Annual Report 2019

Contact

If you have any questions
or remarks regarding this report,
we invite you to contact us.

Avantium NV
P.O. Box 2915
1000 CX Amsterdam
The Netherlands

Tel. +31 20 586 8080
E-mail investorrelations@avantium.com
Website www.avantium.com

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Message from the CEO

Dear Stakeholder,

2019 was in many ways a pivotal year for Avantium. Though it marked the end of our PEF joint venture with BASF, the year also saw us focus further on our commitment to becoming a leader in sustainable chemistry.

By acquiring 100% ownership of the Synvina joint venture with BASF – now Avantium Renewable Polymers – we regained full control over decisions relating to the commercialisation of PEF and YXY Technology®, the proprietary plants-to-plastics technology developed by Avantium. We are now focused on leading the commercialisation of our technology and maximising the opportunities for shareholder value creation.

We are making rapid progress on the implementation of our strategy for Avantium Renewable Polymers. In June we presented plans to build a new commercial flagship plant to produce 5 kilotonnes of FDCA – a key component in PEF and other plastic products – by 2023. We have secured €25 million in EU funding under the PEFerence Consortium and €30 million financing by a regional consortium, comprising the Province of Groningen and regional investment funds. We will only make a binding decision to proceed with building the new plant once we have all the necessary financing in place, currently anticipated at the end of 2020.

Increasingly, brand owners and manufacturers are seeking to reduce and remove fossil carbon from their supply chains. By demonstrating the superior properties and the feasibility of manufacturing and recycling FDCA and PEF at scale, we expect to be able to present a compelling solution to their needs. Our message has been well-received in the markets so far. As an example, in October, we joined the Paper Bottle Project, a collaboration with industry leaders such as Carlsberg, Coca-Cola Europe and L'Oréal to produce a 100% plant-based, recyclable bottle with all the barrier properties needed for carbonated drinks and other products.

Our Renewable Chemistries business continues to show promise. This year, we launched Ray Technology™ (formerly known as the Mekong project) to produce plant-based mono-ethylene glycol (MEG), and opened a demonstration facility in Delfzijl, the Netherlands, enabling us to optimise the technology and validate applications with our partners. MEG is a vital component for making everyday consumer goods including PET, PEF, and polyester textiles. Over 99% of MEG is currently produced from fossil resources and the predicted market growth is substantial. This presents us with a great potential opportunity to introduce plant-based MEG, further supporting the transition to a fully sustainable chemical industry.

Dawn Technology™ produces industrial sugars and lignin from forestry residuals, and we completed our first full year of pilot operations in our biorefinery in Delfzijl. We are in early-stage discussions with partners who may be interested in licensing the Dawn Technology™ as a route to supplying feedstocks for the future chemical industry.

Our Volta technology is a platform technology which uses electrochemistry to convert CO_2 to higher value chemicals and building blocks. We have scaled up from laboratory to pre-pilot installations as demonstrated by the opening of an integrated pre-pilot test unit in the Port of Amsterdam this year.

Avantium Catalysis, our catalysis testing and R&D services arm, continues to contribute well to the business, with revenue growth of 15% in 2019, including the renewal of our partnership with Shell for another four years. 2019 was also a record-breaking year for sales of our well-regarded Flowrence® catalysis testing systems, with promising growth in Asia.

As Avantium enters the next chapter in the execution of its strategy to commercialise our renewable chemistry technologies, we have further developed our organisation to increase efficiency, cost control and strategic focus. We have also expanded our talent pool and acquired additional expertise over the past year. These organisational changes have already enhanced our results-oriented company and culture.

Finally, 2019 saw us re-affirm our commitment to a fossil-free world. We carried out a review of our corporate sustainability performance and identified eight sustainability rules that place our commitment to a fossil-free world at the heart of everything we do. We also continue Life Cycle Analysis for each of our technologies to better understand their footprint and competitiveness versus fossil-based alternatives. These initiatives galvanise our team, develop a shared sense of purpose, and help us build an evidence-based dossier supporting the environmental and performance superiority of our technologies.

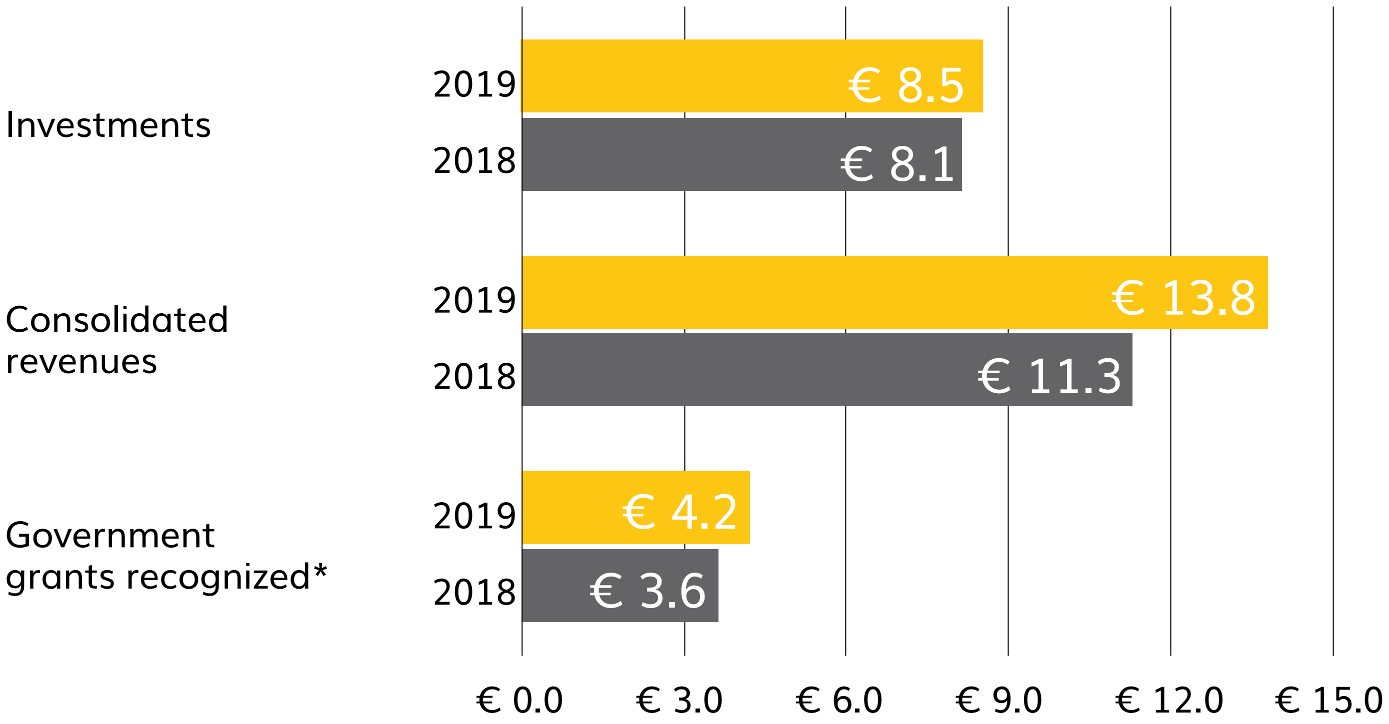
We are proud of the progress we have made in 2019. This has been made possible by the creativity, determination and passion of our employees and the ongoing confidence and support of all our stakeholders

Tom van Aken
Chief Executive Officer

Company highlights 2019

Number of safety accidents	Newly granted patents	Newly reported inventions
1	31	87
2018: 0	2018: 15	2018: 110

Number of FTEs	Nationalities employed	Number of government grant projects
209	19	27
2018: 169	2018: 17	2018: 23



* Excluding WBSO

in million

Management Board Report

1. The world around us and our response

The world around us

Last year, news on the climate crisis and the impact of human behaviour on the environment dominated front pages around the world – from David Attenborough's pleas and the Extinction Rebellion movement, to dramatic weather conditions resulting in dramatic floods and devastating fires. The awareness of the public, governments and companies about the direct relationship between carbon emissions and global warming has never been higher. In 2015, signatories to the Paris Climate Agreement agreed that global warming should be limited to less than two degrees Celsius above pre-industrial levels, with the aim to limit global warming to 1.5 degrees Celsius. At the United Nations Climate Change Conference (COP24) in Katowice, Poland, held in December 2018, 200 countries agreed on rules to implement the Paris Agreement, which will come into force in 2020. It is the rulebook on how governments will measure, and report on their emissions-cutting efforts.

2019 was an eventful year for youth activities in the face of climate change. The powerful speech of Greta Thunberg at the 2018 COP24 Conference spurred thousands of young people to join school strikes and marches to demand accountability and urge governments to take the threats of climate change seriously. TIME Magazine named Greta Thunberg Person of the Year in 2019.

From campaigns against microplastics, to news of the great Pacific garbage patch, public awareness is also growing about the effects plastic has on the world's ecosystems. Consumers are asking for circular alternatives to conventional plastics. Moreover, they are becoming more aware of how plastics contribute to CO_2 emissions, as plastics production draws on fossil feedstocks, leading to a significant carbon impact. Sourcing virgin feedstock from renewable sources – from biomass or CO_2 – helps to reduce the carbon footprint of plastics.

Governments and companies are increasingly setting targets for plastics use. In 2018, the EU launched its 'European Strategy for Plastics in a Circular Economy', while in the United Kingdom, the Netherlands, and elsewhere, so-called 'Plastic Pacts' were struck between companies and governments.

Citizens around the globe are becoming more aware of the need to change their daily habits in order to have a more positive effect on the environment. This is prompting consumers to seek alternatives to conventional, fossil-based plastic materials and packaging. Consumers seem willing to pay a little more for sustainable and circular alternatives.

Now that climate change has become one of the pressing issues of this generation, the problem of plastic waste has grown in prominence, and consumers are more aware of the impact of their own behaviour, the drivers for change have only become stronger in 2019. Change is required in the feedstocks and materials we produce and use. This can be done by shifting to renewable carbon sources and using materials that are recyclable and can degrade when they would end up in the environment.

Considering this imperative to change, the opportunities for Avantium are substantial. Avantium's new polymer PEF scores on (i) performance; (ii) the reduction of CO_2 emissions and mitigation of climate change (since it is made from renewable feedstock); and (iii) circularity; PEF is 100% suitable for recycling and initial results from tests show that PEF biodegrades in about one year under industrial composting conditions. Avantium's Dawn Technology converts forestry and agricultural residuals into industrial sugars for the chemical industry; Avantium's Ray Technology produces one of the largest building blocks for polyesters (mono-ethylene glycol) from a plant-based source; and Avantium's Volta technology converts CO_2 into high-value chemicals, building blocks and fuels. Together, these technologies have considerable economic opportunity and could have significant positive environmental impacts.

The biggest challenge for Avantium is market adoption, as price points need to cover both the initial capital investments and production. Weighing investing in a new plant is difficult when the reference point is an established fossil-based plastics industry that is commoditised and produces at enormous scale. Consumers can drive the transition by considering sustainability in their buying behaviour. This drives retailers and brand owners to adopt fossil-free and circular products. Governments play a role too, as they put a price on carbon and can mandate the use of sustainable products, while incentivising innovative companies, such as Avantium, to come to the market with more sustainable solutions.

Avantium anticipates more market traction for plant-based plastics. There is growing demand worldwide for innovative and sustainable technologies to help alleviate serious environmental problems such as climate change and plastic waste. Consumers are becoming more conscious of the sustainability of products and production methods and have become more vocal in demanding accountability from manufacturers and brand owners. The chemical industry is required to accelerate the transition to renewable feedstock and sustainable processes, and to adopt new process technologies to produce chemicals and materials based on renewable resources. Avantium is very well positioned to take the leading role in this transition to a renewable and circular chemical industry.

Our strategy

In 2019, we sharpened our vision, mission and strategy.

Vision

We believe in a fossil-free world. Let's go.

Mission

We create disruptive technologies across entire value chains, bringing them to the world with partners to accelerate the transition towards more sustainable products.
We foster a safe and vibrant place to make an impact.

Strategy

It is our goal to become a world leader in developing renewable and sustainable chemistry technology solutions. Avantium has an extensive portfolio of renewable technologies focused on plant-based polyesters developed under the leadership of Chief Technology Officer Gert-Jan Gruter. These programmes are subject to stringent development criteria with the application of the company's expertise in the fields of catalysis and advanced chemistry. Avantium continuously assesses the best possible options for an innovation and has multiple strategic routes to monetise our technologies. This includes (i) licensing the innovative technologies to third parties; (ii) applying them in our production plants or via partnership structures or joint ventures; (iii) divestiture to a suitable party; or (iv) shelving the technology until a better opportunity for the innovation arises. We aim to do this by minimising risks and transforming our limited capital into value and positive impact. The way we manage, plan and allocate our limited capital resources must best serve all stakeholders and enable us to fulfil our obligations. Our Catalysis business enables its customers to invent new catalysts, which contributes to sustainability, but also synergistically provides the R&D technologies and methodologies that support our proprietary programmes.

Our four strategic pillars are centred around our mission:

Create disruptive technologies

We aim to build a continuous pipeline of proprietary disruptive technologies, with a focus on the polyester value chain, and bring them to commercial scale.

With partners

We develop innovative renewable chemistry technologies to produce chemicals and materials based on renewable feedstock. We bring technologies to market in collaboration with like-minded partners across the value chain. Partner selection and engagement is a top priority as we know our success will come by working together with others.

Renewable and circular products

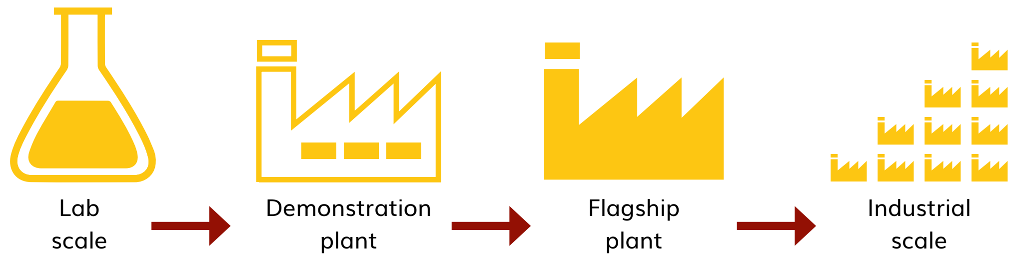
We select opportunities that have the potential to be game-changers in the circular economy.

A safe and vibrant place to make an impact

We embed our safety culture in everything we do, striving for zero accidents and incidents annually. We attract talent from all over the world and create a workplace where people are inspired and inspire others to develop and implement the new technologies for tomorrow's circular economy.

Innovation process

Avantium's innovation process consists of well-defined stages. In the ideation stage, our chemists and engineers can share and discuss new developments in a safe and stimulating environment. Ideas are evaluated based on a model of 19 criteria that assesses the likelihood of technical and commercial success as well as the strategic fit to the company. The ideas with the highest scores progress to the feasibility stage. In this stage, we conduct 'proof of concept' laboratory experiments. We perform a pre-market analysis and seek external validation. We describe the best ideas identified during the ideation and feasibility stages in internal 'invention disclosures' to ensure they are recorded and therefore available to colleagues and further development at a later stage. A small selection of projects will progress from the feasibility stage to the development stage. In this stage, we write a preliminary business case as well as a budget and operational plan for the new technology. During the development stage, we also identify partners with whom we could take the technology further into the pilot stage. Based on an elaborate project plan, a steering committee consisting of the Management Team decides if a new technology advances to the pilot stage or if other options for the new technology are possible. In the pilot stage, a pilot plant design is developed. Given the financial investment required, our Supervisory Board approves the recommendation by Management to build the pilot plant. The new proprietary technology is then tested and demonstrated at the pilot plant. The objective of a pilot plant is to scale up the novel technology from laboratory to demonstration size, to further optimise the technology and to validate applications. Following successful piloting and optimising the technology and operational processes, we proceed to the flagship plant stage, where we begin production at commercial scale. From the flagship plant, Avantium will license the technology to other companies interested in industrial scale production.



Our intellectual capital

Through the process, we log inventions, validate novelty, write invention disclosures and patents that protect the innovations we create. Below is an overview of current patents and patent applications, including our invention disclosures.

IP Portfolios	Business unit	Current number of patent families* (incl. newly filed patent applications)	Newly filed** patent applications in 2019	Newly granted** patents in 2019 in Europe (EPO) or US	Newly reported inventions in 2019 ***
Renewable Polymers	YXY Technology	57	6	14	20
Renewable Chemistry	Ray Technology	10	1	5	14
Renewable Chemistry	Dawn Technology	13	5	3	15
Renewable Chemistry	Volta technology (including former Liquid Light patent families)	34	2	5	11
	Catalysis	10	2	2	16
Corporate Technology	Early stage	21		2	11
	Total	145	16	31	87

* A patent family is a collection of several national and/or regional patents and/or patent applications covering the same invention.
** A patent application is a request pending at a patent office for the grant of a patent for an invention. Once the patent application complies with the laws of the country or region concerned, a patent may be granted for the invention.
*** Newly reported inventions may mature into a publication, patent application or may be kept as a trade secret.

How we create value

We create value for all our stakeholders by working towards our mission to transition the chemical industry to renewable feedstock instead of fossil-based resources and to help our customers and partners embrace the essential technologies of the future. Our purpose is to deliver value to all our stakeholders- and includes being a responsible business in how we collaborate with our partners and serve our customers, creating value for our people and society at large, and driving shareholder value by commercialising our innovative technologies.

Our people

Our people and our culture are our biggest competitive advantage. We foster a safe and vibrant workplace, where our team members can thrive and contribute to our mission to help build a fossil-free world. We strive to be a magnet for the best people, and we employ skilled and talented individuals from diverse backgrounds. We reward our employees with competitive benefit packages.

Our customers and partners

An integral part of Avantium's strategy and commercialisation roadmap has been the close involvement of strong partners throughout the entire value chain. Collaboration is fundamental to how we work with our customers and partners. We work together with like-minded companies who share our values to build a better world for future generations. We bring our technologies to market in collaboration with partners who complement our skills and knowledge and increase our chances of achieving success for our stakeholders. We develop innovative solutions that deliver sustainability benefits to customers and beyond.

Our shareholders

We create value for our shareholders by commercialising our innovative technologies through partnering, licensing or divestiture to a suitable party. The way we manage, plan and allocate our limited capital resources must best serve all our stakeholders, including our shareholders, and enable us to fulfil our obligations to them. We also create value for our stakeholders by developing, exploiting and trading in patents, trademarks, know-how and other industrial property rights.

Avantium in society

We engage with various stakeholders to ensure close alignment between our aims and societal needs. We generate value for stakeholders outside our direct value chains of employees, partners, customers and shareholders; these include governments, local communities, (high school) students and civil society.

Avantium uses its scientific expertise to excite the next generation about sustainability and renewable chemistry. Several Ph.D. students are working on their theses at Avantium, whilst contributing to the development of our technologies. Furthermore, Avantium has hosted multiple programmes and lab tours for children and high school students to teach them how renewable chemistry can contribute to a more sustainable future.

Commitment to the UN Sustainable Development Goals

Sustainability is at the very heart of Avantium. Every technology we develop affirms our commitment to helping create a fossil-free future for the planet. We commit to make a positive impact by working towards the United Nations Sustainable Development Goals, particularly the goal to fight climate change (SDG 13 – 'Climate Action') and to promote responsible consumption and production (SDG 12). By introducing innovative and sustainable manufacturing processes we also contribute to SDG 9 – 'Industry, Innovation and Infrastructure' and SDG 8 – 'Decent Work and Economic Growth'.

COVID-19

Recently, we see increased uncertainties following the COVID-19 worldwide outbreak and market volatility. We have no indication whether the governmental measures will have an effect in preventing a further spread around the world. In the event of a prolonged pandemic there may be an effect on the financial performance of the Company, and its ability to attract partnerships and funding for the commercialization of its technologies in RNP and RNC.

The short-term impact of the COVID-19 outbreak so far is limited. The group has taken measures to ensure our employees and partners continue to be safe while interacting together. Measures have been taken to minimise the impact of the pandemic and to continue operations in all our businesses.

2. This is Avantium

Avantium, headquartered in Amsterdam, The Netherlands, is a pioneer in the emerging industry of renewable and sustainable chemistry. We call ourselves a serial technology developer. We seek to take part in the opportunities for the transition towards a circular economy. It is our goal to develop leading technologies by creating and commercialising sustainable chemistry technology solutions, unlocking value for our stakeholders and the society as a whole. It is our mission to accelerate the transition to a fossil-free world by developing ground-breaking chemicals and materials on the basis of renewable feedstock instead of fossil resources. Sustainable alternatives for fossil-based chemicals and materials include plastic bottles for drinks, films for food packaging and electronics, fibres for textiles and even materials used in toys. We bring these technologies to the market in collaboration with like-minded partners who complement our skills and knowledge and increase our chances of achieving success for our stakeholders. In addition to and underpinning our renewable chemistry business, we also provide advanced catalysis products and services to chemical, refinery and energy companies, universities and research institutes who desire to gain efficiency in their processes.

Business units

Avantium consists of three business units in 2019: Avantium Renewable Polymers, Avantium Renewable Chemistries and Avantium Catalysis.

Avantium Renewable Polymers – Changing the nature of plastics

Avantium Renewable Polymers (formally known as Synvina) aims to commercialise our YXY plants-to-plastics Technology. This technology catalytically converts plant-based sugars into FDCA (furandicarboxylic acid) and materials such as the new plant-based packaging material PEF (polyethylene furanoate). Avantium's PEF is a 100% plant-based, 100% recyclable plastic with superior performance properties compared to today's widely used petroleum-based packaging materials.

In January 2019, Avantium acquired full ownership of our technology to produce FDCA and PEF through the purchase of BASF's shares in the Synvina joint venture, bringing Avantium's 49% stake to 100%. Synvina became a business unit of Avantium, alongside the Catalysis and Renewable Chemistries business units. Avantium appointed a new team to the business unit with a mandate to lead the commercialisation of YXY Technology. In June 2019, Synvina was renamed Avantium Renewable Polymers.

Avantium Renewable Chemistries - Ground-breaking technologies for a sustainable carbon future

Most of the materials and chemicals used in modern daily life – such as plastics, packaging, furniture, clothing and pharmaceuticals – are carbon-based, and as such, derived from petroleum. Changing this paradigm is an ambitious goal but also a promise for a better future. This is why Avantium Renewable Chemistries works on developing practical solutions to accelerate the transition to a fossil-free world. We do this by looking for carbon sources above the ground. This includes plant-based as well as air-based sources such as carbon dioxide (CO_2) that we use as raw material for creating innovative technologies that produce chemicals and other materials to accelerate the transition to a low carbon future.

Avantium Renewable Chemistries has three lead programmes. The first is called Ray Technology and catalytically converts industrial sugars to plant-based MEG (mono-ethylene glycol). Avantium is scaling up its Ray Technology and the demonstration plant in Delfzijl, the Netherlands opened on November 7, 2019. The second programme is Dawn Technology 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 pilot biorefinery in Delfzijl, the Netherlands. In addition to our technologies using plant-based carbon sources, with our third programme called Volta Technology, we aspire to develop materials using CO_2 as a feedstock, and electro-catalysis as the conversion technology.

Avantium Catalysis – Tomorrow's Catalysis Today
Avantium's Catalysis business provides advanced catalysis R&D Services, R&D Systems and Refinery Catalyst Testing. A catalyst is a substance that will increase the rate of a chemical reaction. As such, catalysts are essential to making a wide variety of chemical processes industrially and commercially viable, and more efficient. They are a crucial part of the chemical industry. Catalysts in general play an enormous role in limiting the environmental harm of the (petro-)chemical industry. Avantium Catalysis supports our customers in their transition to a more sustainable business. Through our R&D Services business, Avantium Catalysis supports companies in reaching their sustainability, profitability and growth targets by providing customised catalyst testing and catalysis research expertise, working from our R&D facilities in Amsterdam. In this way, Avantium has enabled our customers to make numerous catalyst inventions and develop innovative and improved chemical processes.

Avantium's Systems business supplies tailored advanced catalyst R&D systems to customers' R&D laboratories. Avantium's proprietary platform, Flowrence, offers customers scalable catalyst testing technology, which provides fast, low-cost and safe high-throughput catalyst testing capability with high accuracy and ease of use. It allows customers to reduce time-to-market and save substantial costs when developing new catalysts, or while optimising existing chemical processes. Helping them to progress swiftly through the R&D stages of early discovery, research, process optimisation and commercial evaluation, Avantium Catalysis offers customers four tailored high-throughput catalyst testing systems, each configured to specific R&D needs. These are our Flowrence XD, Flowrence XR, Flowrence XP and Flowrence XC systems. Introduced in 2017, the Flowrence XD provides catalyst testing geared to the early discovery stage, when our customers need to find out which catalyst works for their chemical process. Our Flowrence XR system enables research into optimising the catalysts. Flowrence XP and Flowrence XC provide testing of catalysts in the process development and commercialisation stages respectively.

The Refinery Catalyst Testing business selects the best commercial catalyst for the customer applications. Choosing the best catalyst is of crucial importance to the profitability of refineries, as it represents a great opportunity to increase margins. Avantium Catalysis is committed to providing customers meaningful results to enable fact-based decisions and ultimately increase their competitiveness and profitability.

