

## **Life Cycle Assessment shows: Avantium's plantMEG™ cuts carbon footprint by up to 83% over fossil-based MEG**

**AMSTERDAM, 22 February 2022, 18:00 hrs CEST – Avantium N.V., a leading technology company in renewable chemistry, recently conducted a third party and critically reviewed Life Cycle Assessment (LCA) study on the environmental impacts of its plantMEG™ (monoethylene glycol), from its Ray Technology™. The LCA shows a greenhouse gas (GHG) emission reduction of up to 83% over the life cycle when Avantium's plantMEG™ is compared with its fossil-based incumbents.**

**MEG is a blockbuster commodity intermediate, used for plastic bottles and packaging, polyester textiles for clothing and furniture, and antifreeze applications. Today, more than 99% of MEG is produced from fossil feedstock, such as naphtha, shale gas, natural gas and coal. Avantium's plantMEG™ is a fully recyclable, plant-based and competitive product while being identical to fossil-based MEG in quality and performance.**

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Avantium partnered with Sphera to perform a cradle-to-grave LCA for Avantium's plantMEG™ in its most applicable market (PET bottles) in 2025 with a regional focus on Europe. The LCA takes into account the use of beet sugar from Cosun Beet Company<sup>i</sup>, the process based on Avantium's Ray Technology™, as well as the end-of-life (at which point waste materials are recycled, incinerated or landfilled). The LCA is aligned with European Commission 2025 target setting for PET and plastic bottle collection and recycling in the Single Use Plastics Directive and uses the Circular Footprint Formula for end-of-life allocation. The study compared Avantium's plantMEG production with current incumbent alternative production routes of MEG (using natural gas, naphtha, shale gas and coal feedstock). For the plantMEG™ production process, electricity from wind, green hydrogen based on wind power and thermal energy from natural gas was assumed<sup>ii</sup>. The plantMEG™ LCA study has been conducted according to the guidelines of ISO 14040/14044 and has been reviewed by an external critical review panel.

### ***PlantMEG™ Carbon Footprint***

The use of renewable feedstock (beet sugar from Cosun Beet Company) for plantMEG™ is the main driver for the reduced carbon footprint, 574kg CO<sub>2</sub>eq<sup>iii</sup>/t plantMEG™ compared to fossil-based MEG. The thermal energy used to produce plantMEG™ is the second driver for the carbon footprint. GHG emissions are 56%-83% lower compared to fossil-MEG (ranging from 56% compared to MEG made from shale gas to 83% for coal-based MEG). PlantMEG™ performs even better under the so-called "substitution approach", which takes the perspective that recycling into secondary material at the end-of-life will substitute an equivalent amount of virgin material. With this approach, plantMEG™ scores 72%-89% better than fossil-MEG. In above figures, carbon sequestration<sup>iv</sup> during biomass growth is not taken into account, in line with the international standards and methods in Europe which do not allow for carbon discounting based on temporary storage<sup>v</sup>.

"The LCA provides clear confirmation of the positive impact provided by Avantium's plantMEG™. Our high-quality plantMEG™ is identical to fossil-based MEG in quality and performance. But the advantage is clear: the process of making plantMEG™ results in significantly lower CO<sub>2</sub> emissions. This makes it a real game-changer for our collective green future", says Math Lambalk, business development manager at Avantium Renewable Chemistries and responsible for the plantMEG™ LCA.

A summary of the LCA, also addressing other relevant impact categories, is available on the Avantium website: [www.avantium.com/sustainability/LCA](http://www.avantium.com/sustainability/LCA)

