carbon above the ground

Carbon under the ground



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

Our company

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: CO_2 to chemicals via electrochemistry

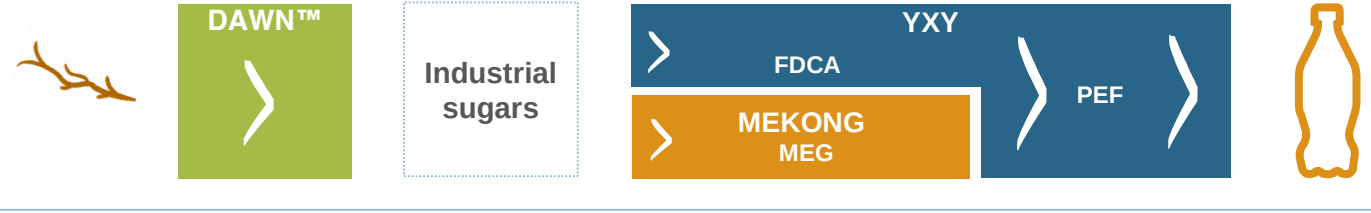


Catalysis

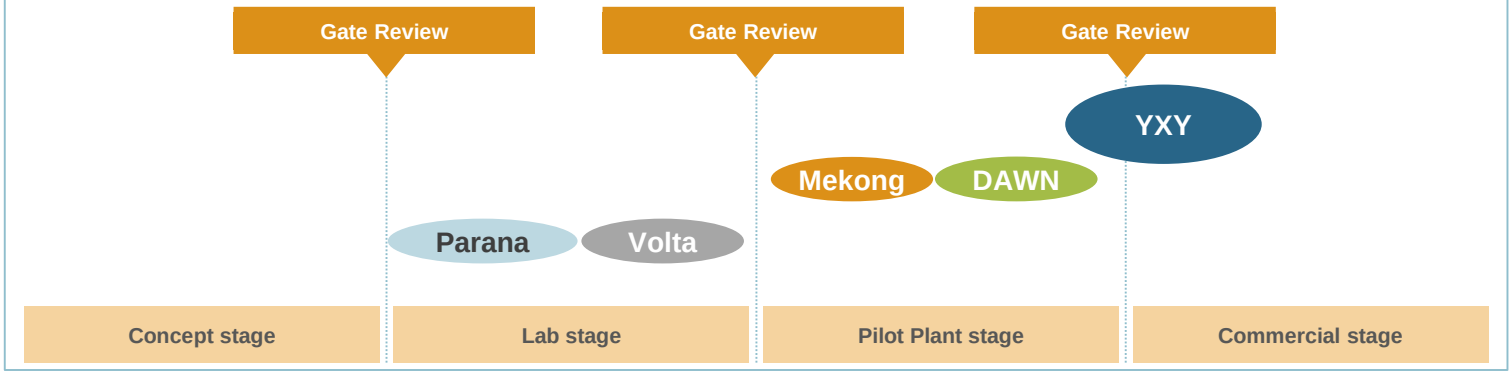
- Leading service and systems provider
- Blue chip clients