Avantium Catalysis has developed a strong, international customer base including several industry leaders. Avantium's long established knowledge of catalysis has allowed our Renewable Chemistries and Renewable Polymers business to benefit from the expertise and experience that Avantium has built up through the execution of more than 100 catalytic development projects. Additionally, Avantium Catalysis high-tech infrastructure enables the parallel testing of catalysts and process conditions, providing business functions that serve as a learning organisation for Avantium. Avantium Catalysis is the foundation that enables the development of novel proprietary technologies.

Our Catalysis technology is protected by a portfolio of 10 patent families.

Our technologies and patents

Avantium has a portfolio of innovative technology programmes within the polyester value chain focusing on the conversion of biomass to chemical building blocks and green materials like plastics. The programmes are complementary and can be highly integrated while not dependent on each other, or on other technology programmes. The technologies build on the company's extensive experience and expertise in catalysis R&D, process technology, chemical process design and pilot-scale operations.

YXY Technology

Avantium has developed the proprietary YXY Technology to catalytically convert plant-based sugars into FDCA, a key building block of PEF. The PEF polymer itself has been known about for a long time but has never been produced at large scale or applied commercially as there were no economically viable production routes to manufacture the key monomer FDCA. Currently, Avantium is working on new methods of producing FDCA, which will enable PEF to become a new widespread polymer for the future.

In 2011, Avantium was the first company to build a FDCA pilot plant. This plant has enabled Avantium to produce FDCA and PEF, further developing our YXY Technology, enabling testing to improve the economics of the process and to strengthen our engineering features in preparation for scale-up to commercial and industrial scale. In June 2019, Avantium announced its intent to build a flagship plant with a planned annual capacity of 5 kilotonnes of FDCA (built, owned and operated by Avantium) and 5 kilotonnes of PEF (produced in collaboration with other commercial partners). Engineering company Worley (formerly known as Jacobs Engineering) has started detailed pre-engineering studies for the FDCA flagship plant, which is slated for a 2023 start-up.

Avantium has conducted an initial Global Warming Potential (GWP) evaluation of the YXY Technology process in collaboration with the Copernicus Institute at the University of Utrecht (Eerhart et al. 2012). The German-based nova-Institut is currently performing a broader Life Cycle Analysis (LCA), taking into consideration various PEF based applications and additional sustainability denominators.

Avantium's YXY Technology is protected by a portfolio of 57 patent families.

Performance
The YXY Technology 100% plant-based lead application, PEF, is a polymer which outperforms today's widely used packaging plastics, such as PET. PEF has superior barrier properties resulting in longer-lasting carbonated drinks and extended shelf life of packaged products. It makes certain coatings required to enhance the barrier performance of PET redundant. Secondly, PEF is 100% recyclable and therewith outperforms coated and multilayer plastics, which in many cases cannot be recycled. Thirdly, in terms of thermal properties, PEF is considered more attractive than PET due to its superior ability to withstand heat and its ability to be processed at lower temperatures.

Superior barrier properties:
- PEF's oxygen barrier is 10 times better than PET
- PEF's carbon dioxide barrier is 6 to 10 times better than PET
- PEF's water barrier is twice as good as PET

More attractive thermal properties:
- The Tg of PEF is 86°C compared to the Tg of PET of 74°C
- The Tm of PEF is 235°C compared to the Tm of PET of 265°C

(Tg – glass transition temperature)
(Tm – melting point)

Furthermore, PEF has enhanced mechanical stiffness and allows for increasing shaping possibilities. In combination with the plant-based feedstock, that added functionality gives PEF all the attributes required to become the next-generation polyester, superior to conventional PET.

End-of-life of PEF
PEF is designed for recycling and reuse, and therefore it fits perfectly in a circular economy. In many countries, recyclability of everyday materials is of prime interest, and industry and government organisations are setting ambitious recycling targets. For example, in the EU, all beverage bottles will need to contain at least 30 % of recycled material by 2030. Obtaining high quality PET waste is essential to achieve those recycling targets but is also notoriously difficult. One of the main challenges is that most polymers used in combination with PET hamper its recyclability. A typical example is a multilayer bottle that uses Polyamide as a barrier layer. The

Polyamide disturbs the output of a mechanical recycling process and induces haze in r-PET. It takes less than 2% of Polyamide in a PET waste stream to cause enough haze to render r-PET unusable (a bottle with 5% polyamide as barrier layer is not considered recyclable). PEF is chemically so similar to PET that it blends well during the recycling process, forming a co-polymer and therefore causing very little disturbance in the resulting r-PET; a PET/PEF mixture will stay almost completely transparent up to 5% PEF. This makes PEF highly suitable for combination with PET without affecting its recyclability. PEF can also be recycled itself using technology used for PET.

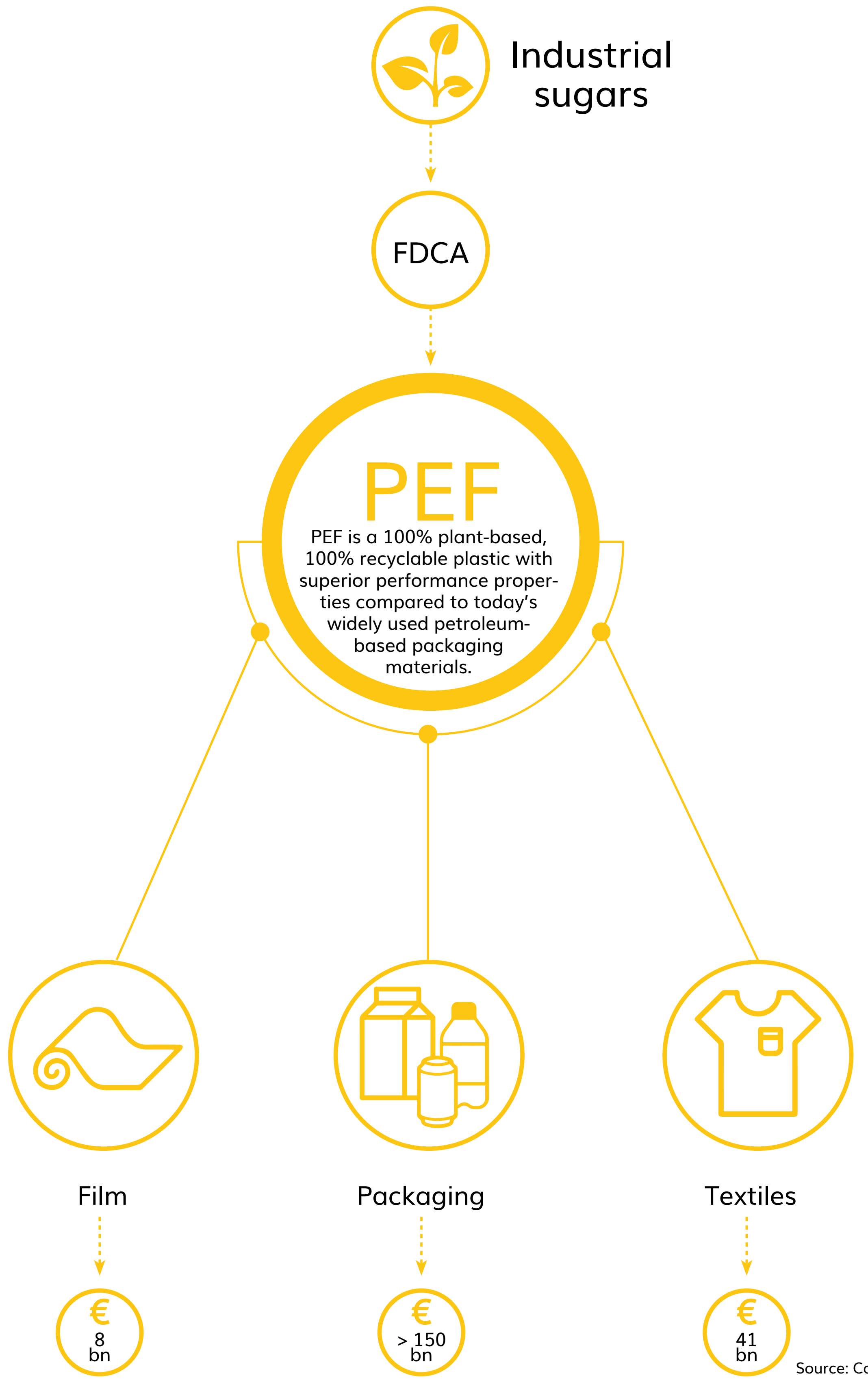
Biodegradation is the breakdown of organic matter by microorganisms, such as bacteria and fungi, to produce carbon dioxide (CO_2) and water. PET is considered to break down in 300-500 years. The first results of tests by OWS (Organic Waste Systems, Gent Belgium) show that PEF degrades much faster than PET under industrial composting conditions (full biodegradation in 250-400 days at 58°C in soil). The biodegradability of PEF in the natural environment (Amsterdam, the Netherlands) is under investigation via a 10-year field trial and we have observed that degradation starts within the first year. PEF biodegradation does not occur during normal use of PEF. Only when a PEF product unintentionally ends up in nature, do the presence of bacteria and fungi will cause it to degrade. How quickly the degradation happens depends on environmental conditions (e.g. moisture (rain), heat, sunlight).

Market potential and applications

PEF has the potential to replace various packaging materials such as PET, glass or aluminium in typical applications like bottles for soft drinks, water, alcoholic beverages and fruit juices. PEF also addresses additional applications in the film and fibre market. Illustratively, the end markets for these packaging materials represent an aggregate annual turnover of over US$200 billion.

Avantium's flagship plant will allow market entry in high-value applications. This includes specialty films that can be used in electronics and displays (LCD/OLED), PEF-enhanced bottles for premium beverages and cosmetics, and plant-based packaging. PEF is ideally suited to compete on performance and command the best price in these applications. As we progress our learning curve and increase scale in the future, PEF will be able to compete in high-volume markets, including bottles for carbonated soft drinks and other beverages.

YXY Technology®



Source: Canadean (2013)

Ray Technology™

Ray Technology
Ray Technology is Avantium's plants-to-glycols technology producing plant-based monoethylene glycol (MEG), a fossil-free core component for everyday products such as textiles or plastic materials like PET and PEF. MEG is a key ingredient in products such as plastic bottles and clothing.

Today, more than 99% of MEG is produced from petroleum with a market value of about $25 billion. Market demand for MEG is expected to grow from 28 million to 50 million tonnes in the next 15 years, with a compounded annual growth rate (CAGR) of 3.5%, requiring more than a million tonnes of additional MEG per year in the next 15 years. This is equivalent to 30 to 40 full-scale commercial plants around the globe. The combination of growing MEG demand and its strong dependence on fossil resources, provides a great opportunity for the introduction of plant-based MEG.

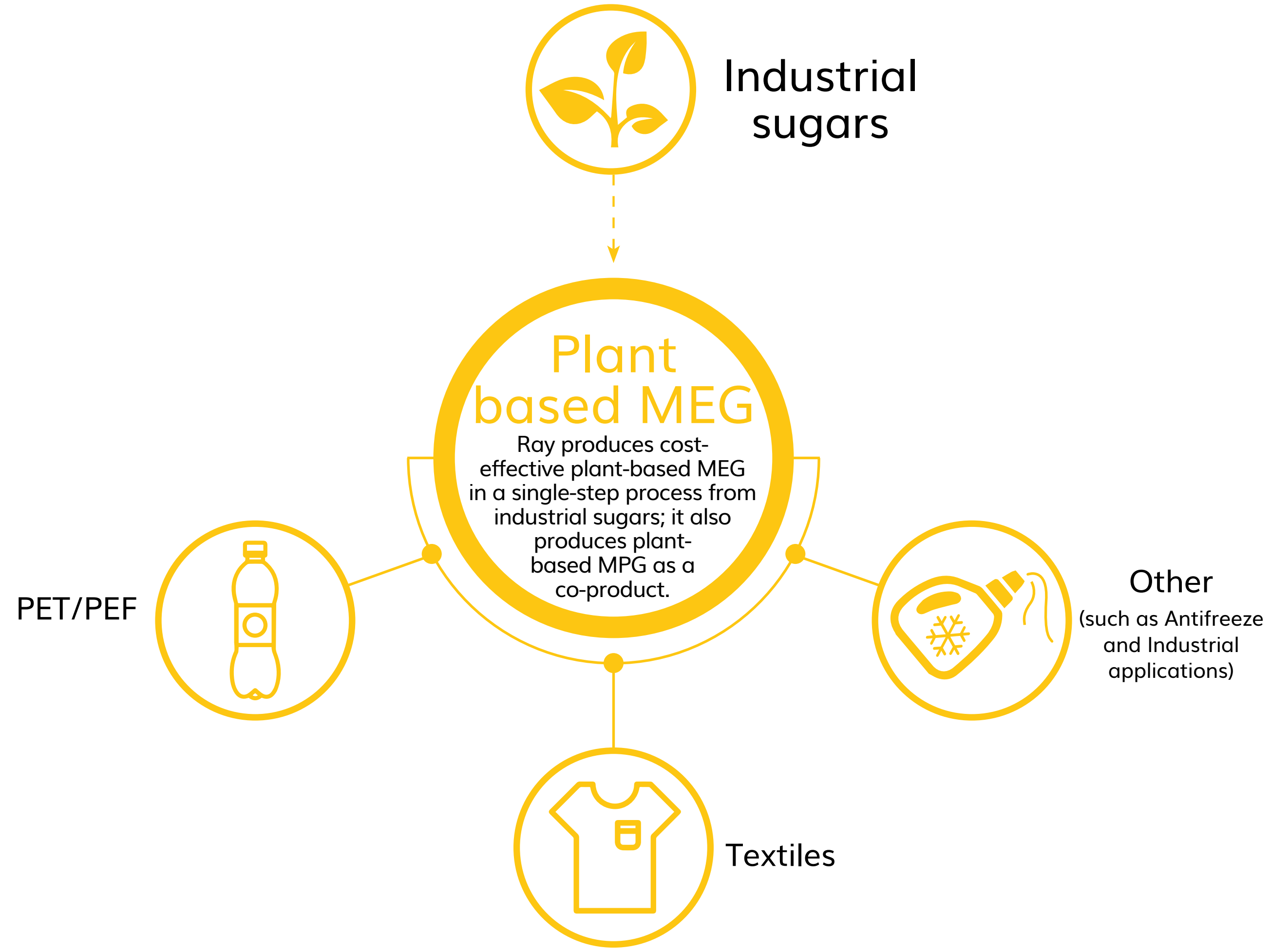
Sustainable and competitive
Internal techno-economics show that the process to produce plant-based MEG by Avantium's Ray Technology produces significantly less CO_2 compared with conventional processes to produce fossil-based MEG. Internal calculations for plant-based MEG show a carbon reduction of around 70% in comparison with fossil-based MEG. These calculations will be validated by an independent Life Cycle Analysis (LCA). Avantium is working with German firm Thinkstep (a Sphera company) to evaluate the sustainability of Ray Technology.

Aside from its advantages in sustainability, Avantium aims to produce plant-based MEG that is chemically identical to petroleum-based MEG and competitive in terms of cost and quality. Avantium's Ray Technology delivers an environmentally sustainable and cost-effective plant-based alternative for fossil MEG, producing it in a single-step process from industrial sugars. It is this direct pathway from sugars to MEG that makes Avantium's plant-based MEG cost-competitive with fossil-based alternatives while, simultaneously, reducing the supply chain's dependence on fossil feedstocks. Avantium will use sugars from various 1st generation feedstocks such as sugar beet, sugar cane, wheat and corn. When available, 2nd generation non-food feedstock such as forestry or agricultural residues can be used.

Scaling up
In November 2019, Avantium opened a demonstration plant in Delfzijl, the Netherlands, with an annual capacity of approximately 10 tonnes of plant-based MEG. The demonstration plant will also produce several tonnes of plant-based mono-propylene glycol (MPG) as a co-product. MPG is used in multiple applications in a variety of industries, such as polyesters, cosmetics, pharmaceuticals, food flavouring and de-icing.

The objective of the demonstration plant is to scale up the technology from laboratory scale to further optimise the technology and validate the product applications. Avantium also plans to collect data to carry out an environmental LCA quantifying the sustainability benefits of Ray Technology. The end-to-end demonstration plant will cover all process steps from sugars to glycols, allowing for the production of MEG and MPG samples that are representative of the final product that could be made commercially. In this way, the demonstration plant could act as a flywheel for commercial developments.

Avantium's Ray Technology is protected by a portfolio of 10 patent families.



Dawn Technology™

Dawn Technology
Dawn Technology is Avantium's biorefinery technology. A biorefinery aims to make the most efficient use of biomass and eliminate waste streams. All biomass constituents are separated into a range of products and the goal is to get the greatest possible value out of these products. This is called cascading.

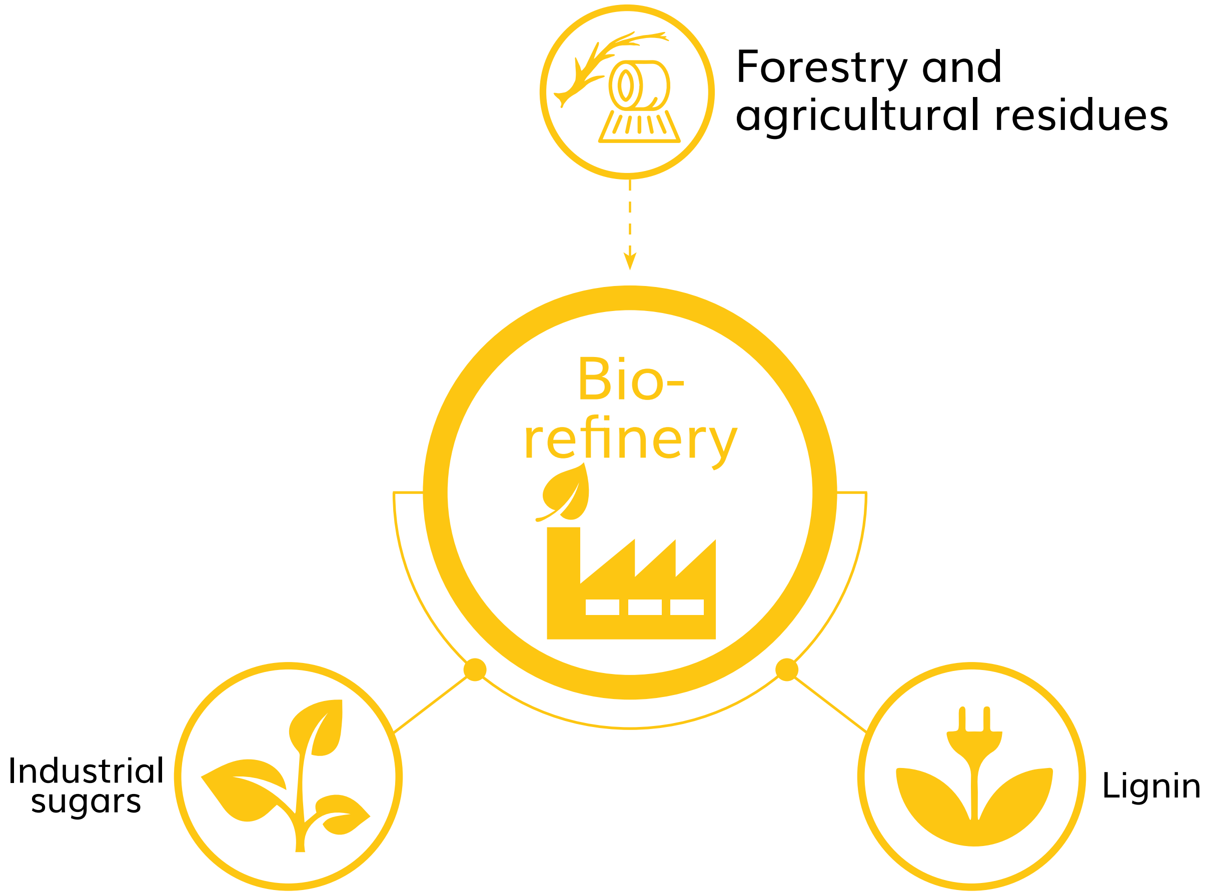
Dawn Technology is an innovative process that converts non-food plant-based feedstock into industrial sugars and lignin. These sugars, such as glucose, are excellent raw materials for chemistry and fermentation processes used to produce a broad range of products. The lignin is dense in energy and ideal for energy generation in addition to other higher value applications. Glucose is a core building block for many industrial products and is increasingly important in the transition towards a bio-based economy. All materials derived from petroleum today (for example bottles, t-shirts and carpets) can be replaced with materials made from glucose. This would reduce reliance on petroleum, mitigate CO_2 emissions and help tackle climate change. Sugars from corn starch and sugar crops represented a US$77 billion market in 2019. These sugars can be used for food, feed and fine chemicals (excluding sugars for bioethanol). Given the anticipated global demand for more materials and chemicals, these products will require non-food industrial sugar sources. The need to develop new feedstock streams and conversion technologies remains high and Dawn Technology is one such technology.

Dawn Technology is an innovative and modern development of an industrial process that has been proven at commercial scale since the 1930s. Avantium has radically improved this process through proprietary inventions. The technology uses acid to selectively separate the sugar streams from the feedstock material (i.e. the agricultural or forestry residues). Avantium's proprietary inventions reduce water consumption by 70% with significantly reduced energy consumption. This not only manages the environmental footprint of the process but also improves the cost profile of the resulting products.

In July 2018, Avantium opened a pilot biorefinery in Delfzijl, the Netherlands, with a maximum capacity of processing 20 tonnes of dry wood chips per year. The objective of the pilot biorefinery is to scale up the technology, validate the economics, and further optimise the technology and application development. Avantium has founded a consortium of partners committed to developing a commercial biorefinery in Delfzijl that will tap into locally available expertise, utilities and infrastructure. The consortium consists of Nouryon, RWE, Staatsbosbeheer and Chemport Europe, each bringing specific expertise and functionality to the biorefinery. This consortium functions as an industrial ecosystem. Avantium aims to license our proprietary Dawn Technology and foresees its global deployment. Potential partners around the world have expressed interest in licensing Dawn Technology for local deployment. These partners aim to add value in the form of industrial sugars to their current available feedstocks. Dawn Technology is feedstock-flexible, allowing future biorefineries to use its own locally sourced non-food biomass. The Delfzijl biorefinery will serve as a demonstration facility for these future biorefineries.

Dawn Technology is complementary to both the YXY Technology and Ray Technology in Avantium's portfolio, as these both begin with the conversion of industrial sugars.

Avantium's Dawn Technology is protected by a portfolio of 13 patent families.



Volta Technology

In addition to our technologies that use plant-based carbon sources, we aspire to develop materials using CO_2 as a feedstock and electro-catalysis as the conversion technology. Avantium's Volta Technology is the leading electro-catalytic platform developing CO_2 utilisation solutions for a circular future. It converts CO_2 to higher value chemicals, building blocks and fuels, by using Gas Diffusion Electrode Technology. The current Volta platform has been developed by bolstering Avantium's existing electro-catalytic know-how with the acquisition of Liquid Light Inc in 2016.

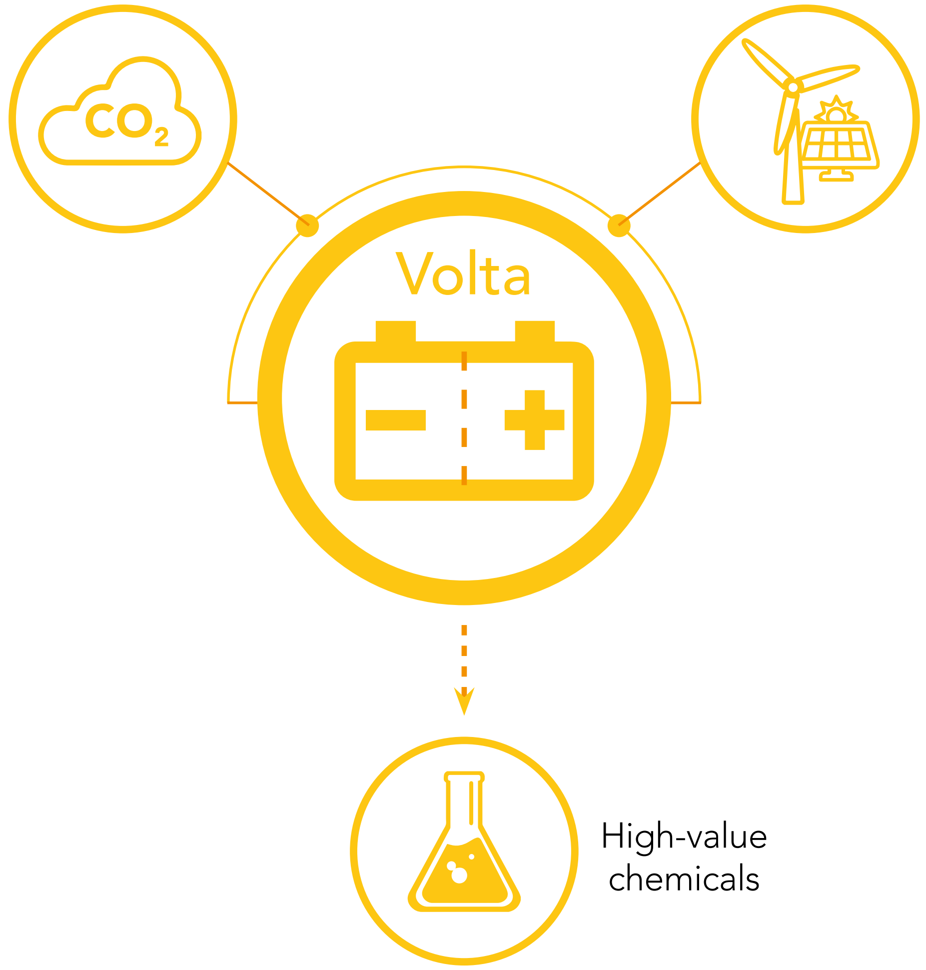
Driven by a global necessity to fight climate change, reduce CO_2 emissions and electrify the chemical industry, our Volta electrochemistry platform enables converting CO_2 into high value chemicals and fuels using renewable electricity. CO_2 is a greenhouse gas that originates as waste from the burning of fossil fuels, and the production of electricity, fertilisers, chemicals, steel and cement. It is the biggest contributor to global warming. The development of electrochemistry has the potential to use CO_2 as a feedstock for the sustainable production of chemicals and materials and is seen as a 'game-changer' for the chemical industry. The result is that greenhouse gas is sequestered into products that can replace plastics and chemicals that are now produced from fossil feedstock. Ultimately, Avantium's Volta Technology provides multiple solutions. Firstly, Volta unlocks a new renewable feedstock for the chemical industry: CO_2. Secondly, Volta enables cleaner chemical processes. Electrons are the cleanest reagents and allow conversions at ambient temperatures and pressures, avoiding waste and enabling high purity products at source. Thirdly, it helps industrial parties to avoid CO_2 emissions, securing their license to operate.