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### About Avantium

Avantium is a leading technology development company and a forerunner in renewable chemistry. Avantium develops novel technologies based on renewable carbon sources as an alternative to fossil-based chemicals and plastics. The company currently has three technologies at pilot and demonstration phase. The most advanced technology is the YXY<sup>®</sup> plant-to-plastics-technology that catalytically converts plant-based sugars into a wide range of chemicals and plastics, such as PEF (polyethylene furanoate). Avantium has successfully demonstrated the YXY<sup>®</sup> Technology at its pilot plant in Geleen, the Netherlands, and will start construction of the world's first commercial plant for large-scale production of PEF in 2022. The second technology is Ray Technology<sup>™</sup> and catalytically converts industrial sugars to plant-based MEG (mono-ethylene glycol): plantMEG<sup>™</sup>. Avantium is scaling up its Ray Technology<sup>™</sup> and the demonstration plant in Delfzijl, the Netherlands opened in November 2019. The third technology is called the Dawn Technology<sup>™</sup> that converts non-food biomass into industrial sugars and lignin in order to transition the chemicals and materials industries to non-fossil resources. In 2018, Avantium opened the Dawn Technology<sup>™</sup> pilot biorefinery in Delfzijl, the Netherlands. Next to developing and commercialising renewable chemistry technologies, the company also provides advanced catalysis R&D services and systems to customers in the refinery and chemical industries. Avantium works in partnership with like-minded companies around the globe to create revolutionary renewable chemistry solutions from invention to commercial scale.

Avantium's shares are listed on Euronext Amsterdam and Euronext Brussels (symbol: AVTX). Avantium is included in the Euronext Amsterdam SmallCap Index (AScX). Its offices and headquarters are in Amsterdam, the Netherlands.

### Forward-looking information / disclaimer

This press release may include forward-looking statements. Other than reported financial results and historical information, all statements included in this press release, including, without limitation, those regarding our financial position, business strategy and management plans and objectives for future operations, are forward-looking statements. These forward-looking statements are based on our current expectations and projections about future events and are subject to risks and uncertainties that could cause actual results to differ materially from those expressed in the forward-looking statements. Many of these risks and uncertainties relate to factors that are beyond Avantium's ability to control or estimate precisely, such as future market conditions, the behavior of other market participants and the actions of governmental regulators. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date of this press release and are subject to change without notice. Other than as required by applicable law or the applicable rules of any exchange on which our securities may be traded, we have no intention or obligation to update forward-looking statements.

### For more information:

Caroline van Reedt Dortland, Director Communications, Avantium  
+31-20-5860110 / +31-613400179,  
[caroline.vanreedt-dortland@avantium.com](mailto:caroline.vanreedt-dortland@avantium.com)

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<sup>i</sup> Avantium and Cosun Beet Company have a long established relationship. Avantium currently uses Cosun Beet Company's beet sugar as renewable feedstock for the production of plantMEG<sup>™</sup> and plantMPG<sup>™</sup> in its demonstration plant in Delfzijl. The companies entered into a Term Sheet to establish a joint venture to construct a first commercial plant to produce plantMEG<sup>™</sup> and plantMPG<sup>™</sup> using the Ray Technology<sup>™</sup> of Avantium. The Term Sheet includes key terms for the joint venture to acquire a Ray Technology<sup>™</sup> license from Avantium, as well as the key terms for a long-term sugar supply agreement with Cosun Beet Company to secure the feedstock for the commercial plant.

<sup>ii</sup> The life cycle impacts of plantMEG<sup>™</sup> are sensitive to assumptions around energy sources. Given a scenario using the national electricity grid mix, grey hydrogen based on natural gas and thermal energy from bio-mass for the Ray Technology<sup>™</sup> production, significant changes to total results compared to the base case results occur for climate change, primary energy demand, particulate matter, marine eutrophication, water and land use.

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<sup>iii</sup> CO<sub>2</sub> equivalent, or carbon dioxide equivalent, is a standard unit that is used to standardise the climate effects of various greenhouse gases. The equivalent expresses the amount of greenhouse gas contributing to global warming, using an equivalent concentration of CO<sub>2</sub>.

<sup>iv</sup> Carbon sequestration is the storage of carbon in plants. All plants absorb CO<sub>2</sub> during growth. When the plant (e.g. a sugar beet) is used to make a biobased product (e.g. plantMEG™), this biogenic carbon is temporarily stored in this product. At the product's end of life (i.e. when it can no longer be recycled and the product gets incinerated), the carbon re-enters the natural carbon cycle, thereby closing the carbon cycle.

<sup>v</sup> European Commission – Joint Research Centre – Institute for Environment and Sustainability. (2010). International Reference Life Cycle Data System (ILCD) Handbook - General guide for Life Cycle Assessment - Detailed Guidance. Luxembourg: Publications Office of the European Union.