A Coherent Portfolio of Technologies

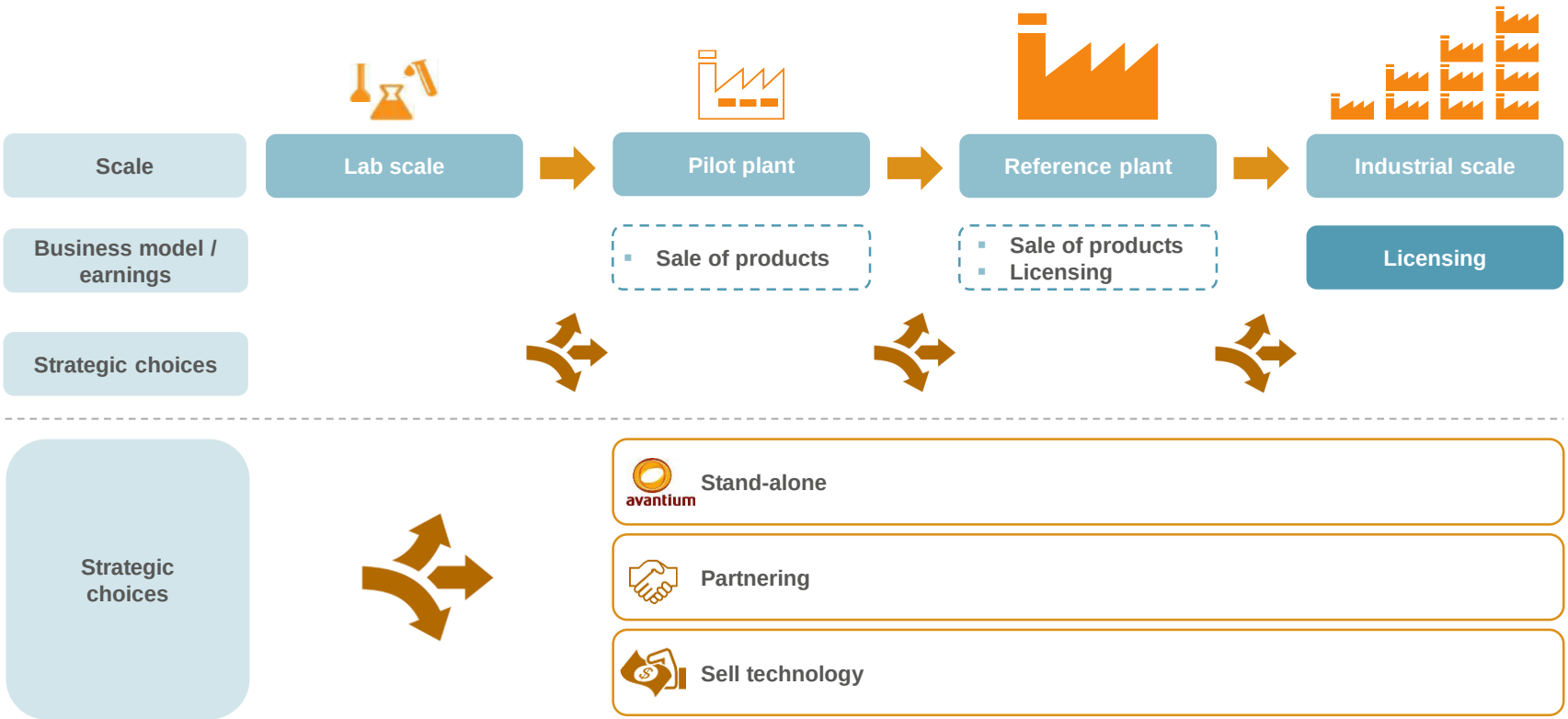
Coherent portfolio, each targeting blockbuster markets



Pursuing the most attractive opportunities through stage gate process



How we innovate: multiple strategic routes to monetize our technologies

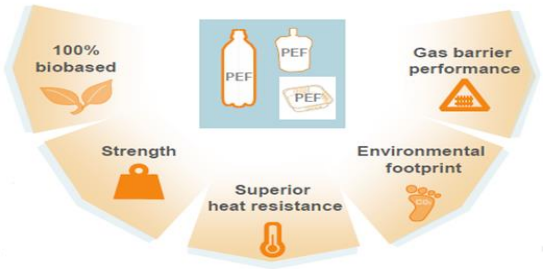


Our technologies:
YXY technology

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

PEF is a 100% plant-based, 100% recyclable plastic with superior performance properties compared to today's widely used petroleum-based packaging materials

Benefits PEF

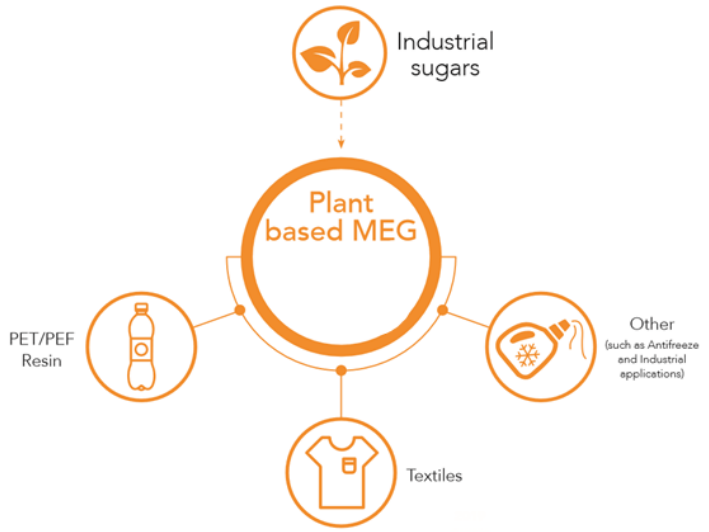


Market potential > € 200bn

Source: Canadean (2013)