The Volta Technology programme progresses at Avantium's laboratories in the Amsterdam Science Park. The Volta team is currently scaling up from laboratory scale towards pre-pilot installations. Avantium actively participates in industry associations and currently cooperates with over 35 partners in European grant consortia, providing the company with over €5 million in grants. Avantium is a founding member of the industrial association CO_2 Value Europe, where we sit on the board and engage with companies and research institutions that share the belief that carbon capture and utilisation (CCU) technologies are needed for our circular future.

Avantium has a leading IP position in electrochemical CO_2 conversions. Avantium's Volta Technology is protected by a portfolio of 34 patent families.

Volta Technology

Converting CO_2 to high value chemicals via electrochemistry



3. Our performance in 2019

Avantium Renewable Polymers

2019 marks a pivotal year for Avantium. It is a year in which we regained full ownership over our YXY Technology to produce FDCA and PEF and a year in which we also redefined the scale-up and market-launch strategy for FDCA and PEF.

The year started with the termination of our collaboration with BASF and the acquisition of 100% ownership of the Synvina joint venture. The reason for the termination of the joint venture was a difference of opinion between Avantium and BASF about the commercialisation strategy of bringing PEF to the market; it was not related to the technology, product, or market demand. The technology has been proven over the years in our pilot plant in Geleen. The main drivers in the plastics material market remain sustainability and circularity, as well as growing consumer and brand owner demands for environmentally friendly and recyclable materials. This provides a strong market pool for PEF, whose benefits include being 100% plant-based and 100% recyclable.

In January 2019, Avantium regained full ownership of the intellectual property, people and assets for the YXY Technology through the purchase of BASF's shares in the Synvina joint venture. Avantium paid BASF €17.4 million, with the transfer taking place on 25 January 2019. Synvina became a business unit of Avantium, alongside the Catalysis and Renewable Chemistries business units. In June 2019, Synvina was renamed Avantium Renewable Polymers.

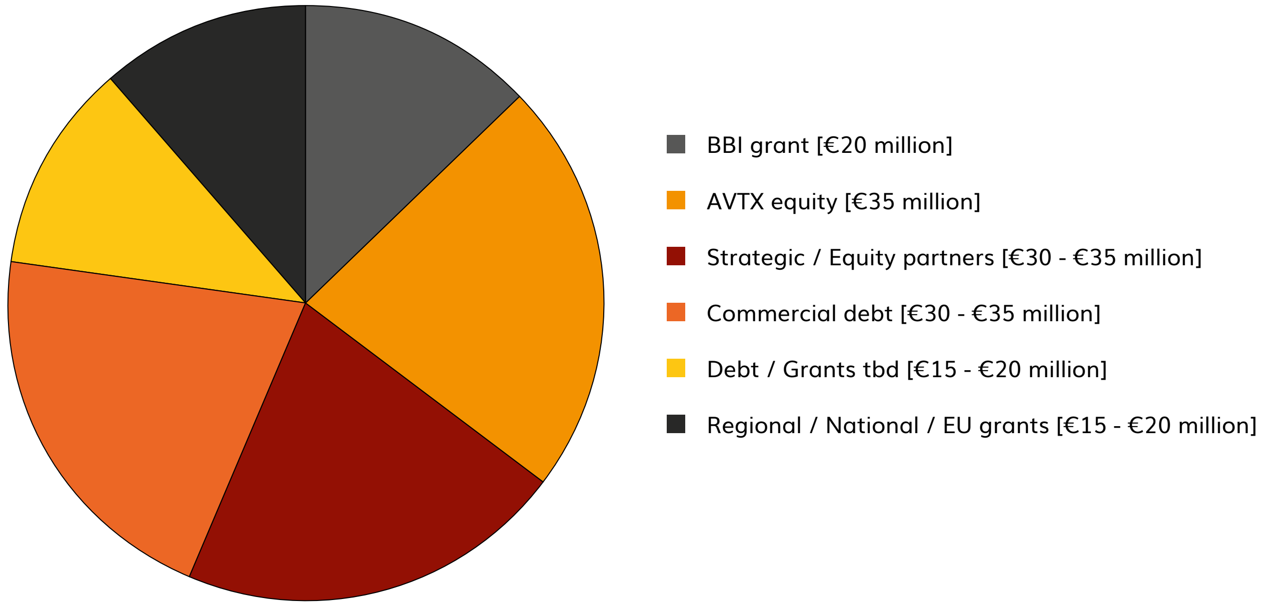
After taking full ownership of the YXY Technology, Avantium explored different scenarios with potential partners and customers to redefine the commercialisation strategy of PEF to meet both market and capital requirements, while maintaining full control of YXY Technology. This led to a revised scale-up and market-launch strategy that we outlined at our Technology & Markets Day for investors and other stakeholders on 6 June 2019.

Avantium intends to build a flagship plant with a planned annual capacity of 5 kilotonnes of FDCA (built, owned and operated by Avantium) and 5 kilotonnes of PEF (produced in partnerships), with a planned startup in 2023. Leading engineering company Worley (formerly known as Jacobs Engineering) has started detailed pre-engineering studies. The plant will produce products for high-value markets and performance applications. This includes specialty films that can be used in electronics and displays (LCD/OLED), PEF-enhanced bottles for premium beverages and cosmetics, and recyclable flexible packaging. PEF is ideally suited to compete on performance and command the best price in these applications. As we progress our learning curve and increase scale in the future, PEF will be able to compete in high-volume markets, including bottles for carbonated soft drinks and other beverages.

Avantium expects to require approximately €150 million (± 20% contingency) for the flagship plant, comprising of CAPEX (ISBL + OSBL), start-up costs, working capital and ongoing Renewable Polymers expenses (2019-2023). Avantium aims to have this financing (national and regional grants, bank loans, own resources and resources from strategic partners) in place before the end of 2020. Avantium intends to make an investment decision for the construction of the flagship plant by the end of 2020.

Over the last year, Avantium reached the first important financing milestones for our plan

Total funding sources FDCA flagship plant



to build a flagship plant to make FDCA and PEF commercially available. In December 2019, the Bio-based Industries Joint Undertaking (BBI JU), an EU body, reconfirmed its award to the PEFerence consortium, coordinated by Avantium, of a €25 million "PEFerence" Horizon 2020 grant. This grant will support the establishment of an innovative value chain for the use of plant-based FDCA and PEF. The PEFerence grant had been originally awarded in 2017 to the PEFerence consortium coordinated by Synvina, the joint venture between Avantium and BASF. After the dissolution of the joint venture in January 2019 and the revised the scale-up and market-launch strategy for PEF, including the planned construction of a 5 kilotonnes FDCA flagship plant, Avantium needed to redefine the PEFerence project with BBI JU and its consortium partners. BBI JU has agreed to the redefined project and has reactivated the grant to the consortium as per 1 December 2019.

In early January 2020, Avantium announced that Avantium Renewable Polymers signed a letter of intent with a regional consortium to locate the 5 kilotonnes flagship plant at Chemie Park Delfzijl, the Netherlands. Avantium and a regional consortium, comprising of the Province of Groningen, Groningen Seaports, NOM (Investment and Development Agency for the Northern Netherlands), FondsNieuweDoen, Investeringsfonds Groningen and Groeifonds, believe the new plant will be an important step in helping transition the chemicals industry away from fossil resources and towards sustainable feedstocks. The regional consortium members and Avantium Renewable Polymers also agreed a letter of intent relating to a conditional financing of €30 million for the engineering and construction of the flagship plant, working capital, start-up costs and operations of Avantium Renewable Polymers. The financing of the regional consortium is subject to the usual conditions, including due diligence and documentation, and formal decisions by Avantium on the construction of the plant and the associated capital expenditure. The definitive financing mix is to be determined in 2020 and is intended to comprise grants, equity and debt.

In 2020, Avantium will focus on progressing discussions with potential strategic partners. Amongst them are both niche users that require PEF's unique features, and premium first movers in larger markets. In its market-launch strategy, Avantium is particularly focused on value chain partnerships: feedstock providers, future licensees, polymer converters and consumer brands.

Our commercialisation initiatives have shown sustained traction in 2019. To accommodate the development and marketing of PEF in high-value applications in the innovative Japanese packaging and electronics market, we have opened our first branch office in Japan to help accelerate business development in the region. Avantium has been active in the Japanese market for several years. Avantium Renewable Polymers has a long-term partnership with the Japanese chemical company Toyobo Co., Ltd. for PEF polymerisation and PEF film. Avantium also collaborates with Mitsui & Co., Ltd. for the market development of PEF in high-value applications and the distribution of PEF to high-end Japanese consumer brands. Japan is generally considered to be the key market for introducing innovative and advanced materials. The establishment of the Avantium Japan branch office will provide local support for Avantium's Japanese customers. Avantium Japan K.K. will serve as the office for regulatory affairs and business development in Japan.

We also signed a partnership with R&F Chemical of South Korea to explore the potential for Avantium products in the Korean market.

In 2019, Avantium partnered with some of the world's largest brands to help shape the sustainable plastic products of tomorrow. In April 2019 Avantium announced the first plant-based pouches using biaxially oriented polyethylene furanoate (BOPEF) film. Avantium jointly developed BOPEF film together with Japan's leading manufacturer Toyobo. The pouches consist of a two-layer laminate of BOPEF and a plant-based polyethylene (PE) sealing layer. The pouches are suitable for dry and liquid products, such as such as cheese & dairy, dry snacks, sauces, and cosmetics. Avantium and Toyobo are continuing to find new features of BOPEF film for various applications.

In October 2019, we affirmed our strategy to develop high-value PEF applications by joining the Paper Bottle Company (Paboco®) - a joint venture between paper packaging material developer BillerudKorsnäs and bottle manufacturing specialist ALPLA. The Paper Bottle Project is an innovation community joining some of the world's leading players in materials, design and technology. In 2015, global brewer Carlsberg Group joined the Paper Bottle Project, followed by leading brands including Coca-Cola Europe, cosmetics manufacturer L'Oréal, spirits firm The Absolut Company and coatings company Teknos. Paboco announced on 11 October 2019 that Avantium has joined the Paper Bottle Project, to be the technology provider for the inner polyester layer of the Paper Bottle. A thin layer of Avantium's PEF will provide the Paper Bottle with the high barrier properties (the ability to withstand gas permeability through the bottle) needed for beverages such as beer and carbonated soft drinks.

It is possible to fully recycle the Paper Bottle by separating the paper and PEF. By separation, each layer becomes a mono-material returned to the recycling stream. Development work of the Paper Bottle with the PEF layer is in progress. The focus will be on building experience with our Pioneer Brands, with a goal to start controlled testing in 2020.

Avantium Renewable Polymers realised revenues of €0.2 million in 2019 from joint development and material transfer agreements.

Avantium Renewable Chemistries

The Renewable Chemistries business unit continues its focus on developing innovative chemistry technologies that utilise renewable sources of carbon (biomass and CO_2) instead of fossil carbon. The technologies enable the production of chemical building blocks and polyester materials. Significant progress has been made in the three lead programmes of Avantium Renewable Chemistries in an effort to accelerate the transition to a fossil-free world.

In 2019, Avantium secured over €9 million of European Union and regional grants for Avantium Renewable Chemistries two lead technologies: Ray Technology and Dawn Technology. Moreover, the revenues from collaboration agreements of our Renewable Chemistries business tripled in 2019 to €1.2 million (FY 2018: €0.4 million).

Ray Technology

Ray Technology is Avantium's proprietary plants-to-glycols technology producing plant-based mono-ethylene glycol (MEG), a fossil-free core component for everyday products such as polyester textiles and film, PET and PEF resins and coolants. This makes it a key ingredient of products such as plastic bottles and clothing.

On 7 November 2019, Avantium inaugurated the demonstration plant for the production of plant-based MEG in Delfzijl, the Netherlands, with an annual capacity of around 10 tonnes plant-MEG. The demonstration plant will also produce several tonnes of plant-based mono-propylene glycol (MPG) as a co-product. MPG is used in multiple applications in a variety of different industries for applications such as polyesters, cosmetics, pharmaceuticals, food flavouring, and de-icing. Avantium additionally announced the naming of this innovative technology: Ray Technology - A Bright Step to The Future.

The opening of this demonstration plant will make possible the research and trials needed to progress towards a commercial flagship plant, aimed for start-up in 2024. Commercial conversations are already ongoing with partners who see economic opportunities with Ray Technology. Avantium is in talks with feedstock providers which wish to diversify their markets, chemical companies who seek to enter a new growth markets and transition to a bio-based economy, and consumer brands looking for plant-based solutions for their textiles and packaging. In 2019, Avantium progressed partnership opportunities to bring Ray Technology to full-scale commercialisation by signing several collaboration agreements with like-minded companies around the globe, who are interested in licensing our technology or supporting the flagship plant.

Avantium has funded the demonstration plant from proceeds of the IPO in March 2017, when we allocated €15-20 million to invest in our most advanced technologies. Approximately half of these funds are being used for Ray Technology. Alongside this important investment decision by Avantium, in 2018 the European Innovation Council awarded Avantium's Ray Technology a grant of approximately €2 million to accelerate the scale-up and commercialisation of innovative business opportunities.

In March 2019, Avantium received an additional €2 million grant, towards constructing the Ray Technology demonstration plant, from the European Regional Development Fund. This is being facilitated by Partnership Northern Netherlands (Samenwerkingsverband Noord-Nederland), and is intended to accelerate innovation in the quest for a low-carbon economy.

In June 2019, Avantium announced that it has been awarded €1.3 million for both Ray Technology and Dawn Technology from the Bio Based Industries Joint Undertaking (BBI JU) under the European Union's Horizon 2020 Research and Innovation Program. This commits Avantium to participate in the VEHICLE consortium, whose members aim to widen the business and market opportunities of existing and future biorefineries by demonstrating the applicability of their sugar streams in several downstream options.

In August 2019, Avantium was awarded €6 million as part of a SPIRE grant to accelerate our Dawn Technology and Ray Technology in addition to utilising our expertise in Catalysis. SPIRE, part of Horizon2020, is the European subsidy programme to facilitate the region's Sustainable Process Industry. Avantium is participating in a four-year research programme, entitled IMPRESS, which aims to demonstrate a new biorefinery concept based on integrating novel processes, like Avantium's Dawn Technology and Ray Technology, for the first time.

Dawn Technology

Avantium's proprietary Dawn Technology produces industrial sugars and lignin from forestry residues in its pilot biorefinery in Delfzijl. These sugars are an excellent raw material for chemistry and fermentation processes to produce a broad range of chemicals and materials. The lignin is energy dense and ideal for energy generation as well as other higher value applications like asphalt. In 2018, Avantium opened a pilot biorefinery for Dawn Technology and we completed our first full year of operations in 2019. With proven technical and economic feasibility, the pilot biorefinery is the prelude to a commercial-scale flagship plant.

Dawn Technology is a feedstock flexible technology which means that future biorefineries can use their own locally sourced non-food biomass like forestry and agricultural residues. Avantium aims to globally deploy the technology via licenses and is in early-stage discussions with partners who may be interested in licensing the Dawn Technology as a route to supplying feedstock for the future chemical industry. In 2019, the Dawn Technology pilot biorefinery ran several feedstock trials for partners.

Avantium is a founding member of a consortium of partners committed to developing a commercial biorefinery in Delfzijl that will tap into locally available expertise, utilities and infrastructure. The consortium comprises of chemistry company Nouryon, energy company RWE (which uses the lignin for energy generation), the Dutch forestry agency Staatsbosbeheer (which provides sustainably sourced woodchips for the plant), and Chemport Europe, a partnership of chemical companies committed to a circular economy. Functioning as an industrial ecosystem, each partner in the consortium brings specific expertise and functionality to the biorefinery. In 2019, we have extended the contract with the consortium to establish the next phase of Dawn Technology.

Volta Technology

Avantium's Volta programme is a platform technology that uses electrochemistry to convert carbon dioxide (CO_2) to higher value products and chemical building blocks. The Volta team is currently scaling up from laboratory to pre-pilot installations. In 2019, we opened a pre-pilot test unit in the Prodock building in the Port of Amsterdam. Here, the first units aim to capture CO_2 from the atmosphere. Avantium's Volta Technology converts this CO_2 into valuable chemicals and eventually applications such as fuels.

Avantium actively participates in industry associations and currently cooperates with over 35 partners in European grant consortia. Additionally, it provides us with over €5 million in grants. An example of such a collaboration is the EU-funded project CELBICON, in which Avantium is converting CO_2, captured directly from air with a unit produced by the Swiss company Climeworks, to syngas.

Avantium Catalysis

Avantium Catalysis provides advanced catalysis testing systems and R&D services. The R&D Services business offers the execution of in-house customised contract research projects. The Systems business comprises of Avantium's unique and advanced Flowrence high-throughput catalyst testing systems, which are tailored to accelerate catalyst screening and to study catalyst deactivation.

The R&D Services business of Avantium Catalysis has developed a strong, international customer base, including several industry leaders. In May 2019, Shell renewed its long-running partnership with Avantium Catalysis for four additional years for the execution of catalyst testing programmes with Avantium's Flowrence technology platform. With this technology platform, Avantium is able to perform parallel high-throughput catalyst testing tailored for the various R&D stages in line with our customer's catalyst development objectives.

To better match customer needs, Avantium decided in June 2019 to significantly expand the capacity to test commercial catalysts for hydrotreating and hydrocracking applica-

tions, by doubling this capacity. The majority of Avantium's in-house reactors are based on our Flowrence technology platform. The expansion of our Refinery Catalyst Testing capacity enables us to better serve the strong demand of customers for independent refinery catalyst testing services, who are looking for easy-to-access catalyst testing facilities to stay competitive.

In 2019, we identified two other business areas to diversify the R&D Services business of Avantium Catalysis: adsorption testing and chemical recycling of plastics. Adsorption is the adhesion of a chemical substance (*adsorbate*) onto the surface of a solid (*adsorbent*). Under the umbrella of the four-year research programme IMPRESS, which aims to demonstrate a new biorefinery concept, Avantium Catalysis is working on the development of new adsorption testing methods, with the construction of two different adsorption test units for separation and purification methods. The IMPRESS project leverages the synergies of Avantium's portfolio of renewable chemistry technologies and Catalysis. We expect that this capability of adsorption testing will also be applicable to broader adsorption issues of our customers. Avantium already signed a collaboration agreement with the French university Ircelyon for adsorption testing.

Another area that is of interest for the R&D Services business of Avantium Catalysis is the field of chemical recycling of plastics. In chemical recycling processes, plastic waste is purified and chemically separated into new, pure chemical building blocks. These, in turn, can be used to manufacture new plastics. When it comes to processing more complex plastics, chemical recycling is the only option. This offers new opportunities for the development of innovative technologies that promote recycling of plastics, including research and development on new materials and additives that facilitate recycling processes, as well as several chemical recycling processes to create value out of the plastic waste. We observe that chemical recycling is an emerging market, as many of our customers are working on chemical recycling to find and optimise new materials and processes. Avantium has supported customers over the last year with the appropriate high-throughput testing solutions, in order to accelerate their R&D in the field of chemical recycling.

In November 2019, Avantium Catalysis and Japan-based catalyst and process licensing company Nikki-Universal entered into an agency agreement to better serve Avantium's customers and boost our business in Japan. Through Nikki-Universal, Avantium expects to generate leads for both our Flowrence units as well as for service projects.

Over the last year, the Systems business of Avantium Catalysis further enhanced its presence in the growing Asian market with the progression of several projects destined for China, new orders in Japan, and the first ever order in South Korea. There is a growing demand for the smaller testing unit Flowrence XD, with record deliveries in 2019 of five Flowrence XD units.

In 2019, we made further efforts to increase the efficiency of our business and to improve our margins. Avantium Catalysis reorganised the business to create more focus and to further increase the quality of our products and services. This has led to Avantium Catalysis recording 15% higher revenues of €12.5 million in 2019 (FY 2018: €10.9 million).

Patents

Last year, 31 patents were newly granted to Avantium, of which 14 patents are related to our YXY Technology to produce FDCA and PEF and five patents are related to our Ray Technology to produce plant-based MEG. More information about current patents and patent applications, as well as our invention disclosures, can be found on page 13.

Avantium announced that it has sold its bio-aromatics patent portfolio to The Netherlands Organisation for Applied Scientific Research, TNO. The sale includes both patents and know-how for technologies that produce bio-derived products for polymers and coatings. These technologies lie outside Avantium's strategic focus and will now be further developed by TNO.

4. People

Our people

We foster a safe and vibrant workplace, where our people can thrive and contribute to our mission to help build a fossil-free world. Our success is built on the ambitions, commitment and expertise of our people. We seek to attract and retain people with diverse backgrounds and talents who can turn our mission and strategy into action. We strive to be an incident- and accident-free organisation.

Safety

As a technology development company working with industrial processes and chemicals, safety is paramount. All Avantium employees are committed to our list of 'Golden Safety Rules' to ensure each employee returns home safely, each and every day. We have long-established procedures and systems in place, however we all know that it requires continuous attention and awareness to ensure that we always operate in a safe manner. We send out regular safety newsletters to all our people to ensure safety awareness and knowledge throughout Avantium is up-to-date. Openness is promoted by our goal to safeguard a no-blame culture. Employees are rewarded for reporting unwanted events.

Safety Golden rules:-

- We are responsible for our own safety, and that of others
- We give and accept feedback, we ask when in doubt
- We learn from our mistakes and those of others
- We take the time to work in a safe way
- We make sure our work area is clean and tidy
- We use the right protective equipment
- We assure immediate containment of unsafe situations
- We report every unsafe situation

Despite our safety efforts, there was one safety accident reported in 2019. An employee bumped its head on a metal rod after an apparatus was removed from the lab. This employee had to stay at home for a week to recover from a head injury. This incident was evaluated, which has led to the introduction of the term "Non-routine work" in the safety instructions. This term encompasses all activities which do not form part of the day-to-day routine and will enable Avantium employees to prepare and execute these activities with more emphasis, leading to an improvement on risk management whereby the number of events will decrease.

Organisation: who we are and what we value

Our team of 220 people are highly motivated to contribute to a sustainable, fossil-free world. We share a common drive in wanting to make a lasting impact on the world. We do this through our imagination, our creativity and perseverance. Innovation is not a linear process, it is characterised by highs and lows. Achieving successful innovations and bringing those innovations to the market requires persistence, flexibility and focus; traits that are core to Avantium's people and culture. We have a highly educated workforce of experts across a wide range of chemistry and engineering. Almost one-third of our people hold a PhD degree, while about two-thirds have a BSc or an MSc.

At Avantium, we have five core values that define what we stand for and how we work with customers and partners.

1. We make a lasting impact
We think big. We understand our customers through and through. We improve the world around us. We drive and thrive on change. We have an impact on the environmental footprint throughout the wider industry.

2. We are determined team players
We embrace challenges. We value complementary talents and diverse perspectives. We actively engage with partners. We work in teams to solve problems. We go the extra mile to deliver results.

3. We do the right things right
We behave ethically. We make bold choices. We take responsibility for our actions. We operate safely.

4. We are pragmatic idealists
We always find a way. We think out of the box – but never lose sight of reality. We keep our feet on the ground. We always sail towards our destination, adjusting course when necessary.

5. We have fun and the rest of the world is a little bit weird
We disrupt. We appreciate unconventional solutions. We celebrate success and learn from setbacks. We view things with a positive eye and an open mind.

Organisation: Emphasis on Focus and Efficiency in 2019
The acquisition of the full ownership of the Synvina joint venture in January 2019, including the intellectual property, people and assets, made it necessary to evaluate the company strategy, including our organisation and operating model. With three business units – Avantium Renewable Polymers, Avantium Renewable Chemistries and Avantium Catalysis – in different business stages, it is necessary to ensure a high degree of focus and efficiency. Avantium is advancing to the next phase of development and commercialisation of our technologies. In 2019, three pilot plants for three different technologies are operational and we are preparing for the construction of the first FDCA flagship plant. This requires capital, partners, management attention and access to the necessary resources and talent to manage this new commercialisation phase of the company.

In line with our strategic goals, it was therefore decided to manage Avantium based on the principles of strategic control and strategic guidance. The Management Team is responsible for setting the strategy (focus on "what") and for providing guidance and input to the business unit's strategies and activities. The Business Unit leadership teams are responsible for the execution of our strategy (focus on the "how"). The leadership teams are responsible for the day-to-day operations of the business unit and manage the key capabilities within the business unit. This means that the three business units operate in a more autonomous manner than before.

In order to get more focus and efficiency, cross-functional departments were set up and teams and activities have been moved from one business unit to the other. Additionally, there have been a few of changes within line management. The organisational review had a limited impact on employees; it could be managed by reducing the number of vacancies and not extending a number of definite contracts. Furthermore, a new position within Avantium was found for most employees directly affected by the organisational review.

As Avantium enters the next chapter of executing our strategy to commercialise our renewable chemical technologies, we also focused on broadening our talent pool in terms of expertise over the last year. We have embarked on a transition from competencies such as innovation and creativity, to skills required for deployment and commercialisation. In 2019, we have started a leadership programme and a project management programme to develop skills of our (project) leaders that support our commercialisation strategy. The organisational adjustments and focus on new skills have enabled Avantium to develop a stronger, results-oriented company and culture.

Organisation: Diversity and inclusivity
We continued to focus on improving our performance in inclusion and diversity. We aspire to be an inclusive and diverse company, with an open and inspiring culture, where people feel safe to develop and share ideas. It is pleasing to see that today, more nationalities than before are represented across our company. At the end of 2019, we employed 19 different nationalities. We also strive for a balanced gender percentage at Management and Supervisory Board level, as well as among their direct reports. Going into 2020, the percentage of women in our Management Team is 29% and in our Supervisory Board 33%, meeting the target of 30% prescribed by Dutch legislation in terms of gender balance.

5. Planet

Sustainability at Avantium
At Avantium, sustainability is built into our very purpose. It drives our employees, informs our technology development and excites our commercial partners. Every technology we develop affirms our commitment to helping create a fossil-free future for the planet.

In 2019, we conducted an analysis of our sustainability performance, resulting in clear principles to govern our sustainability approach. These are our 'Golden Rules', placing our work towards a fossil-free world at the forefront of everything we do.

- We are transparent and clear about our technologies and processes
- We develop our technologies and processes with utmost responsibility to their environmental impact
- We are committed to supply chain integrity and sustainability excellence
- We support progressive partnerships with companies, government agencies, NGOs and academia to develop consistent measurement and make continuous progress
- We engage in regular & meaningful dialogue with our stakeholders
- We support and strive to improve the communities in which we operate and live
- We use our voice to advocate for the systemic transformation needed to tackle the climate breakdown
- We seek to better the world by making a lasting positive impact

In 2020, we will develop and publish a time-bound action plan setting out ambitious 2030 targets across the areas (i) Climate & Nature, (ii) People & Communities, and (iii) Integrity & Governance. This plan will be developed in consultation with our stakeholders.

Managing our carbon footprint
Life Cycle Analysis
We take our global environmental responsibilities very seriously. In support of our ambition to substantially reduce the carbon footprint, we conduct Life Cycle Analyses for our lead technologies.

Life Cycle Analysis (LCA) is fundamental to understanding how Avantium's technologies compete with fossil-based alternatives, as well as the potential sustainability benefits of our technologies. If you consider the source – plants instead of oil -, calculations show that the CO_2 equivalent of our technologies is significantly lower than the CO_2 equivalent of fossil-based alternatives. Avantium has conducted an initial Global Warming Potential (GWP) evaluation of the YXY Technology process in collaboration with the Copernicus Institute at the University of Utrecht (Eerhart et al. 2012). The German-based nova-Institut is currently performing a broader LCA, taking into consideration various PEF based applications and additional sustainability denominators. Avantium is working with the German firm Thinkstep (a Sphera company) to evaluate the sustainability of Ray Technology.

Emissions and waste
An essential aspect in the design of experiments, on both laboratory scale as well as pilot plant scale, is to minimise the negative consequences for the environment. We strive to minimalise the emissions and waste deriving from our operational activities.

Green Team
We also examine how we use resources at our buildings and facilities and look for ways to improve this. 'Team for Green' is a group of Avantium employees, drawn from across the company, who drive 'bottom up' environmental initiatives to enhance sustainability implementation at our company's headquarters in Amsterdam. Recent initiatives include improved policies and practices on waste and recycling, drinking water use, as well as making recommendations on greater access for bicycles and the use of green energy to power the building.

Promoting greener employee travel
Under our Avantium Mobility Plan, we encourage the use of public transport wherever possible. Employees choosing to travel by public transport receive an NS Business chip card which may be used for all work and personal transport across the Netherlands, including train, metro, tram and bus travel, as well as use of the OV bike system. Avantium has one hybrid company car.

Responsible Business Foundations
The following areas are fundamental to embedding responsibility into the core of our day-to-day business operations. They are foundational pillars for our continued success and we take them extremely seriously.

Safety First
Safety is woven into everything that we do. All Avantium employees are committed to our list of 'Golden Safety Rules'. We have long-established procedures and systems in place, however we all know that it requires continuous attention and awareness to ensure that we always operate in a safe manner.

Responsible Business Policies
We pride ourselves on being a responsible business and have published a number of additional policies on our Avantium website. These include the following:

- Code of Good Business Conduct - this code covers a range of areas including but not limited to integrity at work, age discrimination, working conditions, equal opportunities, conflicts of interest, privacy, financial practices, discrimination, harassment and bullying, and complaints procedures.
- Whistleblower Policy - setting out the procedures under which employees can and must report relevant irregularities.
- Bilateral Contacts Policy – this policy covers contact and information-sharing with shareholders.

Additional documents available on the Avantium website include the Articles of Association, Supervisory Board Terms of Reference, and the regulations governing the activities of the Nomination, Audit and Remuneration Committees.

Exciting the new generation
Avantium uses our scientific expertise to excite the next generation about sustainability and renewable chemistry. We have opened our laboratories to students, showcasing sustainable materials and demonstrating how our company works to advance new technologies for a more sustainable future, including the role of PEF in the circular economy. We have held an open 'Weekend of Science' to attract young students' attention to the opportunity innovation will play in the journey to a fossil-free world.

We have two Professors working at Avantium. In 2016, our Chief Technology Officer Dr G.J.M. Gruter, was appointed extraordinary professor of Industrial Sustainable Chemistry (ISC) at the Van 't Hoff Institute for Molecular Sciences (HIMS), one of eight research institutes of the Faculty of Science (FNWI) of the University of Amsterdam. Dr. Klaas Jan Schouten, programme leader for Avantium's leading electrochemistry programme Volta, has been appointed as Research Assistant Professor Electrocatalysis and Applied Electrochemistry at the University of Amsterdam. Avantium has a well-established collaboration with the University to accelerate the development of new products and processes using electrochemistry, and connecting us to important pioneering research.
Several PhD students are working on their theses at Avantium, whilst contributing to the development of our technologies.

Avantium is also working with the University of Amsterdam's Psychology Research Institute. PhD students in Social Psychology research Sustainable Consumer Behaviour, investigating the psychology of green consumer habits, such as the public's willingness to pay a premium for greener packaging.

6. Profit
Financials

Consolidated statement of comprehensive income and segment reporting
Consolidated revenues from operations increased 22% from €11.3 million in 2018 to €13.8 million in 2019, mainly driven by increased systems sales in our Catalysis business unit. The increase of the consolidated revenues is also driven by higher revenues in our Renewable Chemistries business related to collaboration agreements with partners, and revenue from Material offtake agreements from the newly acquired business unit Avantium Renewable Polymers.

Avantium's net loss for the year 2019 amounted to €23.5 million (FY 2018: €68.4 million). 2018 results are influenced by one-off expenses and impairment losses relating to Avantium acquiring 100% ownership of Synvina, which amounted to €50.0. This €50.0 million is made up of €36.9 million Synvina impairments, while €13.1 million relates to onerous contract expenses in 2018. 2019 started with the termination of our collaboration with BASF and the acquisition of 100% ownership of the Synvina joint venture. This leads to full inclusion of Avantium Renewable Polymers results into Avantium's consolidated financial reporting, influencing the year-on-year results.

Overall operational costs in 2019 amounted to €41.0 million (2018: €39.3 million). In 2019 Avantium included Avantium Renewable Polymers to its cost base which resulted in an additional €10.5 million operational costs in 2019. In addition to this, the group implemented IFRS 16 as of 1 January 2019, resulting in an increase of €1,635,000 in Depreciation, amortisation and impairment charges and a corresponding decrease in office and housing expenses. The increase in operational costs in 2019 was partially offset by the provision of onerous contract expense raised in 2018 of €13.1 million.

Total EBITDA decreased as expected from €-9.5 million in full-year 2018 to €-16.3 million in full-year 2019. The EBITDA of Avantium Renewable Polymers is for the first time reported as an Avantium business unit, after Avantium acquiring 100% ownership of this former joint venture. The higher EBITDA of Avantium Renewable Chemistries was mainly due to increased revenues and cost control, while investing in building the Ray Technology demonstration plant according to plan. The EBITDA of Avantium Catalysis increased as a result of higher revenues and lower costs due to cost control and strategic focus.

Balance sheet and financial position
The balance sheet total decreased to €96.5million (31 December 2018: €113.9 million), with net equity of €68.2 million.

Cash and cash equivalents totalled €45.4 million as at 31 December 2019 (31 December 2018: €83.3 million). We have no debt. The cash outflow of 2019 was planned for and resulted from investments in our Renewable Polymers and Renewable Chemistry programmes. Furthermore, in January we paid €17.4 million for regaining full ownership of Avantium Renewable Polymers. We continued to operate under strict working capital management and reduced capital expenditures to protect the cash position of our company. We will continue our risk management strategy of minimising our foreign exchange and interest volatility. Although this impact is not material, thus not requiring the need for financial hedging instruments, we continue to monitor this exposure periodically and adjust when necessary. We will continue to properly manage our capital risk, as expressed in our solvency ratio. Furthermore, note 3 highlights other financial risk factors and how these are managed.

The facility agreement the company holds with Rabobank includes a €4.0 million committed credit facility and a €2.0 million committed bank guarantee facility. At year end, the company adheres to the financial covenants as agreed with Rabobank, mainly related to tangible net worth (TNW) requirements. The tangible net worth of the credit base was €67.5 million on 31 December 2019, where the financial covenant states a minimum of €60.0 million. The company did not make use of the credit facility and will keep the facility as an additional buffer. Refer to note 3.2 for the group's objective in terms of capital management.

New IFRS standards
The group had to change its accounting policies as a result of adopting IFRS 16. The impact of the adoption of IFRS 16 is disclosed in note 30 of this consolidated financial statement.

Investor Relations & Share development
Avantium aims to provide our investors with clear, transparent, accurate and timely information so they can make well-considered decisions. This policy is integral to Avantium's Investor Relations, ensuring we keep investors and analysts informed through our website, conference calls and meetings. Every year, Avantium regularly updates investors and analysts on our financial and operational performance, strategy and the opportunities and challenges we face. We provide full-year and half-year results, accommodate bilateral meeting requests whenever feasible and attend broker conferences. When we report our full-year and half-year results, our CEO and CFO host a conference call for analysts giving more insight into our business performance. A transcript of the call is available on our website.

At our Technology & Markets Day, on 6 June 2019 in Amsterdam, we provided an in-depth update on our strategy and business priorities for the medium and long term. This event was webcast and can be found, together with the presentations, on the Avantium website. We also organise an Annual General Meeting for shareholders. The minutes of this meeting can also be found on our website.

Analysts
Three analysts follow the Avantium share (2018: 3). For further details, see the Investor Relations section of our website.

Listing and dividend
Avantium's shares are listed on Euronext Amsterdam and Euronext Brussels (symbol: AVTX). Avantium has not paid dividends since our listing and we do not expect to pay dividends in the foreseeable future.

Share developments
The dialogue with shareholders was particularly intense in 2019, after the termination of the Synvina joint venture and the collaboration with BASF. This termination was initially taken badly by the markets. Our stock price stabilised and slowly started to rise again after we started delivering on our promises made at the Avantium Technology & Markets Day. The share price ended at €3.15 on 31 December 2019.

Corporate governance

Our corporate governance policies are aligned with the principles and best practice guidelines of the Dutch Corporate Governance Committee as published on 7 September 2017. The full text of the Code is available on www.mccg.nl.

As the new Corporate Governance Code was enshrined in Dutch law in 2007, we are required to report on our compliance with the new Code. See pages 50-57 in this report and the Avantium website for further details. During the year, there were no transactions or issues giving rise to a (possible) conflict of interest between Management, members of the Supervisory Board and the company.

Risk management

In our daily business operations, Avantium and our subsidiaries incur general business risks as well as specific financing risks. Risk management is a company-wide activity. The Management Board bears ultimate responsibility for managing and controlling the risks associated with the activities and the strategy of the company to achieve our ambitions, ensure compliance with corporate governance policies and the law in general and ensure accurate financial reporting. The Supervisory Board oversees the Management Board on these subjects. See pages 40-43 in this report and note 3 to the annual accounts for further details. This assessment is not exhaustive, nor does it provide any guarantee against future losses or failure.

Management Board's responsibility statement

In accordance with provision 1.4.3. of the Code and Article 5:25c of the Financial Supervision Act, the Management Board declares that, to the best of its knowledge:

1 The sections in the Report of the Management Board as included in this report provide sufficient insights into any deficiencies in the effectiveness of Avantium's internal risk management and control systems.
2 The financial reporting systems provide reasonable assurance that Avantium's financial reporting does not contain any material errors.
3 Based on Avantium's current status of affairs, it is justified that the financial reporting is prepared on a going concern basis.
4 The sections in the Report of the Management Board list those material risks and uncertainties relevant to the expectation regarding Avantium's continuity for the period of twelve months after the preparation of the Report of the Management Board.
5 The financial statements as included in this report provide a true and fair view of the assets, liabilities, financial position and result for the financial year of Avantium and the group companies included in the consolidation.
6 The sections in the Report of the Management Board provide a true and fair view of the situation on the balance sheet date, the business development during the financial year of Avantium and of our affiliated group companies included in the financial statements.

The Risk management section describes the material risks to which Avantium is exposed.

Amsterdam, 25 March 2020

Tom van Aken

Chief Executive Officer

Risk management

Risk management is one of the key responsibilities of the Management Board and Supervisory Board. Avantium's principal risks and uncertainties – both under our control or not – are highly dynamic and Avantium's assessment of and responses to them are critical to the company's future business and prospects. Avantium's approach towards risk management is framed by the ongoing challenge of understanding the risks that the company is exposed to, the assessment of the company's risk appetite and how these risks change over time. In general, the more risks can be managed internally and reduced by the company, the lower the risk appetite. We manage those risks by taking mitigating actions as much as possible. The Management Team assesses and approves Avantium's risk appetite, monitors Avantium's risk exposure and sets the group-wide targets, which are reviewed on an ongoing basis. This process is supported by the Supervisory Board.

A number of key risk factors relating to Avantium's industry, business and operations affect Avantium. The risk factors are based on assumptions that are not exhaustive, nor do they provide any guarantee against future losses or failure. Although Avantium believes that the risks and uncertainties described below are the material risks and uncertainties concerning Avantium's business, they are not the only risks and uncertainties relating to Avantium. The main risks relating to Avantium's business, industry and operations include the possibility of:

(i) Financial and financing risks
(ii) Scale-up, market and competitive risks
(iii) Intellectual property risks
(iv) Compliance risks
(v) Operational and organisational risks
(vi) Reputational risks

Below is an overview of the key risk factors and mitigating measures. These risk factors are viewed by Avantium's management as being the most relevant. The company has put in place mitigating factors to counter the identified risks.

Financial and financing risks	**Mitigating factors**
Avantium has incurred losses and negative operating cash flow since it was founded and has an accumulated deficit. Avantium may continue to incur losses for the foreseeable future and may never achieve or sustain profitability. Failure to access timely new funding will block our ability to execute our strategy and meet our payment obligations. Funding might be available at very unfavourable conditions for the company and our existing stakeholders.	• Attracting timely additional sources of funding in the form of subsidies, equity or debt. For this purpose, actively managing close relationships with all relevant stakeholders. • Ensuring that company milestones are met and that partners are attracted to de-risk the technology scale-up. • Making portfolio decisions to prioritise resources and/or divest part of the business or technology.

Scale-up, market and competitive risks	**Mitigating factors**
Avantium may not be able to successfully develop its R&D projects, which may adversely affect Avantium's business, financial condition, operating result and prospects.	• Continuing to apply a strict portfolio management and stage-gate approach, to bring projects from ideation to proof-of-principle, to a fully developed business case that forms the basis for finding like-minded partners and attracting funding.
In order to further develop or commercialise R&D projects, collaboration with partners is necessary. If Avantium fails to enter into, maintain or successfully execute joint development agreements with partners for its R&D projects, it may not be able to develop and commercialise these projects.	• Continuing to include lessons-learned from partnerships in other programmes. • Diversifying project portfolio to allow for multiple non-competing partnerships in parallel. • People, IP, and assets should be fit-for-purpose to attract the right partners.
The decision to start constructing a flagship plant is subject to certain conditions. Avantium may pull back these plans, resulting in the closure or sale of the related activities prior to a positive decision to construct the flagship plant. No assurance can be given that Avantium will timely attract industry partners for validation and funding of the flagship plant. No assurance can be given that the flagship plant will be completed on schedule, within budget, or at all, including the required capital intensity for such a plant.	• Continuing to apply a strict stage-gate approach based on project milestones. • Ensuring broadening market interest, defend and strengthen the IP portfolio and provide resources to meet agreed timelines. • Attracting new sources of funding. • Actively searching for new partners in all parts of the value chain, with proven engineering and manufacturing capabilities to validate each production and process step.
The commercial success of our technologies, such as Avantium's YXY Technology, will depend on the market acceptance of our chemicals and products and Avantium's ability to sell products and licenses, which may only become clear once the flagship plant becomes operational.	• Continuing to monitor competitor activities and competitive technologies. • Giving full management attention to ensure Avantium meets the agreed timelines and develop strong partnerships in the field of renewable chemistry.
Avantium's technologies such as our YXY Technology may not perform as expected at the planned scale at the flagship plant and chemicals and products such as FDCA produced at the flagship plant or PEF produced by third parties may not meet the required product quality standards or specifications.	• Continuing to work with potential customers to demonstrate the performance of our chemicals such as FDCA and/or PEF, providing application development resources, jointly developing new applications to broaden the application fields and developing alternative outlets for FDCA. • Actively searching for new partners with proven engineering and manufacturing capabilities to validate each production and process step.
There is always a risk of facing underestimated competition for our technologies or business units.	• Managing Avantium's competitive position by closely monitoring possible competitors. • Actively maintaining, protecting and expanding our current IP portfolio.

Intellectual property risks	**Mitigating factors**
Avantium may not be able to adequately protect its proprietary technology, products and processes, information, trade secrets and know-how.	• Maintaining, protecting and expanding current IP portfolio in line with IP strategy. • Active monitoring of IP infringement. • Maintaining adequate IT/Legal/Compliance controls.
Litigation or third-party claims of alleged intellectual property infringement could require substantial time and money to resolve and may result in liability for damage. Unfavourable outcomes in these proceedings could limit Avantium in commercialising its lead technologies.	• Proactively monitoring publications potentially relevant to Avantium's lead technologies. If appropriate, take action such as challenging third-party patent right in line with the IP strategy and providing guidance on innovation and commercial development.

Compliance risks	Mitigating factors
New government measures, including increased regulations on the production and use of sustainable products versus oil-based products, may have a major impact on our business and financial position, and can present an opportunity or threat to activities.	• Monitoring and adapting to relevant (changes in) rules and regulations. • Maintaining a dialogue with authorities, where possible.
Inside information may be misused (intentionally or unintentionally).	• Creating employee awareness around adherence to Avantium's insider trading policy and legislation through training programmes and communication. • Timely establishing log files on classified information likely developing to become inside information. • Having an appropriate meeting schedule (frequency) for the Disclosure Committee, reporting to Management Board and Supervisory Board. • If applicable, timely notifying insiders on obligations, creating explicit status acceptance. • Disclosing to the market when appropriate.
Avantium products may not comply with a large variety of regulations, such as REACH, food contact and waste regulations.	• Registering Avantium products in accordance to the existing regulations allowing the manufacture, distribution and use of Avantium products. • Executing work in accordance with protocols which ensure that tests are performed, and substances are accompanied by proper documents. • Constant attention to awareness regarding proper execution of work where irregularities are registered and analysed.
Environmental regulations such as PFAS (Perfluoroalkyl and polyfluoroalkyl substances) and PAS (*Programma Aanpak Stikstof* – Dutch Programme Nitrogen Approach) may have a stalling effect on permitting trajectories or lack of clarity about regulations on how environmental issues will be addressed, which may also have an impact on plant design requirements and timing.	• Giving specific attention to efforts regarding obtaining permits, within the development and building projects. • Drawing up a realistic time schedule. • Regularly engaging with all involved regulatory parties.
Avantium may be unaware or (un)wilfully have partners, customers, agents, consultants or other company contacts in breach of Sanctions Regulations which could adversely affect the business of Avantium.	• Doing our utmost to adhere to (sanctions) laws and regulations, with Avantium's policies, procedures and ethics codes prescribing it is not to enter into business with sanctioned parties. • Using sanctions screening software tooling that is kept up-to-date for all the relations it enters into.
Avantium may be exposed to bribery and corruption.	• Managing a stringent approach to bribery and corruption with internal control, coordinated by the Finance and Legal teams. • Retaining an external, independent organisation to assist, where necessary, in monitoring the interaction with suppliers, agents and distributors.
Avantium may be subject to fraudulent activities.	• Mitigating fraud with internal control activities. • Encouraging employees to report any suspicion of non-compliance with our ethics code. Following a report, any potential violation will be investigated. The outcome may lead to a disciplinary action. The severity of the disciplinary action is determined by the nature and circumstances of the incident, and may include termination of employment. If necessary, the company takes additional action to prevent a similar incident in the future. • Using the processes described in the Whistleblower or Confidant policies.

Operational and organisational risks	Mitigating factors
Looking ahead, we see increased uncertainties following the COVID-19 worldwide outbreak and market volatility. We have no indication whether the governmental measures, including possible additional measures, will have an effect in preventing a further spread around the world. In the event of a prolonged pandemic there may be an effect on the financial performance of the company and its ability to timely attract funding.	• The company will implement all instructions and best-practices by government agencies and health officials. A crisis team at MT level will coordinate all relevant aspects for operations and health & safety.
Handling hazardous substances within laboratories and pilot plants delivers risks regarding spills (environmental damage) and exposure (health damage).	• Preceding all activities by thorough assessments from which failure situations are reasoned, their risks are weighed, and necessary measures are implemented.
Despite having procedural and system controls in place, cybercrime constantly needs attention to protect our assets, intellectual property and other information. This risk is exacerbated by the accelerating pace of digitalisation. There is also a risk of a failing back office ICT infrastructure.	• Actively managing this risk by having in place preventive controls, monitoring controls and detective controls • Keeping our hardware and software up-to-date ((firmware / (security) patches) • Having policies and procedures in place and actively working on awareness of our employees as regards to cyber security • Making daily backups of our critical systems / servers and conducting regular restore tests
Avantium requires a high-quality workforce of experts and a pipeline of talents. Retention of our talent pool is key. The new scale-up and commercialisation phase of the company requires attracting talent and expertise for scale-up, engineering and manufacturing.	• Attracting intrinsically motivated people, wanting to be engaged in meaningful work, to achieve our ambitions. • Organising a survey to understand what people working at Avantium value and incorporating these insights into our people practices, from rewards and recognition to development to attracting new people. • Initiating learning workshops where people can share knowledge on a variety of topics to promote development. • Putting basic structures in place to reward people fairly. • Creating learning communities, promoting best practices and stimulating working in cross-functional teams, to further promote challenging work and development. • Keeping track on specific KPIs, like attrition rate, 360day quit rate and learning from exit interviews why people leave.

Reputational risks	Mitigating factors
A negative perception among consumers, customers, partners, shareholders and/or regulatory authorities can deteriorate the reputation of Avantium.	• Safeguarding reputational risks in other risk disciplines as in most cases it is a consequence of other risk events happening. • Proactively managing the engagement with all our stakeholders. • Creating a consistent, clear and understandable brand identity and brand awareness for all key stakeholders • Connecting all Avantium employees with the mission and values of Avantium.

Role of the Supervisory Board

Report of the Supervisory Board

The Supervisory Board oversees and advises the Management Board in setting and fulfilling the company's strategy. Avantium has a two-tier governance structure, which requires a structured relationship between the Management Board and the Supervisory Board. Each board bears its own specific responsibilities, but they share overall responsibility for the company's strategy and risk profile. Key to all the Supervisory Board's decisions are the long-term interests of the company's stakeholders, including value creation for its shareholders.

This report explains how the Supervisory Board fulfilled its responsibilities in 2019. The Report of the Supervisory Board should be read in conjunction with the Corporate governance section page 50-57, which provide information on the company's corporate governance structure. A profile of the Supervisory Board members is available on the Avantium website.

Supervisory Board Composition

There were a number of changes to the composition of the Supervisory Board during the year 2019.