Our technologies:
Mekong technology

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

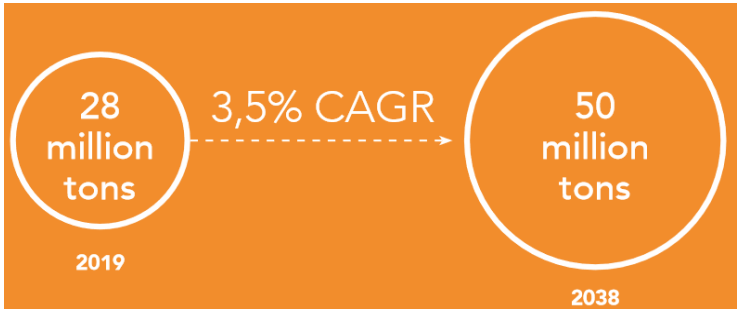


Mekong produces cost- effective plant-based MEG in a single-step process from industrial sugars

Benefits Mekong technology

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

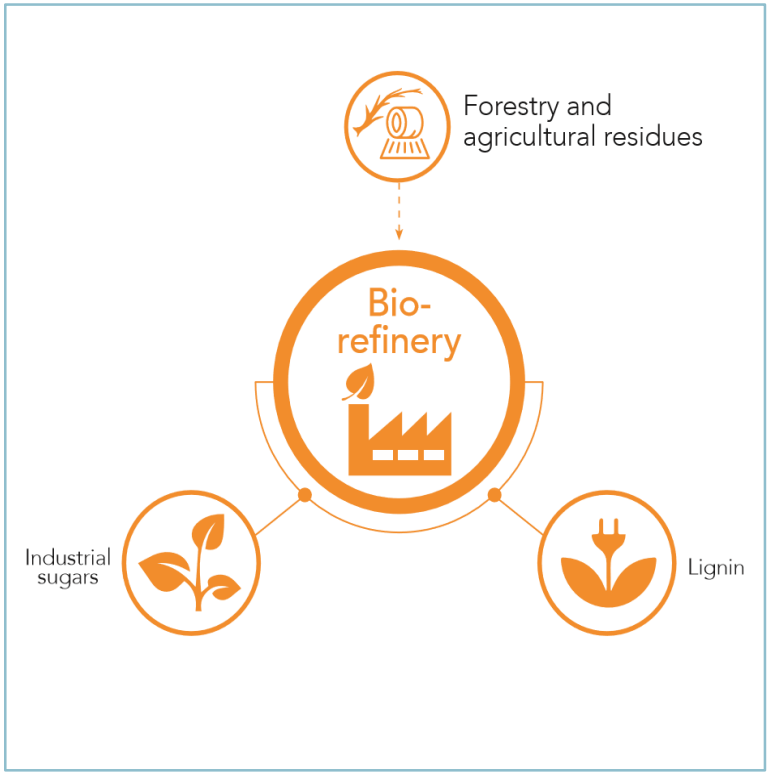
Market potential global MEG market consumption



Source: Nexant report 2017

Our technologies:
Dawn Technology™

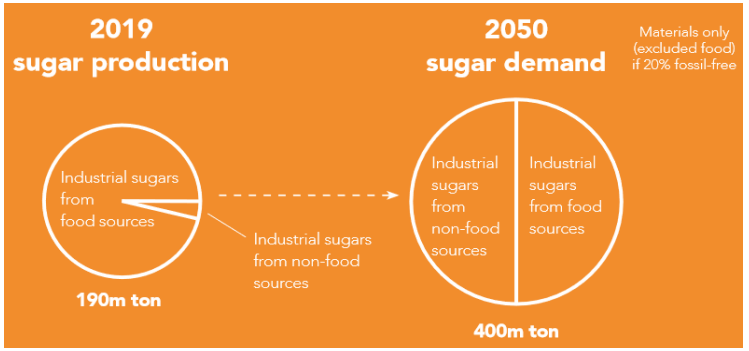
Biorefinery process for industrial sugars and lignin from non-food biomass