At the Annual General Meeting on 15 May 2019 the following changes occurred:
Jonathan Wolfson, who was appointed to the Avantium Supervisory Board in 2013, stepped down; Gabrielle Reijnen, member of the Avantium Supervisory Board since 2015, also stepped down; Denis Lucquin was reappointed as a member of the Supervisory Board for an additional two years and; Rob van Leen was appointed as a member of the Supervisory Board of Avantium for a term of four years.

At an Extraordinary General Meeting (EGM) on 20 December 2019, Kees Verhaar stepped down as Chairperson and member of the Supervisory Board. Rob van Leen also resigned from Avantium's Supervisory Board effective 31 December 2019. At the same EGM, Edwin Moses was appointed as a Supervisory Board member for a term of four years. Directly after the EGM, the Supervisory Board appointed Edwin Moses as the new Chairperson of the Supervisory Board.

On 15 January 2020, Avantium announced the nomination of Michelle Jou for appointment to the Supervisory Board, and this nomination is expected to be ratified at the Annual General Meeting on 14 May 2020.

All members of the Supervisory Board, except Denis Lucquin, are deemed independent. In the Supervisory Board's opinion, the composition of the Supervisory Board is such that the members can act critically and independently from one other and from the Management Board, as stipulated in the Code. This means that the tasks of the Supervisory Board as laid down in the Articles of Association can be fulfilled, including providing the Management Board with solicited and unsolicited advice and support.

With respect to the composition and diversity of the Supervisory Board, Board members will continue to be selected based on their wide-ranging experience within the industry, backgrounds, skills, knowledge and insight. Going into 2020, the percentage of women in the Supervisory Board is 33%, meeting the target of 30% prescribed by Dutch legislation in terms of gender balance.

Supervisory Board and Committee Meetings in 2019

In its oversight capacity, Avantium's Supervisory Board has frequent communications with the Management Board in and between Supervisory Board meetings. Supervisory Board meetings are held regularly to discuss the company's achievements and plans, the functioning of the Supervisory Board and the performance of the Management Board.

In 2019, the Supervisory Board held nine meetings and five progress calls with members of the Management Board present. The average attendance rate of all Supervisory Board members in 2019 was 95%.

Major topics discussed with the Supervisory Board

Each year, the Management Board and senior management present various matters to the Supervisory Board for approval, such as company strategy, budgets, the detailed progress reports on-individual business units' results, the balance sheet and reports on any matters related to material risks, and control and compliance issues. These matters were all discussed and approved by the Supervisory Board in 2019.

In 2019, the Supervisory Board devoted particular attention to the following topics.

The termination of the Synvina joint venture and the renewed commercialisation strategy for the YXY Technology

Throughout 2019, the Supervisory Board spent significant time discussing the consequences of BASF's exit from the Synvina joint venture and the new commercialisation strategy for the YXY Technology to produce FDCA and PEF. In January 2019, after intensive discussions with the Management Board, the Supervisory Board endorsed the repurchase of the BASF shares in the joint venture for net €17.4 million. After taking full ownership of the YXY Technology, the Management Board explored different scenarios for the commercialisation strategy of PEF, while maintaining full control of the YXY Technology. This was a complex exercise to find the right balance between value creation and accessing appropriate financial resources, which was discussed at length in the Supervisory Board meetings. The Supervisory Board fully supported the Management Board's approach and decisions regarding the revised scale-up and market-launch strategy of the YXY Technology that Avantium outlined at the Technology & Markets Day for investors and other stakeholders on 6 June 2019. The construction of a flagship plant capable of producing 5 kilotonnes of FDCA and PEF, focusing on high-value PEF applications, was determined to be the best strategic option, with funding anticipated through equity investments, strategic partnerships, grants and debts. A key objective for 2020 is to secure €150 million to finance the FDCA flagship plant.

Renewable Chemistry technologies

The Supervisory Board also engaged in intense discussions with the Management Board about the technology portfolio within Renewable Chemistries and the strategic choices for each technology in the portfolio. The Supervisory Board closely monitored developments regarding Ray Technology, Dawn Technology and Volta Technology. This includes the opening of the Ray Technology demonstration plant in Delfzijl that will help advance the production of plant-based mono-ethylene glycol (MEG) and the scaling up of the Volta Technology from lab-scale to pre-pilot installations, with the opening of a pre-pilot test unit in the Port of Amsterdam in 2019.

Strategic focus & organisational review

The acquisition of the Synvina joint venture and the YXY Technology for the production of FDCA and PEF, the revised market-launch strategy for PEF and the progress of the other renewable chemistry technologies marks a new chapter in the evolution of Avantium. To help support these developments, the Management Board carried out an organisational review. The Supervisory Board discussed the consequences of this organisational review with the Management Board and endorsed the organisational changes needed to improve focus and efficiency within the organisation. It was also concluded that this new phase of the company's development required a different composition of the Management Board and as part of this, it was a natural move for Frank Roerink, CFO since 2007, to step down effective 31 December 2019.

Management Board succession

The Nomination Committee initiated a search for a new CFO in the second half of 2019. A detailed specification was agreed, and a leading head-hunter led the search. The Nomination Committee assessed several candidates, and the full Supervisory Board, in consultation with the Works Council, selected Bart Welten as the new CFO effective January 2020.

Bart will be proposed as a statutory member of the Management Board of Avantium at the AGM on 14 May 2020.

Bart will be appointed for a four-year term, in line with the Dutch Corporate Governance Code, and is subject to the compensation and benefits package for Avantium Management Board members. See the Remuneration Committee report for details.

Self-evaluation of the Supervisory Board
Every year, the Supervisory Board evaluates its own performance and that of its separate Committees and individual members, in accordance with best practice provision II.2.6 of the Dutch Corporate Governance Code. Once every three years, the board is assisted by an external consultant. Due to the many changes in the composition of the Supervisory Board, it was decided to postpone this self-assessment to 2020.

The Supervisory Board Committees
The Supervisory Board organises its tasks across three Committees: the Audit Committee, the Remuneration Committee and the Nomination Committee. These Committees prepare for their specific topics ahead of decision-making in the plenary meetings of the Supervisory Board.

Audit Committee
Members of the Audit Committee in 2019 were Margret Kleinsman (Chair), Kees Verhaar and Gabrielle Reijnen (until May 2019). As of December 2019, the Audit Committee consisted of Margret Kleinsman (Chair) and Edwin Moses. In 2019, the Audit Committee held five meetings in total. The meetings were also attended by the CEO, CFO, the Group Controller and the external independent auditor. Minutes of all meetings were submitted to the Supervisory Board. The Audit Committee discussed the periodic financial statements, risk management and the joint venture accounting and impairment of Synvina. Furthermore, the auditor was present at the Supervisory Board meeting of 21 March 2019 to discuss the 2018 financial statements as well as the external independent auditor's report and findings. The most important discussion points from the Management Letter provided by the independent auditor were related to the impact of BASF's exit notice from the Synvina joint venture. The discussions on this item resulted in three main positions taken by the Management Board, being: (a) the assessment of control over Synvina, where the Management Board agreed that the notice did not constitute a change of control, the change of control occurred in 2019; (b) accounting treatment of the settlement with BASF to pay €17.4 million by Avantium to regain 100% ownership of the Synvina assets and charge the remainder to the P&L as the cost of an onerous contract; and (c) the original contract and settlement made in respect of BASF's exit, where the Management Board concluded that it was a buy-back under the existing joint venture agreement rather than an acquisition. The impairment test applied by the Management Board resulted in an onerous contract and an obligation to pay.

Key audit matters related to meeting the funding requirements to execute strategy, acquisition of Renewable Polymers B.V. and the impairment assessment of property, plant and equipment and capitalisation of research and development expenses.

Other areas of focus for this year related to the application of IFRS 16, project revenue recognition and valuation of contract assets and liabilities, government grant recognition and accounting for share based compensation.

At the Annual General Meeting in May 2019, the Audit Committee proposed reappointing the external auditor PwC for the financial year 2019. This recommendation is based on the Committee's evaluation of the quality of the audit process, the auditor's independence and its working relationship with management. This proposal was adopted by the Annual General Meeting.

Nomination Committee
Until May 2019, the Nomination Committee consisted of Gabrielle Reijnen (Chair), Denis Lucquin and Jonathan Wolfson. After May 2019, members of the Nomination Committee were Kees Verhaar (Chair), Denis Lucquin and Rob van Leen. In December 2019, Edwin Moses joined the Nomination Committee as Chairperson, next to Denis Lucquin. The meetings of the Nomination Committee are attended by the CEO, except when issues relating to his performance and remuneration are discussed. The Nomination Committee met five times in 2019. The Committee's standard duties include assessing the composition of the Supervisory Board and the Management Board, and the functioning of individual members, succession planning and monitoring corporate governance.

A key activity for the Nomination Committee in 2019 was selecting a new Chief Financial Officer for the Management Board, as well as new members for the Supervisory Board. The Committee developed detailed profiles for each of the positions, assessed all the candidates and monitored the overall selection process and appointment of the new members. It worked closely with the full Supervisory Board on this and consulted the Works Council as appropriate. The searches were supported by well-respected head-hunters.

Remuneration Committee
The members of the Remuneration Committee until May 2019 were Gabrielle Reijnen (Chair), Denis Lucquin and Jonathan Wolfson. After May 2019, the Remuneration Committee consisted of Kees Verhaar (Chair), Denis Lucquin and Rob van Leen. In December 2019, Edwin Moses joined the Remuneration Committee as Chairperson, with Denis Lucquin as the other member. The Committee is responsible for advising the Supervisory Board on remuneration. One of its standard duties is to assess whether the Management Board's performance targets have been achieved. The Remuneration Committee met three times in 2019 to discuss and formulate proposals for the remuneration of the individual members of the Management Board and the related performance targets in 2019. The Remuneration Committee presented its findings and proposals to the Supervisory Board. The Supervisory Board decided on the performance appraisal and related remuneration of the individual Management Board members.

Frank Roerink resigned as member of the Management Board as of 31 December 2019. In connection with his resignation, Frank received a severance payment of €235,000, which is in line with the Dutch Corporate Governance Code; not exceeding one year's (gross) salary. Frank Roerink remained eligible for variable remuneration initiatives over the financial year 2019. He received his variable remuneration for 2019 (including the LTIP component), fully in cash since the awards under the LTIP serve as a long-term investment in the company and aim to align the respective interests with those of the other shareholders, so they are no longer appropriate when an individual leaves the Company. For more information, please see the 'Remuneration Report' on page 58-63.
The Remuneration Committee also discussed the compensation and benefits package for the new CFO, Bart Welten. In accordance with the guidelines of the Dutch Corporate Governance Code, he is subject to the compensation and benefits package for Management Board members. His fixed annual salary is €235,000. His bonus, if any, has (i) a cash component of no more than 25% of his annual base salary and (ii) a non-cash component amounting to an amount equivalent to the cash component which must be invested in Investment Shares. For more information, please see the 'Remuneration Report' on page 58–65.

Financial statements 2019 and profit appropriation
The financial statements for the financial year 2019 were prepared by the Management Board in compliance with Articles 20 and 21 of the Articles of Association. Attached to these statements is the unqualified independent auditor's report from PricewaterhouseCoopers Accountants N.V. (PwC). The financial statements and the outcome of the audit performed by the external independent auditor were discussed by the Supervisory Board in the presence of the external independent auditor. The 2019 financial statements were endorsed by all Management Board and Supervisory Board members and are, with PwC's auditor's report, included in this Annual Report. The Management Board will present the 2019 financial statements at the Annual General Meeting on 14 May 2020.

Gratitude
The Supervisory Board wishes to thank all the employees for their dedication to Avantium, especially for their passion, creativity and perseverance. The Supervisory Board also wishes to express its gratitude to the members of the Management Board and senior management for their leadership and constructive, open dialogue. We are grateful to Frank Roerink for the important contribution he made over the years to the development of Avantium and wish him well in his future endeavours. We also wish to thank Kees Ver-

haar for his dedication and guidance in the role of Chairperson of Avantium's Supervisory Board. In addition, we also thank Gabrielle Reijnen, Jonathan Wolfson and Rob van Leen for their commitment and efforts as members of the Supervisory Board. Finally, we wish to thank our partners and shareholders for their continued support during this pivotal year for Avantium.

Amsterdam, 25 March 2020

On behalf of the Avantium Supervisory Board,

Edwin Moses, Chairperson
Denis Lucquin
Margret Kleinsman

Corporate governance

Structure

Avantium N.V. is a Dutch public company based and with its registered office in Amsterdam, the Netherlands. It acts as the holding company for the Dutch operating companies of the company: Avantium Renewable Polymers, Avantium Renewable Chemistries and Avantium Catalysis. Avantium's shares are listed on Euronext Amsterdam and Euronext Brussels (symbol: AVTX).

As such, Avantium is subject to the Dutch Corporate Governance Code (the Dutch Code), as amended and published on 8 December 2016. The Dutch Code contains principles and best practice provisions for management boards, supervisory boards, shareholders and general meetings of shareholders and audit and financial reporting. The Dutch Code is applicable to the company as of the financial year 2017.

Avantium's corporate governance framework is based on the requirements of the Dutch Civil Code, the Dutch Code, the company's Articles of Association of 14 March 2017, applicable securities laws, and regulations concerning the management board and the supervisory board.

The company has a two-tier governance structure consisting of the Management Board and the Supervisory Board. The third governing body is the General Meeting.

This section provides information on these governing bodies and their powers and duties. In addition, it describes the way the company applies the Dutch Code.

Management Board

General
The Management Board is the statutory executive body and is, together with the Executive Team of Avantium (known under the name Management Team consisting of the Chief Executive Officer, Chief Financial Officer, Chief Technology Officer, the Group Legal Counsel together with the three Managing Directors of the business units) responsible for the day-to-day management of Avantium. The Management Board shall remain collectively responsible for decisions prepared by the Management Team. The Management Board formulates the company strategy and policies and takes responsibility for the internal control systems, subject to the supervision of the Supervisory Board. The members of the Management Board may divide its duties among its members. The Management Board may perform all acts necessary or useful for achieving Avantium's objectives, with the exception of those acts that are prohibited or expressly attributed to the General Meeting or Supervisory Board by law or by the Articles of Association. Avantium's Articles of Association include most of the Dutch Code's principles and best practice provisions insofar they apply to a two-tier governance structure. Avantium's Articles of Association are published on the website of Avantium (https://www.avantium.com/corporate-governance/).

In performing its duties, the Management Board is required to be guided by the interests of Avantium, taking into consideration the interests of Avantium's stakeholders (which include the shareholders and Avantium's creditors, employees and clients) as well as the corporate social responsibility issues that are relevant to the business. The Management Board must submit certain important decisions to the Supervisory Board or the General Meeting for approval, as more fully described below under "Management Board resolutions". The Management Board shall timely provide the Supervisory Board with all information required for the exercise of its duties.

Composition, appointment, dismissal and suspension

The following two members composed the Management Board in 2019:

Name	Date of birth	Position	Member as of	Scheduled for re-election
T.B. van Aken	19 October 1970	CEO	17 February 2006	At the General Meeting in 2021
F.C.H. Roerink	14 June 1969	CFO	11 May 2007	Not applicable; stepped down at 31 December 2019

With respect to the composition of the Management Board, it is noted that the Management Board's members will continue to be selected based on their wide-ranging experience within the industry, backgrounds, skills, knowledge and insight. Within this profile, gender diversity has the Management Board's attention in accordance with article 2:166 of the Dutch Civil Code, although so far this has not resulted in increased gender diversity in the Management Board. On 4 July 2019, Avantium announced that CFO Frank Roerink would leave the company at the end of 2019. He continued to fulfil his responsibilities for the remainder of the year. This allowed Avantium to look for a successor. On 23 December 2019, the Supervisory Board of Avantium announced the appointment of Bart Welten. He will be proposed as a statutory member of the Management Board of Avantium at the Annual General Meeting on 14 May 2020.

The members of the Management Board are appointed by the General Meeting. In accordance with Avantium's Articles of Association, the Supervisory Board shall make binding nominations for the appointment of a Management Board member. In case the Supervisory Board has made a binding nomination for the appointment of a Management Board member, the nominee shall be appointed, provided that the General Meeting may override the binding nature of such nomination by a resolution of two-thirds of the votes cast, which votes also need to represent more than half of the issued share capital. If the Supervisory Board has not made a binding nomination, the General Meeting shall be free to appoint a member of the Management Board at its discretion by a simple majority representing at least one-third of the issued share capital.

Pursuant to Avantium's Articles of Association, the General Meeting may at any time dismiss or suspend a member of the Management Board. The General Meeting may only adopt a resolution to dismiss or suspend such a member by a simple majority at the proposal of the Supervisory Board. Without such proposal, the resolution shall require a two-thirds majority of the votes cast, representing more than half of the issued share capital.

Management Board resolutions
The Management Board may in principle pass resolutions only if at least the majority of the Management Board members are present. The CEO may depart from this principle with respect to decision-making in urgent situations. Management Board resolutions may at all times be adopted outside of a meeting, in writing or otherwise, provided that the proposal concerned is submitted to all Management Board members then in office and none of them objects to this manner of adopting resolutions. Where possible, resolutions shall be passed by unanimous vote. If this is not possible, the resolution shall be taken by a majority of votes. If the vote is tied, the proposal shall be rejected. Pursuant to Dutch law and the company's Articles of Association, the Management Board must obtain the approval of the General Meeting for resolutions regarding an important

change of identity or character of the company or its business. This includes in any event: (i) the transfer of all or substantially all business activities of the company to a third party, (ii) the conclusion or cancellation of any long-lasting cooperation by the company or a subsidiary with another legal entity or company or as a fully liable general partner of a limited partnership or a general partnership, provided that such cooperation or the cancellation thereof is of essential importance to the company, and (iii) the acquisition or disposal by the company or a subsidiary of a participating interest in the capital of a company with a value of at least one-third of the sum of the assets according to the consolidated balance sheet of the company's most recently adopted financial statements with explanatory notes thereto.

The Management Board must obtain the approval of the Supervisory Board for various resolutions listed in the Management Board Regulations including, but not limited to:
(i) Entering into agreements, whereby the company is granted credit by a bank
(ii) Lending and borrowing money, with the exception of acquiring money under a credit already granted to the company by a bank
(iii) Long-term direct or indirect cooperation with another company and the termination of such cooperation
(iv) Investments and divestitures
(v) Entering into agreements by which the company binds itself as guarantor or as severally liable co-debtor or otherwise guarantees or agrees to bind itself as security for a debt of a third party
(vi) Making settlements
(vii) Being a party to legal proceedings, including conducting arbitration, with the exception of taking legal measures that cannot be delayed
(viii) Entering into and changing employment agreements, whereby remuneration is granted, which exceeds the annual maximum amount determined by the Supervisory Board and notified to the Management Board in writing
(ix) Establishing pension plans and granting pension rights in excess of those arising from existing arrangements
(x) Adopting and amending the strategy of the enterprise and the business plan
(xi) Adopting the annual budget
(xii) Adopting employee stock-option plans

The Supervisory Board may determine that such a resolution does not require its approval if the amount involved does not exceed a value fixed by the Supervisory Board and notified to the Management Board in writing.

Conflict of interest
Pursuant to the Management Board Regulations and the Dutch Code, each member of the Management Board is required to immediately report any conflict or potential conflict of interest to the Chairperson of the Supervisory Board and the other members of the Management Board. The Chairperson of the Supervisory Board must determine whether a reported conflict or potential conflict of interest qualifies as a conflict of interest within the meaning of article 2:129, paragraph 6 of the Dutch Civil Code, to which the following applies. A member of the Management Board may not participate in the adoption of resolutions (including any deliberations) if they have a direct or indirect personal interest conflicting with the interests of the company and the business connected therewith. If all members of the Management Board have a conflict of interest, the resolution concerned will be adopted by the Supervisory Board. If a member of the Management Board does not comply with the provisions on conflicts of interest, the resolution concerned is subject to voidness (nietigheid) or voidability (vernietigbaarheid) and this member can be held liable towards the company. All transactions in which there are conflicts of interest with members of the Management Board must be agreed on terms that are customary in the sector in which the company operates and must be approved by the Supervisory Board.

In 2019, there were no conflicts in this respect.

Supervisory Board
General
The Supervisory Board supervises the management of the Management Board and the general course of affairs at the company and the business connected with it. The Supervisory Board shall assist the Management Board by giving advice. In performing their duties, the Supervisory Board members act in accordance with the interests of the company and the group, taking into consideration the interests of the company's stakeholders (including the company's shareholders, creditors, employees and clients), as well as the corporate social responsibility issues that are relevant to the business.

The Supervisory Board is responsible for submitting the nomination for the appointment of an external accountant to audit and report on and issue a statement concerning the company's annual financial statements to the General Meeting, supervising the functioning of such accountant and resolving on the engagement of such accountant. The Supervisory Board Regulations can be found on the company's website (www.avantium.com/corporate-governance/) and will apply in addition to the relevant provisions of the Articles of Association.

The Supervisory Board has appointed an Audit Committee, a Remuneration Committee and a Nomination Committee. These committees are tasked with preparing the decision-making of and advising the Supervisory Board, although the Supervisory Board remains collectively responsible for the fulfilment of the duties delegated to its Committees. In accordance with the company's Articles of Association and the Supervisory Board Regulations, the Supervisory Board has drawn up rules on each Committee's role, responsibilities and functioning. The Committee Regulations are published on the website of Avantium (www.avantium.com/corporate-governance/).

Composition, appointment, dismissal and suspension
As of 31 December 2019, the Supervisory Board composition is as follows:

Name	Date of birth	Gender	Member as of	Scheduled for re-election
E. Moses	28 October 1954	Male	20 December 2019	At the General Meeting in 2023
D.J. Lucquin	13 January 1957	Male	19 May 2011	At the General Meeting in 2021
M.G. Kleinsman	24 October 1963	Female	14 June 2017	At the General Meeting in 2021

At the Annual General Meeting on 15 May 2019 the following changes occurred: Jonathan Wolfson, who was appointed to the Avantium Supervisory Board in 2013, stepped down; Gabrielle Reijnen, member of the Avantium Supervisory Board since 2015, also stepped down; Denis Lucquin was reappointed as a member of the Supervisory Board for an additional two years and; Rob van Leen was appointed as a member of the Supervisory Board of Avantium for a term of four years.

At an Extraordinary General Meeting (EGM) on 20 December 2019, Kees Verhaar stepped down as Chairperson and member of the Supervisory Board. Rob van Leen also resigned from Avantium's Supervisory Board effective 31 December 2019. At the same EGM, Edwin Moses was appointed as a Supervisory Board member for a term of four years. Directly after the EGM, the Supervisory Board appointed Edwin Moses as the new Chairperson of the Supervisory Board.

On 15 January 2020, Avantium announced the nomination of Michelle Jou for appointment to the Supervisory Board, and this nomination is expected to be ratified at the Annual General Meeting on 14 May 2020.

Further information about the Supervisory Board members is published on the company's website (www.avantium.com/corporate-governance/).

The Supervisory Board shall consist of at least three members. Avantium's Articles of

Association provide that the Supervisory Board shall make binding nominations for the appointment of a Supervisory Board member. In case the Supervisory Board has made a binding nomination for the appointment of a Supervisory Board member, the nominee shall be appointed, provided that the General Meeting may at all times override the binding nature of such nomination by a resolution of two-thirds of the votes cast, which votes also need to represent more than half of the issued share capital. If the General Meeting overrules the binding nomination, the Supervisory Board shall make a new binding nomination. If the Supervisory Board has not made a binding nomination, the General Meeting shall be free to appoint a member of the Supervisory Board at its discretion by a simple majority representing at least one-third of the issued share capital.

Pursuant to Avantium's Articles of Association, the General Meeting may at any time dismiss or suspend a member of the Supervisory Board. The General Meeting may only adopt a resolution to dismiss or suspend such a member by a simple majority at the proposal of the Supervisory Board. Without such proposal, the resolution shall require a two-thirds majority of the votes cast, representing more than half of the issued share capital.

Each Supervisory Board member shall be appointed or reappointed for a period of no more than four years, provided that, unless a Supervisory Board member resigns earlier, their appointment period shall end immediately after the Annual General Meeting, held in the fourth calendar year after the date of their appointment. The Supervisory Board member may then subsequently be reappointed again for a period of two years, which appointment may be extended by two years at most. In the event of a reappointment after an eight-year period, reasons should be given in the consultative Report of the Supervisory Board. The Supervisory Board shall appoint one of its members to be the Chairperson of the Supervisory Board.

Supervisory Board resolutions

The Supervisory Board can in principle only validly adopt resolutions in a meeting at which at least one half of its members is present or represented, provided that members who have a conflict of interest shall not be taken into account when calculating this quorum. Resolutions of the Supervisory Board are adopted by an absolute majority of votes. If the vote is tied, the proposal shall be rejected. The Supervisory Board may also adopt resolutions outside a meeting, in writing or otherwise, provided that the proposal concerned is submitted to all members of the Supervisory Board then in office and none of them objects to this manner of decision-making.

Conflict of interest

Pursuant to the Supervisory Board Regulations, each Supervisory Board member (other than the Chairperson) shall immediately report any conflict or potential conflict of interests concerning a Supervisory Board member to the Chairperson. In case the Chairperson has a conflict or potential conflict of interests, they shall immediately inform the Vice Chairperson of the Supervisory Board thereof. The Chairperson or the Vice Chairperson (as applicable) shall determine whether a reported conflict or potential conflict of interest qualifies as a conflict of interest within the meaning of article 2:140, paragraph 5 of the Dutch Civil Code, to which the following applies. A Supervisory Board member may not participate in the adoption of resolutions (including any deliberations) if they have a direct or indirect personal interest conflicting with the interests of the company and the business connected therewith. If all members of the Supervisory Board have a conflicting personal interest, the resolution concerned will be adopted by the General Meeting, unless the Articles of Association decide otherwise. Avantium's Articles of Association provide that, if all members of the Supervisory Board have a conflict of interest, the resolution concerned will nevertheless be adopted by the Supervisory Board. If a member of the Supervisory Board does not comply with the provisions on conflicts of interest in the Supervisory Board Regulations, the resolution concerned is subject to voidness (nietigheid) or voidability (vernietigbaarheid) and this member can be held liable towards the company.

In 2019, there were not conflicts of interest of Supervisory Board members.

Evaluation of the Supervisory Board and Management Board

Pursuant to the Dutch Code, the Supervisory Board should at least once per year, outside the presence of the Management Board, evaluate its own functioning, the functioning of the Committees and that of the individual Supervisory Board members, and discuss the conclusions that are attached to the evaluation. The evaluation of the Supervisory Board, the Committees and the individual Supervisory Board members was performed on an irregular basis prior to Avantium's IPO, with a minimum of once a year a self-assessment. After the IPO of Avantium, the Supervisory Board appointed an external consultant to perform a detailed evaluation of the Supervisory Board, the Committees and the individual Supervisory Board members. This assessment was performed in 2018. Due to the changes in the composition of the Supervisory Board in 2019, it was decided to postpone the self-assessment of the Supervisory Board to 2020.

The Dutch Code also provides that the Supervisory Board should at least once per year, outside the presence of the Management Board, evaluate the functioning of the Management Board and that of the individual Management Board members. They should discuss the conclusions that must be attached to the evaluation, such also in light of the succession of Management Board members. At least once annually, the Management Board should evaluate its own functioning and that of the individual Management Board members. The performance of the Management Board and individual members of the Management Board is evaluated at every closed session of the Supervisory Board meetings and subsequently communicated to the Management Board by the Chairperson of the Supervisory Board.

General Meeting

General

The Annual General Meeting is held each year within six months of the end of the financial year. Its general purpose is to discuss the board report, discuss and adopt the financial statements and discharge the Management Board members and the Supervisory Board members of their respective management and supervision duties. Extraordinary General Meetings are held as often as the Management Board and Supervisory Board deem necessary and at the request of one or more shareholders, who, alone or jointly, represent at least one tenth of the issued share capital of the company (as set out in article 2:110, paragraph 1 of the Dutch Civil Code).

Notice and admission to the General Meeting

A General Meeting is called by means of a convening notice that is sent by the Management Board or the Supervisory Board, stating inter alia the place and time of the meeting and the agenda of the meeting. Shareholders who, alone or jointly, represent at least 0.03% of the company's issued capital, may request that items can be added to the agenda of the meeting. These requests will be granted, providing that the request (including the reasons for such request) is received in writing by the Management Board or Supervisory Board at least 60 days before the day of the meeting.

Every shareholder may attend and address the General Meeting. Each shareholder is entitled to vote. Those entitled to attend a General Meeting may be represented at the meeting by a proxy authorised in writing.

General Meeting resolutions

Unless Dutch law or the Articles of Association require a larger majority, resolutions of the General Meeting are adopted by a simple majority of votes cast. Certain resolutions require a qualified majority of two-thirds of the votes cast, if less than half of the issued share capital is present or represented at the General Meeting at which such a resolution is put to vote.

Corporate governance statement

This section – together with the Report of the Supervisory Board, the description of risk management and the content of the company's website – constitutes the corporate governance statement. The corporate governance section on the website contains the company's Articles of Association, the Supervisory Board profile and regulations, a description of the application of the Dutch Code by the company and various other policies. The composition of the Management Board and the Supervisory Board is also set out on the website, including the CVs of the members and the rotation plan of both boards. This section is therefore to be read in conjunction with all of the aforementioned information on the company's website.

Each public company (naamloze vennootschap) under Dutch law, with its official seat in the Netherlands, whose shares or depositary receipts for shares have been admitted to listing on a stock exchange, or more specifically to trading on a regulated market or a comparable system, and all large companies whose registered offices are in the Netherlands (balance sheet value > €500 million) whose shares or depositary receipts for shares have been admitted to trading on a multilateral trading facility or a comparable system, are required under Dutch law to disclose in their annual reports whether or not they apply the provisions of the Dutch Code that relate to the Management Board or Supervisory Board and, if they do not apply, to explain the reasons therefore. The Dutch Code provides that if a company's General Meeting explicitly approves the corporate governance structure and policy and endorses the explanation for any deviation from the Dutch Code's best practice provisions, such company will be deemed to have applied the Dutch Code.

Avantium acknowledges the importance of good corporate governance and agrees with the principles of the Dutch Code. It has taken and will take further steps it considers appropriate to implement the Dutch Code.

The 2009 Belgian Code on Corporate Governance (the Belgian Code) applies to companies incorporated in Belgium whose shares are admitted to trading on a regulated market. The Belgian Code and the Dutch Code are mainly based upon the same or at least comparable principles of good corporate governance. As the company is incorporated under Dutch law and also has a listing on Euronext Amsterdam, it applies the Dutch Code.

Compliance with the Dutch Code
Avantium is committed to applying all the principles and best practice provisions of the Dutch Code. The principles and best practice provisions where it is not in compliance with the Dutch Code are as follows:

• Principle 1.3: The duty of the internal audit function is to assess the design and the operation of the internal risk management and control systems. The Management Board is responsible for the internal audit function. The Supervisory Board oversees the internal audit function and maintains regular contact with the person fulfilling this function. In 2019, the duties and responsibilities of the internal audit function are allocated to various senior support staff functions within the company (Legal, Finance). With the newly appointed CFO, the allocation of these responsibilities will be reconsidered in 2020.

• Best practice provision 3.3.2: Supervisory Board members may not be awarded remuneration in the form of shares and/or rights to shares. To continue to be able to attract and retain top talent in a competitive and global environment and to focus the Supervisory Board on creation of sustainable added value, the company has, in view of the IPO, introduced a renewed Employee Share Option Plan (ESOP) in 2016, pursuant to which the company granted some members of the Supervisory Board a certain number of options, subject to the approval of the General Meeting. The General Meeting has given its approval hereto at the company's Extraordinary General Meeting of 10 February 2017. The company intends to continue this practice, subject to the General Meeting's approval and the applicable terms of the ESOP. Any options held by members of the Supervisory Board serve as a long-term investment in the company. The company does not grant any loans to any members of the Supervisory Board.

• Best practice provision 4.3.3: The General Meeting of a company not having statutory two-tier status (structuurregime) may pass a resolution to cancel the binding nature of a nomination for the appointment of a member of the Management Board or of the Supervisory Board and/or a resolution to dismiss a member of the Management Board or of the Supervisory Board by an absolute majority of the votes cast. It may be provided that this majority should represent a given proportion of the issued capital, which proportion may not exceed one-third. If this proportion of the capital is not represented at the meeting, but an absolute majority of the votes cast is in favour of a resolution to cancel the binding nature of a nomination, or to dismiss a board member, a new meeting may be convened at which the resolution may be passed by an absolute majority of the votes cast, regardless of the proportion of the capital represented at the meeting.

The company's Articles of Association provide that the Supervisory Board shall make binding nominations. In case the Supervisory Board has made a binding nomination for the appointment of a Management Board or a Supervisory Board member, the nominee shall be appointed irrespective of the majority of the votes cast in favour. The General Meeting may override the binding nature of such nomination by a resolution of two-thirds of the votes cast, which votes also need to represent more than half of the issued share capital. If the Supervisory Board has not made a binding nomination, the General Meeting shall be free to appoint a member of the Management Board or the Supervisory Board at its discretion by a simple majority representing at least one-third of the issued share capital.

Pursuant to the company's Articles of Association, the General Meeting may at any time dismiss a member of the Management Board or the Supervisory Board. The General Meeting may only adopt a resolution to dismiss such a member by a simple majority at the proposal of the Supervisory Board. Without such proposal, the resolution shall require a two-thirds majority of the votes cast, representing more than half of the issued share capital.

These provisions deviate from best practice provision 4.3.3 of the Dutch Code. The purpose of these provisions is to safeguard the continuity of the company and its group companies.

Tax
The company calculates tax charges based on the tax laws enacted or substantively enacted at the balance sheet date in the countries where the company's subsidiaries and associates operate and generate taxable income. Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. It establishes provisions where appropriate based on amounts expected to be paid to the tax authorities.

The company does not use contrived or abnormal tax structures that are intended for tax avoidance. The company pays an appropriate amount of tax according to where value is created within the normal course of business activities. For further disclosure, see note 25 of the company's financial statements.

Remuneration Report

Remuneration Report Introduction

In 2019, Avantium regained control over the YXY Technology to produce FDCA and PEF, revised the scale-up and market-launch strategy for FDCA and PEF and presented the intent to build a 5 kilotonnes FDCA flagship plant at the Avantium Technology & Markets Day in June 2019. Avantium made good progress on the implementation of this revised commercialisation strategy, including the selection of the location for the flagship plant and reaching the first important financing milestones for the engineering and construction of the flagship plant. Avantium also progressed with the other lead technology programmes such as Ray Technology, with the opening of the Ray demonstration plant for the production of plant-based mono-ethylene glycol (MEG) in Chemie Park Delfzijl. Avantium Catalysis contributed well and recorded strong revenue growth of 15% in 2019. Those achievements are reflected in the remuneration as presented in this Remuneration Report. The remuneration paid in 2019 is in line with the Remuneration Policy as approved by the General Meeting on 10 February 2017. The full legally superseding Remuneration Policy is published on the Avantium website (https://www.avantium.com/corporate-governance/#remuneration).

This Remuneration Report provides a summary of the Remuneration Policy of the Management Board and the Supervisory Board of Avantium respectively, as well as an overview of the remuneration of the members of the Managing Board and the Supervisory Board paid in the financial year 2019. This Remuneration Report also contains information about the Employee Share Option Plan (ESOP) and the Long-term Investment Plan (LTIP) for 2019 (see page 60).

The Remuneration Policy supports the long-term development of Avantium and aims to support all stakeholders' interests, while keeping an acceptable risk profile. The Supervisory Board ensures that the policy and its implementation are linked to Avantium's strategic goals and objectives. The policy is designed to encourage behavior that is focused on long-term value creation for all stakeholders. The primary objectives of the remuneration policy are to attract, motivate and retain highly qualified executives, as well as to reward members of the Management Board with a balanced and competitive remuneration package that is focused on sustainable results and is aligned with Avantium's long-term strategy.

This Report is prepared in accordance with Section 135b Book 2 of the Dutch Civil Code and is brought in line with the EU-guidelines based on the EU Shareholders' Rights Directive, and explains the application of the respective policies in 2019. Notwithstanding such, we will continue to improve on our alignment of reporting in the Remuneration Report over the year 2020. The Avantium Remuneration Report will be submitted to the Annual General Meeting on 14 May 2020 for an advisory vote by our shareholders, in line with article 2:135b (2) of the Dutch Civil Code. The Remuneration Report has not been presented to the General Meeting for an advisory vote previously.

Edwin Moses
Chair Remuneration Committee

Summary Remuneration policy Management Board 2019

Governance of the remuneration policy

The Supervisory Board established the remuneration of the members of the Management Board in accordance with the remuneration policy, which has been approved by the General Meeting on 10 February 2017. This remuneration policy is published on the Avantium website (https://www.avantium.com/corporate-governance/#remuneration) (hereafter the Remuneration Policy).

The Remuneration Committee prepares the Supervisory Board for decisions on matters within its remit. The Committee reports its findings and recommendations to the Supervisory Board which is collectively responsible for fulfilling the duties delegated to the Remuneration Committee. The Supervisory Board decides on the proposed remuneration and checks that it complies with the principles of restrained remuneration.

The Remuneration Committee performs scenario analyses of the possible financial outcomes of different performance levels and how these will have an impact on the total remuneration of the members of the Management Board.

Remuneration policy for the Management Board

The remuneration of the members of the Management Board consists of the following components:

i) Fixed annual base salary;
ii) Annual variable remuneration (bonus) in cash;
iii) Long-term variable remuneration in the form of shares and options;
iv) Allowance for pension and fringe benefits; and
v) Severance payments

Avantium strives to offer sufficiently competitive remuneration packages and to reward at least at the median of the relevant market.

Avantium does not grant its key management with any personal loans, guarantees or advance payments.

i) Fixed annual base salary

In 2019, the base salary of CEO Tom van Aken remained at €261,000 and the annual base salary of CFO Frank Roerink remained at €235,000.

ii) Annual variable remuneration (bonus)

The annual variable remuneration awarded is subject to achieving set performance conditions. The objective of the annual variable remuneration is to ensure that the members of the Management Board are focused on realising their short-term operational objectives, leading to longer-term value creation. The bonus, if any, has (i) a cash component of no more than 40% of a Management Board member's annual base salary and (ii) a non-cash component amounting to a percentage equivalent to the cash component which must be invested in Investment Shares (see under iii.1 Long-term Investment Plan).

ii.1 Performance conditions

On an annual basis, the Supervisory Board sets performance conditions by, at or prior to the beginning of the relevant financial year. The performance conditions are specific, measurable and include Avantium's financial performance and qualitative criteria related to Avantium's performance, taking into account Avantium's various stakeholders. The performance conditions are based on Avantium's strategy and long-term objectives. The Supervisory Board ensures that the relationship between the chosen performance criteria and the strategic objectives applied are properly reviewed and accounted for, both ex-ante and ex-post. The bonus is (partly) rewarded when predefined targets are (partly) realised. If realised performance is below a certain threshold level, no bonus is rewarded.

iii) Long-term variable remuneration

The objective of the long-term variable remuneration in the form of shares is to encourage the long-term commitment and retention of (inter alia) members of the Management Board. It also drives and rewards sound business decisions for Avantium's long-term creation of sustainable added value and aligns the Management Board and shareholder interests.

Incentive Plans

On 10 October 2016, Avantium adopted the 2016 Avantium Employee Stock Option Plan, (ESOP), and the 2016 Avantium Long Term Incentive Plan (LTIP) (collectively the Incentive Plans).

iii.1 Long-term Investment Plan (LTIP)/ Share matching:

The members of the Management Board are obligated to invest the total non-cash component of their (netto) bonus in shares to be delivered by the company (Investment Shares). The non-cash component percentage is 50%. The cash component of the bonus may, at the discretion of the relevant member of the Management Board, also be invested in Investment Shares. The sum of the non-cash component of their (netto) bonus and elected percentage will not exceed 100% of the full amount of their paid-out (netto) bonus amount

The Investment Shares are subject to a retention period of 5 years. After the end of the retention period, the company will match the Investment Shares in a 1:1 ratio, i.e. one matching share is granted for each Investment Share.

The objective of the plan is that Management Board members build an equity position in the company.

iii.2 Employee Share Option Plan (ESOP)

On an annual basis and on certain other occasions set out in the plan rules, options under the ESOP (Options) may be conditionally granted to members of the Management Board in accordance with criteria determined by the Supervisory Board. The Options will vest on the third anniversary following the grant as approved by the Supervisory Board. If the Management Board member is no longer employed by the company at the date of vesting, the number of Options will be decreased as provided for in the plan rules. The exercise period of the Options will be up to 5 years after the date of vesting.

iii.3 Adjustments to variable remuneration

In line with Dutch law, the variable remuneration of the members of the Management Board may be reduced or Management Board members may be obliged to repay (part of) their remuneration to the company if certain circumstances apply:

(a) Test of reasonableness: any variable remuneration awarded to a member of the Management Board may be adjusted by the Supervisory Board to an appropriate level if payment of the variable remuneration were to be unacceptable according to the criteria of reasonable and fairness.

(b) Claw back: the Supervisory Board has the authority to recover from a member of the Management Board any variable remuneration awarded based on incorrect financial data in respect of underlying targets or other circumstances of which the variable remuneration is dependent.

(c) Deduction of value increase of shares: in case the value of the shares (including rights to subscribe for shares) granted by the company to the respective members of the Management Board as part of their remuneration increases during a period in which a public offer is made on the shares, the remuneration of that respective Management Board member will be reduced by the amount by which the value of the shares granted by the company to such member has increased. Similar provisions apply in the situation of an intended legal merger or demerger of the company, or if the company intends to enter into certain transactions that are of significance to the company that the Management Board requires the approval of the General Meeting pursuant to Dutch law.

iv) Allowance for pensions and fringe benefits

The members of the Management Board participate in Avantium's pension plan. The pension plan is a defined contribution plan. New legislation in 2015 reduced the maximum pension accrued to 1.875% (from 2.15%) of the full pensionable salary. The members of the Management Board can choose to build up the part of the pensionable salary above € 107,593 (2019) in a separate defined contribution plan. There are no arrangements for early retirement.

The members of the Management Board are entitled to customary fringe benefits, such as car allowance and reimbursement of business expenses, in accordance with applicable Avantium policies, plans and arrangements.

v) Severance payments

The members of the Management Board are employed based on a permanent employment contract. These contracts do not contain severance payment provisions. The Supervisory Board may determine that a member of the Management Board is entitled to compensation for the loss of income resulting from a non-voluntary termination as a Management Board member, in line with the best practice provision in the Corporate Governance Code.

Remuneration Report Management Board 2019

General overview of the financial year 2019

The start of the year was challenging for Avantium, with the termination of the Synvina joint venture in January 2019 and Avantium buying the shares from BASF in the Synvina joint venture to take full control over the YXY Technology. We regained full ownership of Synvina and revised the scale-up and market-launch strategy for FDCA and PEF, which we shared with the markets at the Avantium Technology & Markets Day of June 2019. We are moving ahead quickly with our revised strategy to commercialise FDCA and PEF. Engineering company Worley (formerly known as Jacobs Engineering) has started detailed pre-engineering studies for a 5 kilotonnes FDCA flagship plant, which is slated for a 2023 start-up. Furthermore, we have secured €25 million in EU funding under the PEFerence Consortium and €30 million financing by a regional consortium for the FDCA flagship plant. The objective for 2020 is to secure €150 million to finance the FDCA flagship plant as one of the important criteria for reaching a positive investment decision at the end of 2020.

In addition to the developments of the YXY Technology, we have also entered a new phase towards commercialisation with our other Renewable Chemistry technology programmes. We opened a demonstration plant in Delfzijl, next to the Dawn Technology pilot biorefinery, that will help advance the production of plant-based mono-ethylene glycol (MEG). We also scaled up our technology that uses electrochemistry to convert CO2 to higher value chemicals - from lab-scale towards pre-pilot installations, with the opening of a pre-pilot test unit in the Port of Amsterdam in 2019.

Avantium Catalysis, our catalysis testing and R&D services business unit, continues to contribute well to the business, with revenue growth of 15% during 2019.

As Avantium enters the next chapter of executing our strategy to commercialise our renewable chemical technologies, the Management Board has made some organisational adjustments to increase efficiency, cost control and strategic focus. This is part of the company's long-term strategy to become a world leader in renewable chemistry technologies and to create shareholder value by commercialising these technologies in partnership with like-minded organisations. We also focused on broadening our talent pool in terms of expertise over the last year. The organisational adjustments and focus on new skills have enabled Avantium to develop a stronger, results-oriented company and culture.

It was concluded that this new phase of the company requires a different composition of the Management Board and as part of this, it was a natural move for Frank Roerink, CFO since 2007, to step down. He stepped down as CFO and Management Board member effective 31 December 2019.

For more information about the performance of Avantium in 2019, please read the full Annual Report 2019, which is published on the Avantium website: https://www.avantium.com/investors/#annual-report.

The progress in 2019 is reflected in the remuneration paid to the Management Board, which is in line with the Remuneration Policy as approved by the Annual General Meeting on 10 February 2017 (https://www.avantium.com/corporate-governance/#remuneration).

Total Remuneration received by members of the Management Board
The following table provides a breakdown of the remuneration in 2019 of the members of the Management Board. The Management Board members continued their current employment agreements with Avantium Support B.V. a subsidiary of the Company. These agreements are contracts for an indefinite period of time and do not contain severance payment provisions. These employment agreements will be replaced by management agreements with Avantium N.V. in due course (foreseen for the financial year 2020):

	Fixed remuneration		Variable						
(In Euro x 1,000)	Salary	Other benefits*	Short-term bonus **	Long-term award***	Severance payments	Post-employee benefits	Total Remuneration	% of fixed remuneration	% of variable remuneration
Management Board									
Tom van Aken									
2019	261	27	119	8	-	17	432	71%	29%
2018	261	27	-	-	-	18	306	100%	0%
Frank Roerink									
2019	235	32	92	6	235	17	616	46%	54%
2018	235	27	-	-	-	17	280	100%	0%
Total - 2019	**496**	**59**	**210**	**14**	**235**	**34**	**1,048**	**79%**	**21%**
Total - 2018	496	55	0	0	0	35	586	100%	0%

*Other benefits mainly include contributions to social security plans, benefits in kind such as company cars, medical expenses and legal expenses.
**Short-bonus include the cash and non-cash part of the awarded bonus for the specific performance year.
***Long-term award includes the value of the various performance share-based plans that vested during the year. The value of the LTIP reward is calculated based on the number of matching shares that have vested and of the share price at the date of vesting. The value of the ESOP reward is calculated based on the number share options that have vested during the year and the net of the share price at vesting date less the exercise price.

The total remuneration based on IFRS in 2019 for Tom van Aken amounted to €548,000 (2018: €451,000) due to the share-based payment expenses of €117,000 recognised during the year (2018: €145,000). The total remuneration based on IFRS in 2019 for Frank Roerink amounted to €674,000 (2018: €366,000) due to the share-based payment expenses of €57,000 recognised during the year (2018: €87,000).

Frank Roerink resigned as member of the Management Board effective 31 December 2019. In connection with his resignation Frank Roerink will be paid a severance payment of €235,000 in 2020, which amount is in line with the Dutch Corporate Governance Code; not exceeding one year's (gross) salary. Frank Roerink remained eligible for variable remuneration over the financial year 2019. He will receive his variable remuneration over 2019 (including the LTIP component) fully in cash in January 2020. The awards under the LTIP serve as a long-term investment in the company and aim to align the respective interests with those of the other shareholders. Now that Frank Roerink has stepped down and left the company, this is no longer applicable to him. Reference is also made to the 'Deviations of Remuneration Policy' section of this Remuneration Report on page 66.

Performance targets
The performance targets are specific, measurable and are formulated and communicated at the beginning of each year. The targets – based on Strategic Differentiators, Commercial Performance and Operational Performance targets - are based on Avantium's strategy and long-term objectives, as set out in the Remuneration Policy (https://www.avantium.com/corporate-governance/#remuneration). When the performance criteria are set, the interests of all stakeholders are taken into account.
The targets of the Strategic Differentiators are based on value creation for shareholders, and realising strategic focus. The targets for Commercial Performance are based on securing strategic partnerships for the commercialisation of technology programmes and reaching the commercialisation phase of the different technology programmes (path from laboratory scale to demonstration scale and finally commercialisation scale). The Operational Performance targets are financial targets, consisting of budget cash runway components. Avantium does not disclose the exact actual targets, as these qualify as strategically and commercially sensitive information, though the targets set are fully in line with the long-term strategy of Avantium to maximise the value of our technologies.
In line with the performance of Avantium in 2019, as set out in the section 'General overview of the financial year 2019' on page 26 of the Remuneration Report, it was concluded that Strategic Differentiator targets were partly achieved, Commercial targets were partly achieved and that Operational Performance targets were fully achieved. This resulted in the conclusion of the Supervisory Board that 65% of the targets have been achieved. The Supervisory Board has not used any upward or downward discretion. The overall average achievement of the Management Board members for performance year 2019 amounts to 65% of the maximum achievable bonus. The maximum achievable bonus for Tom van Aken is 70% (therefore resulting in a variable remuneration for 2019 of 46% of his annual base salary). The maximum achievable bonus for Frank Roerink is 60% (therefore resulting in a variable remuneration for 2019 of 39% of his annual base salary).

Name	Weight factor	Target	Measured performance	Total performance in 2019
T.B. van Aken	45%	Strategic Differentiators	67%	65%
	45%	Commercial Performance	55 %	
	10%	Operational Performance	100%	
F.C.H. Roerink	45%	Strategic Differentiators	67%	65%
	45%	Commercial Performance	55%	
	10%	Operational Performance	100%	

The following table provides an overview of the remuneration of the Chief Executive Officer and Chief Financial Officer compared to the average total remuneration of an Avantium employee (defined as gross wages, holiday allowance, other benefits, pension, bonus and long-term awards) and company performance since the listing of the company's shares in 2017:

(In Euro x 1,000)

Management Board member	2019	% change	2018	% change	2017
Tom van Aken	432	41%	306	-17%	368
Frank Roerink	616	120%	280	-13%	321
Average employee salary	**70**	0%	**70**	7%	**66**

	2019	% change	2018	% change	2017
Total company performance	**65%**	122%	**29%**	-66%	**86%**
Strategic Differentiators	67%	168%	25%	-66%	68%
Commercial Performance	55%	175%	20%	-66%	100%
Operational Performance	100%	11%	90%	-66%	100%

The table includes information on a three year period, as of 2017, the year Avantium became a publicly traded company.