Benefits industrial sugars from non-food sources

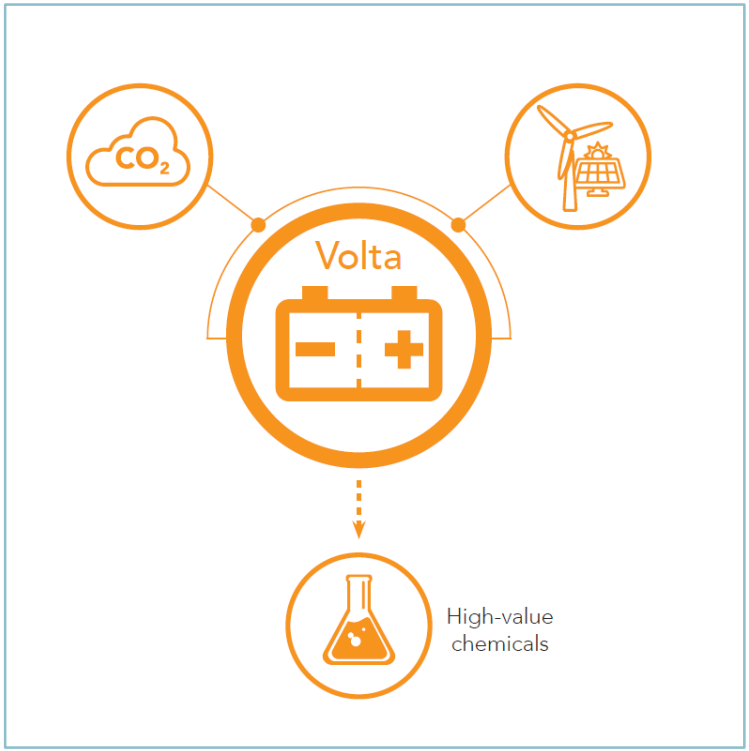
- ✓ Reduce land use and environmental impact of 1G sugars
- ✓ Cascading the use of biomass for chemicals, materials and energy
- ✓ Suitable for locally sourced biomass

Market potential Industrial sugars from plant-based feedstock



Our technologies: Volta

Converting CO_2 to high value chemicals via electrochemistry



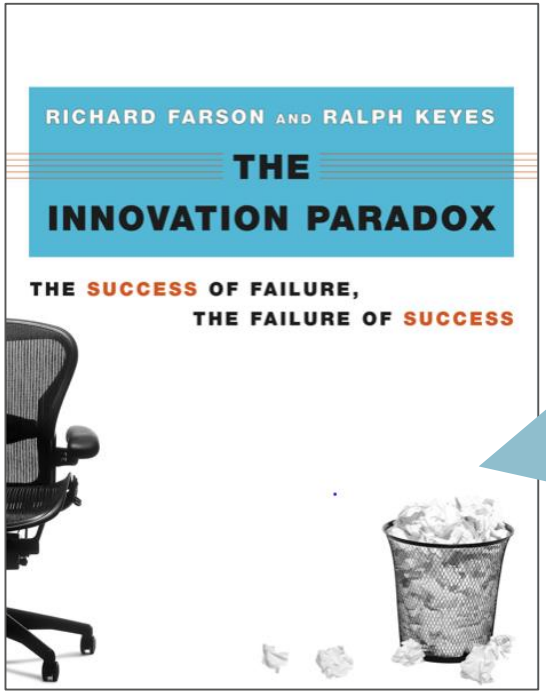
Benefits Volta

- 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

The Innovation Paradox



RISKS OF DEVELOPING DISRUPTIVE TECHNOLOGIES

VERSUS

THE DESIRE TO HAVE PREDICTABLE RESULTS

Closing