With respect to Frank Roerink, it is noted that his severance payment is included in his total remuneration over the year 2019.

The pay-out ratio at Avantium (defined as gross wages, plus social securities and bonus) of the CEO versus the median of all employees is 5:1 (2018: 5:1).

Investment shares

As noted above, the performance of the individual members of the Management Board in a specific year is based on whether they achieve the targets set at the start of the financial year. The Supervisory Board evaluated the performance over the 2018 financial year, and decided on 13 March 2019 to not to award a cash and non-cash variable payment. Therefore the members of the Management Board did not acquire any investment shares in 2019.

The following table provides a breakdown of the number of awards outstanding as per 31 December 2019 for each individual member of the Management Board.

Tom van Aken

	The main conditions of share plans					Information regarding the reported financial year						
Management Board Member	Specification of plan	Performance period	Award date	Vesting date	End of Retention period	Number of awards outstanding 1 January	Shares allocated during the year	Shares forfeited during the year	Shares vested during the year	Value of Matching shares vested during the year in EUR*	Matching shares unvested as at 31 December	Shares subject to Retention period as at 31 December
Tom van Aken, CEO	Long-term Investment Plan	2017-2018	3/16/2018	3/16/2018	3/16/2023	7,441	-	-	-	-	-	7,441
	Matching shares	n/a	3/16/2018	3/16/2021	3/16/2023	7,441	-	-	2,481	6,661	4,960	2,481
						14,882	**-**	**-**	**2,481**	**6,661**	**4,960**	**9,922**

*The value of matching shares vested during the year is expressed in EUR and is determined by the share price at vesting date.

Frank Roerink

	The main conditions of share plans					Information regarding the reported financial year						
Management Board Member	Specification of plan	Performance period	Award date	Vesting date	End of Retention period	Number of awards outstanding 1 January	Shares allocated during the year	Shares forfeited during the year	Shares vested during the year	Value of Matching shares vested during the year in EUR*	Matching shares unvested as at 31 December	Shares subject to Retention period as at 31 December
Frank Roerink, CFO	Long-term Investment Plan	2017-2018	3/16/2018	3/16/2018	3/16/2023	5,789	-	-	-	-	-	5,789
	Matching shares	n/a	3/16/2018	3/16/2021	3/16/2023	5,789		(3,859)	1,930	5,182	-	1,930
						11,578	**-**	**(3,859)**	**1,930**	**5,182**	**-**	**7,719**

*The value of matching shares vested during the year is expressed in EUR and is determined by the share price at vesting date.

With respect to the number of matching shares forfeited: the matching entitlements are decreased in accordance with the LTIP plan rules as a result of Frank Roerink's resignation effective 31 December 2019.

The following table provides a breakdown of the number of share options outstanding as per 31 December 2019 for each individual member of the Management Board.

Tom van Aken

	The main conditions of share option plans					Information regarding the reported financial year						
Management Board Member	Specification of plan	Award date	Vesting date	Exercise period	Exercise price of the option in EUR	Number of vested options outstanding 1 January	Share options granted during the year	Share options forfeited during the year	Share options vested during year	Value of Share options vested during the year*	Share options unvested as at 31 December	Share options vested as at 31 December
Tom van Aken, CEO	Employee Share Option Plan	10/19/2006	10/19/2009	10 years	7,60	20,230	-	-	-	-	-	20,230
		10/1/2008	10/1/2011	10 years	0,10	20,657	-	-	-	-	-	20,657
		5/1/2009	5/1/2012	10 years	0,10	35,000	-	-	-	-	-	35,000
		5/1/2010	5/1/2013	10 years	0,10	29,770	-	-	-	-	-	29,770
		11/4/2010	11/4/2013	10 years	0,10	28,000	-	-	-	-	-	28,000
		11/30/2011	11/30/2014	10 years	0,10	135,000	-	-	-	-	-	135,000
		10/1/2015	3/15/2017	10 years	0,10	22,000	-	-	-	-	-	22,000
		10/1/2015	3/15/2017	10 years	9,80	7,500	-	-	-	-	-	7,500
		3/2/2017	3/15/2017	10 years	0,10	13,000	-	-	-	-	-	13,000
		3/2/2017	3/15/2017	10 years	9,80	18,000	-	-	-	-	-	18,000
		5/17/2017	5/17/2020	8 years	10,58	50,000	-	-	16,667	-	5,556	44,444
		3/28/2018	3/28/2021	8 years	5,34	50,000	-	-	16,667	-	19,444	30,556
		5/16/2019	5/16/2022	8 years	2,60	-	100,000	-	22,222	917	77,778	22,222
					Total	**429,157**	**100,000**	**-**	**55,556**	**917**	**102,778**	**426,379**

*The value of share options vested during the year is expressed in EUR and is determined by the share price at vesting date less the exercise price.

Frank Roerink

	The main conditions of share option plans					Information regarding the reported financial year						
Management Board Member	Specification of plan	Award date	Vesting date	Exercise period	Exercise price of the option in EUR	Number of options outstanding 1 January	Share options granted during the year	Share options forfeited during the year	Share options vested during year	Value of Share options vested during the year*	Share options unvested as at 31 December	Share options vested as at 31 December
Frank Roerink, CFO	Employee Share Option Plan	5/11/2007	5/11/2010	10 years	7,60	8,918	-	(8,918)	-	-	-	-
		10/1/2008	10/1/2011	10 years	0,10	14,098	-	-	-	-	-	14,098
		5/1/2009	5/1/2012	10 years	0,10	25,000	-	-	-	-	-	25,000
		5/1/2010	5/1/2013	10 years	0,10	22,432	-	-	-	-	-	22,432
		11/4/2010	11/4/2013	10 years	0,10	16,500	-	-	-	-	-	16,500
		11/30/2011	11/30/2014	10 years	0,10	90,000	-	-	-	-	-	90,000
		10/1/2015	3/15/2017	10 years	0,10	14,300	-	-	-	-	-	14,300
		10/1/2015	3/15/2017	10 years	9,80	5,000	-	(5,000)	-	-	-	-
		3/2/2017	3/15/2017	10 years	0,10	13,000	-	-	-	-	-	13,000
		3/2/2017	3/15/2017	10 years	9,80	14,000	-	(14,000)	-	-	-	-
		5/17/2017	5/17/2020	8 years	10,58	30,000	-	(3,333)	10,000	-	-	26,667
		3/28/2018	3/28/2021	8 years	5,34	30,000	-	(11,667)	10,000	-	-	18,333
		5/16/2019	5/16/2022	8 years	2,60	-	60,000	(46,667)	13,333	550	-	13,333
					Total	**283,248**	**60,000**	**(89,585)**	**33,333**	**550**	**-**	**253,663**

*The value of share options vested during the year is expressed in EUR and is determined by the share price at vesting date less the exercise price.

With respect to the number of options forfeited: the share option entitlements are decreased in accordance with the LTIP plan rules as a result of Frank Roerink's resignation effective 31 December 2019.

In 2019, 160,000 additional share options were granted to the Management Board. The share-based payment expenses of the Management Board of €174,000 comprise the part of the share-based compensation (note 14) contributable to the share options granted in previous years.

Based on the applicable terms and conditions of the Incentive Plans, the Supervisory Board has the authority to recover from a member of the Management Board any variable remuneration awarded based on incorrect financial data in respect of underlying targets or other circumstances of which the variable remuneration is dependent.

Deviations of Remuneration Policy
Frank Roerink resigned as member of the Management Board effective 31 December 2019. In connection with his resignation Frank Roerink will receive a severance payment of €235,000 in 2020, which amount is in line with the Dutch Corporate Governance Code and the Remuneration Policy; not exceeding one year's (gross) salary. Frank Roerink remained eligible for variable remuneration over the financial year 2019. As a deviation to the Remuneration Policy, the Supervisory Board decided that he will receive his variable remuneration over 2019 (including the LTIP component), fully in cash. The awards under the LTIP serve as a long-term investment in the company and aim to align the respective interests with those of the other shareholders. Now that Frank Roerink has stepped down and left the company, this is no longer applicable.

Remuneration Report Supervisory Board 2019

Summary of the remuneration of the Supervisory Board
The remuneration policy of the Supervisory Board is designed to attract qualified leaders with the right balance of personal skills, competences and experience required to oversee (the execution of) Avantium's strategy, its performance and long-term value creation, serving the interests of all stakeholders. In line with the Dutch Corporate Governance Code, the remuneration of the Supervisory Board is not linked to company or individual performance.

Pursuant to the Articles of Association, the General Meeting may determine the remuneration for Supervisory Board members upon proposal by the Supervisory Board. The remuneration for the Supervisory Board was adopted by the General Meeting on 10 February 2017.

The remuneration of the Supervisory Board is as follows:
- Membership of the Supervisory Board: €40,000
- Chairpersonship of the Supervisory Board: an additional €35,000
- Membership of a Committee of the Supervisory Board: €5,000 (per Committee)
- Chairpersonship of the Audit Committee of the Supervisory Board: an additional €5,000

In addition, the members of the Supervisory Board may participate in the Employee Share Option Plan.

The following table provides detail on total remuneration received by each Supervisory Board member in accordance with the period the underlying shares are traded on Euronext:

(In Euro x 1,000)	K. Verhaar	D. Lucquin	G. Reijnen	J. Wolfson	M. Kleinsman	R. van Leen	E. Moses	Total
Supervisory Board Fixed fee								
2019	**90**	**50**	**21**	**18**	**50**	**30**	**3**	**262**
2018	80	50	55	50	50	-	-	285
2017	6	53	50	45	27	-	-	181

Supervisory Board members shall be reimbursed for all reasonable costs incurred in connection with their attendance of meetings. Any other expenses shall only be reimbursed, either in whole or in part, if incurred with the prior consent of the Chairperson of the Supervisory Board.

Deviation to the Dutch Corporate Governance Code Best Practice provision 3.3.2

DCGC best practice provision 3.3.2: Supervisory board members may not be awarded remuneration in the form of shares and/or rights to shares.

To continue to be able to attract and retain top talent in a competitive and global environment and to focus the Supervisory Board on creation of sustainable added value, the company has, in view of the IPO, introduced a renewed Employee Share Option Plan (ESOP) in 2016, pursuant to which the company granted some members of the Supervisory Board a certain number of options, subject to the approval of the General Meeting. The General Meeting has given its approval hereto at the company's Extraordinary General Meeting of 10 February 2017. The company intends to continue this practice, subject to the General Meeting's approval and the applicable terms of the ESOP. Any options held by members of the Supervisory Board serve as a long-term investment in the company. The company does not grant any loans to any members of the Supervisory Board

Mr K. Verhaar stepped down as of 20 December 2019. Mr J. Wolfson and Mrs G. Reijnen stepped down as of the date of the Annual General Meeting of 14 May 2019. Mr J. van der Eijk stepped down on 30 November 2017.

The following table provides a breakdown of the number of share options outstanding as per 31 December 2019 for the following (previous) members of the Supervisory Board.

Jan van der Eijk

	The main conditions of share option plans					Information regarding the reported financial year			
Supervisory Board Member	Specification of plan	Award date	Vesting date	Exercise period	Exercise price of the option in EUR	Number of options outstanding 1 January	Share options exercised during the year	Value of Share options exercised during the year*	Share options vested as at 31 December
Jan van Eijk	Employee Share Option Plan	12/14/2012	12/14/2015	10 years	0,10	10,000	(10,000)	26,000	-
		3/2/2017	3/2/2020	10 years	0,10	1,000	(1,000)	2,567	-
		3/2/2017	3/2/2020	10 years	9,80	4,000	-	-	4,000
					Total	**15,000**	**(11,000)**	**28,567**	**4,000**

Jonathan Wolfson

	The main conditions of share option plans					Information regarding the reported financial year			
Supervisory Board Member	Specification of plan	Award date	Vesting date	Exercise period	Exercise price of the option in EUR	Number of options outstanding 1 January	Share options exercised during the year	Value of Share options exercised during the year*	Share options vested as at 31 December
Jonathan Wolfson	Employee Share Option Plan	4/19/2013	4/19/2016	10 years	0,10	10,000	-	-	10,000
		3/2/2017	3/2/2020	10 years	0,10	1,000	-	-	1,000
		3/2/2017	3/2/2020	10 years	9,80	4,000	-	-	4,000
					Total	**15,000**	**-**	**-**	**15,000**

Gabrielle Reijnen

	The main conditions of share option plans					Information regarding the reported financial year			
Supervisory Board Membe	Specification of plan	Award date	Vesting date	Exercise period	Exercise price of the option in EUR	Number of options outstanding 1 January	Share options exercised during the year	Value of Share options exercised during the year*	Share options vested as at 31 December
Gabrielle Reijnen	Employee Share Option Plan	4/15/2015	4/15/2019	10 years	9,80	10,000	-	-	10,000
		3/2/2017	3/2/2020	10 years	9,80	4,000	-	-	4,000
					Total	**14,000**	**-**	**-**	**14,000**

*The value of share options exercised during the year is expressed in EUR and is determined by the share price at exercised date less the exercise price.

Consolidated financial statements 2019

Consolidated statement of comprehensive income

in Euro x 1,000	Notes	Year ended 31 December 2019	2018
Continuing operations			
Revenues	20	13,821	11,283
Other income	21	4,217	3,637
Expenses			
Raw materials and contract costs	22	(3,666)	(3,065)
Employee benefit expenses	23	(19,747)	(13,731)
Depreciation, amortisation and impairment charge	22	(5,948)	(1,799)
Office and housing expenses	22	(1,800)	(2,208)
Patent, license, legal and advisory expenses	22	(3,185)	(1,897)
Laboratory expenses	22	(3,606)	(1,737)
Advertising and representation expenses	22	(1,438)	(1,311)
Expense due for onerous contract	7,9	(724)	(13,088)
Other operating expenses	22	(890)	(447)
Operating loss		**(22,966)**	**(24,362)**
Finance income	24	27	19
Finance costs	24	(345)	(87)
Finance costs - net		**(319)**	**(68)**
Share in loss of joint ventures	8	(259)	(43,948)
Loss before income tax		**(23,544)**	**(68,378)**
Income tax expense	25	-	-
Loss for the period		**(23,544)**	**(68,378)**
Other comprehensive income			
Share of other comprehensive income of joint ventures accounted for using the equity method	7	-	-
Total comprehensive income / (expense) for the year		**(23,544)**	**(68,378)**
Profit / (Loss) attributable to:			
Owners of the parent		(23,544)	(68,378)
		(23,544)	(68,378)
Total comprehensive income / (expense) attributable to:			
Owners of the parent		(23,544)	(68,378)
		(23,544)	**(68,378)**

		Year ended 31 December	
Earnings per share for profit from continuing operations attributable to the ordinary equity holders of the company	**Note**	**2019**	**2018**
Basic earnings per share	13	(0,91)	(2,65)
Diluted earnings per share	13	(0,91)	(2,65)
Earnings per share for profit attributable to the ordinary equity holders of the company			
Basic earnings per share	13	(0,91)	(2,65)
Diluted earnings per share	13	(0,91)	(2,65)

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated statement of financial position

in Euro x 1,000		As at 31 December	
		2019	2018
Assets	Notes		
Non-current assets			
Property, plant and equipment	5	27,677	15,186
Intangible assets	6	684	722
Right-of-use assets	7	9,732	-
Investments in joint ventures and associates	8	-	4,249
Total non-current assets		**38,092**	**20,157**
Current assets			
Inventories	10	1,440	1,160
Trade and other receivables	11	11,541	9,307
Cash and cash equivalents	12	45,443	83,302
Total current assets		**58,425**	**93,769**
Total assets		**96,517**	**113,926**
Liabilities			
Non-current liabilities			
Lease liabilities	7	9,264	-
Total non-current liabilities		**9,264**	**-**
Current liabilities			
Lease liabilities	7	1,534	-
Trade and other payables	16	17,367	9,525
Provisions for other liabilities and charges	18	137	13,244
Total current liabilities		**19,038**	**22,769**
Total liabilities		**28,303**	**22,769**
Equity			
Equity attributable to owners of the parent			
Ordinary shares	13	2,583	2,583
Share premium	13, 14	204,296	204,296
Other reserves	13, 14	9,862	9,331
Accumulated losses		(148,527)	(125,053)
Total equity attributable to the owners of the parent		68,215	91,157
Total equity		**68,215**	**91,157**
Total equity and liabilities		**96,517**	**113,926**

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated statement of changes in equity

in Euro x 1,000	Attributable to equity holders of the company				
	Ordinary shares	Share premium	Other reserves	Accumulated losses	Total Equity
Balance at 1 January 2018	**2,577**	**204,296**	**8,252**	**(56,765)**	**158,360**
Comprehensive income					
Result for the year	-	-	-	(68,378)	(68,378)
Other Comprehensive income for the year	-	-	-	-	-
Total Comprehensive income for the year	**-**	**-**	**-**	**(68,378)**	**(68,378)**
Transactions with owners					
- Employee share schemes – value of Employee services	-	-	970		970
- Employee share schemes – LTIP investment shares granted	-	-	199		199
- Transfer value share scheme to retained earnings	-	-	(90)	90	-
- Issue of ordinary shares	7	-	-	-	7
Total transactions with owners	**7**	**-**	**1,079**	**90**	**1,175**
Balance at 31 December 2018	**2,583**	**204,296**	**9,331**	**(125,053)**	**91,157**
Balance at 1 January 2019	**2,583**	**204,296**	**9,331**	**(125,053)**	**91,157**
Comprehensive income					
Result for the year	-	-	-	(23,544)	(23,544)
Other Comprehensive income for the year	-	-	-	-	-
Total Comprehensive income for the year	**-**	**-**	**-**	**(23,544)**	**(23,544)**
Transactions with owners					
- Employee share schemes – value of Employee services	-	-	574		574
- Employee share schemes – LTIP investment shares granted	-	-	25		25
- Transfer value share scheme to retained earnings	-	-	(69)	69	-
- Issue of ordinary shares	-	-	-	-	-
- Shares delivered from treasury shares	-	-	2	-	2
Total transactions with owners	**-**	**-**	**532**	**69**	**601**
Balance at 31 December 2019	**2,583**	**204,296**	**9,863**	**(148,527)**	**68,215**

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated statement of cash flows

in Euro x 1,000		Year ended 31 December	
	Notes	2019	2018
Cash flows from operating activities			
Loss for the year from continuing operations		(23,544)	(68,378)
Adjustments for:			
- Depreciation of property, plant and equipment	5	4,130	1,550
- Amortisation	6	183	249
- Depreciation of right of use assets	7	1,635	-
- Share in loss of joint ventures	8	259	43,948
- Share-based payment	13	599	1,169
- Finance costs - net	24	319	68
- Non cash portion of onerous contract expense		492	-
Changes in working capital (excluding exchange differences on consolidation):			
- (Increase)/decrease in inventories	10	(280)	95
- (Increase)/decrese in trade and other receivables	11	(2,192)	171
- (Increase)/decrease in trade and other payables	15	8,442	(789)
- (Decrease)/increase in provisions	17	(13,107)	13,107
		(23,064)	**(8,810)**
Interest (paid) on current accounts	24	(17)	(24)
Net cash used in operating activities		**(23,080)**	**(8,834)**
Cash flows from investing activities			
Purchases of property, plant and equipment (PPE)	5	(8,458)	(7,958)
Purchases of intangible assets	6	(86)	(120)
Acquisition of Subsidiary	9	(4,189)	
Net cash used in investing activities		**(12,734)**	**(8,078)**
Cash flow from financing activities			
Interest received from current accounts	24	27	19
Principal elements of lease payments	7	(2,021)	-
Other interest received		56	43
Other interest paid and financing costs		(94)	(80)
Net cash generated from financing activities		**(2,032)**	**(18)**
Net decrease in cash and cash equivalents		**(37,846)**	**(16,930)**
Cash and cash equivalents at beginning of the year	12	83,302	100,237
Effect of exchange rate changes	24	(12)	(5)
Cash and cash equivalents from continuing operations at end of financial year		**45,443**	**83,302**
Cash and cash equivalents at end of financial year		**45,443**	**83,302**

The accompanying notes are an integral part of these consolidated financial statements.

Notes to the consolidated financial statements

1. General information

Avantium N.V. ('the company') and its subsidiaries (together 'the group') develop and commercialise next generation bio-based plastics and chemicals based on our unique technological capabilities in advanced catalysis research & development. The company is also the ultimate parent of the group. Over the years, our company has established a leading market position in providing advanced catalysis services and systems. The company has its statutory seat at Zekeringstraat 29-31, 1014 BV in Amsterdam, the Netherlands.

For setting the principles for the recognition and measurement of assets and liabilities and determination of the result of its company financial statements, Avantium N.V. makes use of the option provided in Section 2:362 (8) of the Dutch Civil Code. This means that the principles of the recognition and measurements of assets and liabilities and determination of the result (hereafter referred to as accounting policies) of the company financial statements of Avantium N.V. are the same as those applied for the consolidated financial statements under IFRS (refer to note 2). By applying this option, reconciliation is maintained between the group's and the company's equity.

These consolidated financial statements were approved for issue by both the Supervisory Board and the Management Board on 24 March 2020.

2. Summary of significant accounting policies

The principal accounting policies applied in the preparation of these consolidated financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

2.1 Basis of preparation

The consolidated financial statements of Avantium N.V. have been prepared in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union. The consolidated financial statements have been prepared under the historical cost convention unless otherwise stated.

The preparation of financial statements in accordance with IFRS requires the use of certain critical accounting estimates. It also requires management to exercise its judgment in the process of applying the group's accounting policies. The areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to the consolidated financial statements, are disclosed in note 4.

2.1.1 Going concern

The net loss for the year 2019 amounted to €23,544,000, and in anticipation of the Annual General Meeting's adoption of the annual accounts, this has been added to the accumulated deficit resulting in a net equity of €68.2 million.

On 15 March 2017, the company listed on Euronext Amsterdam and Brussels, raising gross proceeds of €109 million (including the over-allotment exercise). On 31 December 2019, the company held €45.4 million in cash and cash equivalents.

The facility agreement the company holds with Rabobank includes a €4.0 million committed credit facility and a €2.0 million committed bank guarantee facility. The financial covenants as agreed with Rabobank, mainly relate to tangible net worth (TNW) requirements, being at least €60.0 million tangible net worth. The company did not make use of the credit facility and will keep the facility as an additional buffer. Refer to note 3.2 for the group's objective in terms of capital management.

For 2020, the company anticipates a net loss including overall negative operating cash flows. With respect to the services and systems business a positive cash flow is anticipated and with the funding obtained in March 2017 from the IPO, and obtained funding and anticipated funding for Avantium Renewable Polymer's commercial plant, sufficient cash flows are available to meet the requirements for working capital, capital expenditures and R&D for at least twelve months after the signing date of these financial statements.

Looking ahead, we see increased uncertainties following the COVID-19 worldwide outbreak and market volatility. We have no indication whether the governmental measures will have an effect in preventing a further spread around the world. In the event of a prolonged pandemic there may be an effect on the financial performance of the company. The group has taken measures to ensure our employees and partners continue to be safe while interacting together. Measures have been taken to minimise the impact of the pandemic and to continue operations in all our businesses.

The short term impact of the COVID-19 outbreak is limited. The company recorded €13.8 million revenues in 2019, mostly from customer-made systems and longer term service contracts in our Catalysis unit. Catalysis customers are multinational companies which normally have a long term focus and invest in innovation. In case a closure of all our operations is required (offices, labs and pilot plants), there could be a modest delay in invoicing, assuming closure is limited to just weeks. The company can quickly reduce discretionary spending on consultants, interim staff and delay certain capital expenditures. Development projects in our Renewable Chemistry Technologies could experience some delay in achieving technical milestones.

The financial situation of the group is currently healthy, with a balance of €45.4 million of cash and cash equivalents as of 31 December 2019. In case operations have to completely cease for a period of time due to COVID-19 related restrictions we believe customers will still accept delayed delivery of our Catalysis systems based on the originally agreed terms. Therefore based on our current cash balance and expected yearly cash outflow, we expect, even in the scenario where operations completely cease for a period of time, to be able to meet our financial obligations. Therefore, Avantium continues to adopt a going concern assumption as the basis for preparing its consolidated financial statements.

Depending on the progress made in the development of the various technologies of Avantium and strategic choices by management, management expects to require additional funding in the coming years. The current market volatility could negatively impact the company's ability to attract funding in the upcoming years and could impact management's ability to achieve its strategic goals.

2.1.2 Changes in accounting policy and disclosures

(a) New standards, amendments and interpretations adopted by the group

The following standards have been adopted by the group for the first time for the financial year beginning on or after 1 January 2019. The impact on the group is as follows:

IFRS 16, "Leases"

– The new IFRS standard "Leases" (IFRS 16) was adopted by the group on 1 January 2019 and replaced the pre-existing standard, IAS 17. IFRS 16, 'Lease accounting', became effective for accounting periods beginning on or after 1 January 2019. To increase comparability, the new standard eliminated nearly all off balance sheet accounting for lessees and redefined many commonly used financial metrics. The implementation of IFRS 16 had an impact on the group's consolidated financials, as previous off-balance sheet operating lease commitments are now being reported on the balance sheet as of 1 January 2019, affecting the balance sheet totals.

– The implementation of IFRS 16 also had a favourable impact on EBITDA, which forms part of the segment reporting in note 19 of this consolidated financials. The favourable impact on EBITDA is a result of rent expenses previously recorded under operating leases replaced by depreciation expenses and interest expenses, which are reported below EBITDA. There was no significant impact on current ratios or other metrics used in the group.

– Furthermore, IFRS 16 had an impact on the company's consolidated statement of comprehensive income, as the depreciation increased due to the right-of-use asset that was recorded, interest expenses increased due to the lease liability that was recorded, and other categories such as housing and car rental expenditures decreased.

– The company has opted for a modified retrospective approach as the transition approach, which had been used consistently for all lease obligations. The new standard mainly had an effect on the accounting of the company's operating leases.

The group had to change its accounting policies as a result of adopting IFRS 16. The impact of the adoption of IFRS 16 is disclosed in note 30 of this consolidated financial statement.

IAS 20, "Government Grants"

The group decided to change its accounting policy on the disclosure of the company's government grant income. In previous years the group reported its government grant income as a deduction of the related expense, which in prior years consisted mostly of wage costs. However as the relation to wage costs and other costs such as machine and laboratory expenses has changed over the years, the group have decided to change the way it reports the total income. As of 1 January 2019, the company reports government grant income under a separate category as other income. This change in accounting policy had an impact on the company's consolidated statement of comprehensive income, since employee benefit expenses increased and other income increased with the similar amount. For further information on the impact of the change in accounting policy, please refer to note 30 of this consolidated financial statement.

Other standards, amendments and interpretations which are effective for the financial year beginning on 1 January 2019 are not material to the group.

(b) New standards, amendments and interpretations not yet adopted

A number of new standards and amendments to standards and interpretations are effective for annual periods beginning after 1 January 2019, and have not been applied in preparing the consolidated financial statements. None of these is expected to have a significant effect on the consolidated financial statements of the group, except the following set out below:

IFRS 17, "Insurance contracts"

IFRS 17 replaces IFRS 4, "Insurance Contracts". It requires a current measurement model where estimates are remeasured in each reporting period.

The standard allows a choice between recognising changes in discount rates either in the income statement or directly in other comprehensive income.

IFRS 17 was issued in May 2017 and applies to annual reporting periods beginning on or after 1 January 2021. The company has yet to assess the standard's full impact.

2.2 Consolidation

(a) Subsidiaries

Subsidiaries are all entities over which the group has control. The group controls an entity when the group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the group. They are deconsolidated from the date that control ceases.

The consolidated companies are listed below:

- Avantium Technologies B.V., Amsterdam (100%)
- Avantium Support B.V., Amsterdam (100%)
- Renewable Technologies B.V. Amsterdam (100%)
- Avantium Chemicals B.V., Amsterdam (100%)
- Avantium Knowledge Centre B.V., Amsterdam (100%)
- Furanix Technologies B.V., Amsterdam (100%)
- YXY Technologies B.V., Amsterdam (100%)
- Stichting Administratiekantoor Avantium, Amsterdam (100%)
- Stichting Stock Options Avantium, Amsterdam (100%)
- Feedstock Technologies B.V., Amsterdam (100%)
- Avantium Renewable Polymers B.V., Amsterdam (100%)
- Avantium Japan K.K, Tokyo (100%)

On 15 January 2019 (i.e. the economic transfer date), Avantium increased its investment in Avantium Renewable Polymers B.V. from 49% stake to 100%. On 24 January 2019, Avantium paid BASF €17.4 million for the full ownership of Avantium Renewable Polymers B.V. (formerly known as Synvina B.V.). As a consequence, Avantium gained full ownership over this investment and the investment in joint venture was de-recognised from the statement of financial position and consolidated into the financial statements.

Given Avantium, before the full acquisition of Synvina, held 49% investment in the joint venture, the full acquisition of Synvina is considered to be a step-acquisition and the acquisition method of accounting is used to account for business combinations by the group (refer to note 9).

Reference is made to note 8 & Note 9 for further disclosure on the changes in the composition of the entity.

Inter-company transactions, balances and unrealised gains on transactions between group companies are eliminated. Unrealised losses are also eliminated. When necessary, amounts reported by subsidiaries have been adjusted to conform to the group's accounting policies.

(b) Changes in ownership interests in subsidiaries without change of control

Transactions with non-controlling interests that do not result in loss of control are accounted for as equity transactions – that is, as transactions with the owners in their capacity as owners. The difference between fair value of any consideration paid and the relevant share acquired of the carrying value of net assets of the subsidiary is recorded in equity. Gains or losses on disposals to non-controlling interests are also recorded in equity.

(c) Disposal of subsidiaries

When the group ceases to have control, any retained interest in the entity is remeasured to its fair value at the date when control is lost with the change in carrying amount recognised in profit or loss. The fair value is the initial carrying amount for the purposes of subsequently accounting for the retained interest as an associate, joint venture or financial asset. In addition, any amounts previously recognised in other comprehensive income in respect of that entity are accounted for as if the group had directly disposed of the related assets or liabilities. This may mean that amounts previously recognised in other comprehensive income are reclassified to profit or loss.

(d) Principles of consolidation and equity accounting
When the group ceases to consolidate or equity account for an investment because of a loss of control, joint control or significant influence, any retained interest in the entity is remeasured to its fair value with the change in carrying amount recognised in profit or loss. This fair value becomes the initial carrying amount for the purposes of subsequently accounting for the retained interest as an associate, joint venture or financial asset. In addition, any amounts previously recognised in other comprehensive income in respect of that entity are accounted for as if the group had directly disposed of the related assets or liabilities. This may mean that amounts previously recognised in other comprehensive income are reclassified to profit or loss.

If the ownership interest in a joint venture or an associate is reduced but joint control or significant influence is retained, only a proportionate share of the amounts previously recognised in other comprehensive income are reclassified to profit or loss where appropriate.

(e) Segment reporting
Operating segments are reported in a manner consistent with the internal reporting provided to the chief operating decision maker. The Management Board has appointed the Executive Team which assesses the financial performance and position of the group, and makes strategic decisions. The Executive Team (known under the name Management Team), which has been identified as being the chief operating decision maker, consists of the Chief Executive officer, the Chief Financial Officer, the Chief Technology Officer, the Group Legal Counsel, the Managing Director of Avantium Renewable Chemistries, the Managing Director of Avantium Catalysis and the Managing Director of Avantium Renewable Polymers.

2.3 Foreign currency translation
(a) Functional and presentation currency
Items included in the financial statements of each of the group's entities are measured using the currency of the primary economic environment in which the entity operates ('the functional currency'). The consolidated financial statements are presented in euros, which is the company's functional currency.

(b) Transactions and balances
Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the dates of the transactions or valuations where items are remeasured. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year-end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of comprehensive income.

Foreign exchange gains and losses that relate to borrowings and cash and cash equivalents are presented in the statement of comprehensive income within 'finance income or cost'.

(c) Group companies
The results and financial position of all the group entities (none of which has the currency of a hyper-inflationary economy) that have a functional currency different from the presentation currency are translated into the presentation currency as follows:
- Assets and liabilities for each balance sheet presented are translated at the closing rate at the date of that balance sheet.
- Income and expenses for each statement of comprehensive income are translated at the average exchange rates.
- All resulting exchange differences are recognised as a separate component of other comprehensive income.

2.4 Use of estimates
The preparation of consolidated financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingencies at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. The use of estimates is or could be a significant factor affecting the reported carrying values of property, plant and equipment, intangibles, trade and other receivables and trade and other payables. Despite management's best efforts to accurately estimate such amounts, future results could materially differ from those estimates.

2.5 Property, plant and equipment
Property, plant and equipment comprise mainly laboratory equipment, hardware and leasehold improvements. All property, plant and equipment is stated at historical cost less accumulated depreciation. Historical cost includes expenditures that are directly attributable to the acquisition of the items.
Subsequent costs are included in the asset's carrying amount or recognised as a separate asset, as appropriate, only when it is probable that future economic benefits associated with the item will flow to the group and the cost of the item can be measured reliably. All other repairs and maintenance charges are expensed in the financial period in which they are incurred.
Depreciation is calculated using the straight-line method to allocate their cost of the assets to their residual values over their estimated useful lives as follows:
- Leasehold improvements 5-20 years
- Machinery, laboratory equipment and vehicles 5 years
- Computer hardware 3 years
- Office furniture and equipment 3-5 years

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount. Gains and losses are included in the consolidated statement of comprehensive income.

2.6 Intangible assets
(a) Research and development
Research expenditures are recognised as expenses as incurred. Development costs that are directly attributable to the design and testing of identifiable and unique products controlled by the group are recognised as intangible assets when the following criteria are fulfilled:
- It is technically feasible to complete the intangible asset so that it will be available for use or sale.
- Management intends to complete the intangible asset and use or sell it.
- There is an ability to use or sell the intangible asset.
- It can be demonstrated how the intangible asset will generate probable future economic benefits.
- Adequate technical, financial and other resources to complete the development and to use or sell the intangible asset are available.
- The expenditure attributable to the intangible asset during its development can be reliably measured.

Other development expenditures that do not meet these criteria are recognised as an expense as incurred. Development costs previously recognised as an expense are not recognised as an asset in a subsequent period. Capitalised development costs are recorded as intangible assets and amortised from the point at which the asset is ready for use on a straight-line basis over its estimated useful life of five years. Intangible assets not ready for use are tested for impairment at least on an annual basis.

Amortisation of development costs is included in depreciation, amortisation and impairment charge in the statement of comprehensive income. All development costs arose from internal development.

(b) Computer software
Acquired computer software licenses are capitalised on the basis of the costs incurred to acquire and use the specific software. These costs are amortised straight-line over their estimated useful lives of three years.

Costs associated with developing or maintaining computer software programmes are recognised as expenses as incurred. Development costs that are directly attributable to the design and testing of identifiable and unique software products controlled by the group, that will probably generate economic benefits exceeding costs beyond one year, are recognised as intangible assets.

(c) Intellectual property
Following the acquisition of Liquid Light on 30 December 2016, the company records intellectual property (patent portfolio acquired) on its consolidated balance sheet. The intellectual property is stated at historical cost, which will subsequently be lowered with accumulated amortisation in the following years, when the technology on which the intellectual property is filed is ready to deploy commercially.

Subsequent costs are included in the asset's carrying amount or recognised as a separate asset, as appropriate, only when it is probable that future economic benefits associated with the item will flow to the group and the cost of the item can be measured reliably.
Amortisation is calculated using the straight-line method to allocate their cost of the assets to their residual values over their estimated useful lives (average lifetime of

patent portfolio) as follows:

- Intellectual property 5-20 years

2.7 Impairment of non-financial assets

Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units). Non-financial assets other than goodwill that suffered impairment are reviewed for possible reversal of the impairment at each reporting date.

2.8 Non-current assets (or disposal groups) held for sale

Non-current assets (or disposal groups) are classified as assets held for sale when their carrying amount is to be recovered principally through a sale transaction and a sale is considered highly probable. They are stated at the lower of carrying amount and fair value less costs to sell.

2.9 Financial assets

2.9.1 Classification

The group classifies its financial assets in the following measurement categories:

(i) those to be measured at amortised cost.

The classification depends on the company's business model for managing the financial assets and the contractual terms of the cash flows. Management determines the classification of its financial assets at initial recognition. The group classifies its financial assets as assets held for collection of contractual cash flows.

2.9.2 Recognition and measurement

Regular purchases and sales of financial assets are recognised on the trade-date, the date on which the group commits to purchase or sell the asset. Financial assets are derecognised when the rights to receive cash flows from the financial assets expire or if the company transfers the financial asset to another party and does not retain control or substantially all risks and rewards of the asset. Financial liabilities are derecognised when the company's obligations specified in the contract expire or are discharged or cancelled.

Financial assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortised cost. Interest income from these financial assets is included in finance income using the effective interest rate method. Any gain or loss arising on derecognition is recognised directly in the statement of comprehensive income and presented in other gains/ (losses). Impairment losses are presented as separate line item in the statement of comprehensive income.

2.10 Offsetting financial instruments

Financial assets and liabilities are offset and the net amount reported in the balance sheet when there is a legally enforceable right to offset the recognised amounts and there is an intention to settle on a net basis or realise the asset and settle the liability simultaneously. The legally enforceable right must not be contingent on future events and must be enforceable in the normal course of business and in the event of default, insolvency or bankruptcy of the company or the counterparty.

2.11 Impairment of financial assets

(a) Assets carried at amortised cost

Impairment provisions for trade receivables are recognised based on the simplified approach within IFRS 9 to measuring expected credit losses which uses a lifetime expected loss allowance for all trade receivables and contract assets.

To measure the expected credit losses, trade receivables and contract assets have been grouped based on shared credit risk characteristics and the days past due. The contract assets relate to unbilled work in progress and have substantially the same risk characteristics as the trade receivables for the same types of contracts. The group has therefore concluded that the expected loss rates for trade receivables are a reasonable approximation of the loss rates for the contract assets.

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised (such as an improvement in the debtor's credit rating), the reversal of the previously recognised impairment loss is recognised in the consolidated statement of comprehensive income.

Other assets are tested for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash inflows which are largely independent of the cash inflows from other assets or groups of assets (cash-generating units).

2.12 Inventories

Inventories are stated at the lower of cost and net realisable value. Cost is determined using the first-in, first-out (FIFO) method. The cost of raw materials, finished goods and work in progress comprises all purchase costs including charges incurred to bring inventories to their current location and into their current state. It excludes borrowing costs. Net realisable value is the estimated selling price in the ordinary course of business, less applicable variable selling expenses.

2.13 Trade receivables

Trade receivables are amounts due from customers for products sold or services performed in the ordinary course of business. If collection is expected in one year or less (or in the normal operating cycle of the business if longer), they are classified as current assets. If not, they are presented as non-current assets.

Trade receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method, less provision for impairment. Refer to note 2.11 for further information about the group's impairment policy on financial assets.

2.14 Cash and cash equivalents

In the consolidated statement of cash flows, cash and cash equivalents includes cash in hand, deposits held at call with banks, other short-term highly liquid investments with original maturities of three months or less and bank overdrafts. In the consolidated statement of financial position, bank overdrafts are shown within borrowings in current liabilities.

2.15 Share capital

Ordinary shares

Ordinary shares are classified as equity. Incremental costs directly attributable to the issue of new ordinary shares or options are shown in equity as a deduction, net of tax, from the proceeds.

Treasury shares

Where any group company or liquidity provider appointed by the group, purchases the company's equity share capital (treasury shares), the consideration paid, including any directly attributable incremental costs (net of income taxes), is deducted from equity attributable to the company's equity holders until the shares are cancelled or reissued. Where such ordinary shares are subsequently reissued, any consideration received, net of any directly attributable incremental transaction costs and the related income tax effects, is included in equity attributable to the company's equity holders. No gain or loss is recognised in the statement of comprehensive income on the purchase, sale, issuance or cancellation of the company's own equity instruments.

2.16 Trade payables

Trade payables are obligations to pay for goods or services that have been acquired in the ordinary course of business from suppliers. Accounts payable are classified as current liabilities if payment is due within one year or less (or in the normal operating cycle of the business if longer). If not, they are presented as non-current liabilities.

Trade payables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method.

Fair value measurement of financial assets and financial liabilities

The fair value of financial assets and financial liabilities is included at the amount at which the instrument could be exchanged in a current transaction between knowledgeable willing parties, other than in forced or liquidation sale. Valuation techniques used to measure fair value must maximise the use of observable inputs and minimise the use of unobservable inputs. The fair value hierarchy defines a three-level valuation hierarchy for disclosure of fair value measurements as follows:

– Level 1: Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.
– Level 2: Observable inputs that reflect quoted prices for identical assets or liabilities in markets that are not active; quoted prices for similar assets or liabilities in active markets; inputs other than quoted prices that are observable for the assets or liabilities; or inputs that are derived principally from or corroborated by observable market data by correlation or other means.
– Level 3: Unobservable inputs reflecting the company's own assumptions incorporated in valuation techniques used to determine fair value. These assumptions are required to be consistent with market participant assumptions that are reasonably available.

2.17 Current and deferred income tax
The tax expense for the year comprises current and deferred tax. Tax is recognised in the statement of comprehensive income, except to the extent that it relates to items recognised in other comprehensive income or directly in equity. In this case, the tax is also recognised in other comprehensive income or directly in equity respectively.

The current income tax charge is calculated on the basis of the tax laws enacted or substantively enacted at the balance sheet date in the countries where the company's subsidiaries and associates operate and generate taxable income. Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation. It establishes provisions where appropriate on the basis of amounts expected to be paid to the tax authorities.

Deferred income tax is recognised, using the liability method, on temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. However, the deferred income tax is not accounted for if it arises from initial recognition of an asset or liability in a transaction other than a business combination that at the time of the transaction affects neither accounting nor taxable profit or loss. Deferred income tax is determined using tax rates (and laws) that have been enacted or substantially enacted by the balance sheet date and are expected to apply when the related deferred income tax asset is realised or the deferred income tax liability is settled.

Deferred income tax assets are recognised only to the extent that it is probable that future taxable profit will be available against which the temporary differences can be utilised.

Deferred income tax assets and liabilities are offset when there is a legally enforceable right to offset current tax assets against current tax liabilities and when the deferred income tax assets and liabilities relate to income taxes levied by the same taxation authority on either the taxable entity or different taxable entities where there is an intention to settle the balances on a net basis.

2.18 Employee benefits
(a) Pension obligations
The group operates a defined contribution pension plan for all employees funded through payments to an insurance company. The group has no legal or constructive obligations to pay further contributions if the plan does not hold sufficient assets to pay all employees the benefits relating to employee service in the current and prior years. The contributions are recognised as employee benefit expense when they are due. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payments is available.

(b) Share-based payments
The group operates a share-based compensation plans for its employees, which consist of an Employee Stock Option Plan (ESOP) and a Long-term Incentive Plan (LTIP), also refer to note 14. These plans are classified as an equity-settled share option plan which was initially adopted in 2006 and replaced by the new share-based compensation plans at the IPO in 2017.
Share options granted to employees are measured at the fair value of the equity instruments granted under the indirect method of measurement. Fair value is determined through the use of an option-pricing model considering, amongst others, the following variables:
a) The exercise price of the option
b) The expected life of the option
c) The current value of the underlying shares
d) The expected volatility of the share price
e) The dividends expected on the shares
f) The risk-free interest rate for the life of the option

For the company's share option plan, management's judgment is that the Black-Scholes valuation model is most appropriate for determining fair values as this model allows accounting for non-transferability and early exercise. Since the company became listed in March 2017, there is published share price information available to determine the fair value of its shares and the expected volatility of that value. These assumptions and estimates are further discussed in note 14 to the IFRS consolidated financial statements. The result of the share option valuations and the related compensation expense is dependent on the model and input parameters used.

For the equity-settled Avantium ESOP, the fair value of the grant is determined at the grant date. For the LTIP, the fair value is determined by the share price of the award at the grant date.

The fair value of the employee services received in exchange for the grant of the awards is recognised as an expense. For share-based payments that do not vest until the employees have completed a specified period of service, the group recognises the cost of services received as the employees render service during that period.

At each balance sheet date, the company revises its estimates of the number of awards that are expected to become exercisable. It recognises the impact of the revision of original estimates, if any, in the statement of comprehensive income and for the equity settled plan a corresponding adjustment to equity.

The proceeds received from exercised options net of any directly attributable transaction costs are credited to share capital (nominal value) and share premium.

(c) Profit-sharing and bonus plans
The group recognises a liability and an expense for bonuses and profit-sharing where contractually obliged or where there is a past practice that has created a constructive obligation.

(d) Termination benefits
Termination benefits are payable when employment is terminated by the group before the normal retirement date, or when an employee accepts voluntary redundancy in exchange for these benefits. The group recognises termination benefits at the earlier of the following dates: (a) when the group can no longer withdraw the offer of those benefits; and (b) when the entity recognises costs for a restructuring that is within the scope of IAS 37 and involves the payment of terminations benefits. In the case of an offer made to encourage voluntary redundancy, the termination benefits are measured based on the number of employees expected to accept the offer. Benefits falling due more than 12 months after the end of the reporting period are discounted to present value.

2.19 Provisions
Provisions are recognised when the group has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount can be reliably estimated.

The group provides for the estimated cost of product warranties at the time revenue is recognised and the group has a constructive obligation. Warranty provision is established based on the group's best estimates of the amounts necessary to settle future and existing claims on products sold as of the balance sheet date.

The group provided for a one-off event which was triggered by the exit notice of BASF. For this reason an onerous contract expense was provided during in 2018. The provision for an onerous contract was based on the unavoidable costs expected to be incurred by the company due to the exit notice received from BASF. In January 2019 the provision was reversed in 2019, since Avantium paid €17.4 million to exit from the joint venture and take back the residual stake in the joint venture.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the obligation.

2.20 Revenue recognition

Revenue comprises the fair value of the consideration received or receivable for the sale of goods and services in the ordinary course of the group's activities. Revenue is shown net of value-added tax, returns, rebates and discounts and after eliminating sales within the group.

The group recognises revenue when specific criteria have been met for each of the group's activities as described below. The group bases its estimates on historical results, taking into consideration the type of customer, the type of transaction and the specifics of each arrangement.

a) Sales of goods

For the supply of goods, revenue is recognised at a point in time, as soon as the control relating to the title of the goods have been transferred to the customer and the entity has a present right to payment. In practice, this is at the shipment date or after installation (if applicable). Contracts related to sale of goods are typically the following:

- System parts
- Consumables
- Material offtake agreements originating from RNP and RNC

A receivable is recognised when the goods are shipped as this is the point in time that the consideration is unconditional because only the passage of time is required before the payment is due.

b) Construction contracts

Revenue and expenses related to Flowrence systems are accounted over time, which recognises revenue as performance of the contract progresses. The company satisfies the criteria prescribed under IFRS 15 for recognising revenue over time, since in each sales contract agreed with a customer, relates to the creation of a Flowrence system which is a tailor-made machine, with varying components for the various chemistries which cannot be used for alternative purposes by the company and the company has an enforceable right to payment for the performance completed to date. The customer has full control over the Flowrence as it is being created. The customer can direct the specifics of how the asset is to be used and has input on the varying components of the Flowrence being created. The stage of completion is measured by referring to the contract costs incurred up to the end of the reporting period as a percentage of total estimated costs for each contract. Costs incurred in the year in connection with future activity on a contract are excluded from contract costs in determining the stage of completion.

On the balance sheet, the group reports the net contract position for each contract as either as contract asset or a contract liability. A contract represents a contract asset where costs incurred plus recognised profits (less recognised losses) exceed progress billings; a contract represents a contract liability where the opposite is the case.

Variations in contract work, claims and incentive payments are included in contract revenue to the extent that may have been agreed with the customer and are capable of being reliably measured.

Where the income of a revenue contract cannot be estimated reliably, contract revenue that is likely to be recovered is recognised to the extent of contract costs incurred. Contract costs are recognised as expenses in the period in which they are incurred.

c) Multiple element arrangements

In certain circumstances, it is necessary to apply the recognition criteria to the separately identifiable components of a single transaction in order to reflect the substance of the transaction. Conversely, the recognition criteria are applied to two or more transactions together when they are linked in such a way that the commercial effect cannot be understood without reference to the series of transactions as a whole.

The group offers arrangements whereby a customer purchases systems and installations services under one arrangement. When such multiple element arrangements exist, an element is accounted for as a separable element if it has value to the customer on a standalone basis and the fair value can be determined objectively and reliably. The transaction price is allocated to each separate element based on the stand-alone selling prices.

When Catalysis systems revenues and installation service revenues are identified as separable elements in a multiple element transaction, the systems revenue recognised is determined based on the standalone selling price of the systems in relation to the transaction price of the arrangement taken as a whole and is recognised as discussed above. The revenue relating to the installation service element, which represents the standalone selling price of the installation services in relation to the transaction price of the arrangement, is recognised on completion of the installation services.

This separation is justified due to the fact that the supply and installation of the goods are offered to the customer separately as the installation can also be executed by an independent third party.

Timing of payment by the customer from the supply of goods is based on the contractual identified instalments. This could result, on a product by product basis, in advanced payments. These amounts are reported as contract liabilities on the balance sheet under other current liabilities.

c) Sales of services

Revenue from the sales of services is recognised over time recognising revenue based on the actual services provided to the end of the accounting period as a proportion of the total services to be performed.
Timing of payment by the customer from sale of services is based on the contractual identified technical milestones. This could result, on a project by project basis, in contract assets or contract liabilities. These amounts are reported on the balance sheet under other receivables or other current liabilities.

As part of the Renewable Chemistries business development agreements, which constitute solely a step-in, management identified this as one-off revenue recognition at moment of signing the agreements, in accordance with IFRS 15, since it is deemed that once the agreement is signed, no future obligation is to be fulfilled.

If circumstances arise that may change the original estimates of revenues, costs or extent of progress toward completion, estimates are revised. These revisions may result in increases or decreases in estimated revenues or costs and are reflected in income in the period in which the circumstances that give rise to the revision become known by management.

2.21 Government grants

Grants from the government are recognised at their fair value when there is a reasonable assurance that the grant will be received, and the group will comply with all attached conditions.

Government grants relating to costs are deferred and recognised in the income statement over the period necessary to match them with the costs that they are intended to compensate.

Government grants relating to property, plant and equipment are included in non-current liabilities as deferred government grants and are credited to the income statement on a straight-line basis over the expected lives of the related assets.

2.22 Interest income

Interest income is recognised using the effective interest method. When a loan and receivable is impaired, the group reduces the carrying amount to its recoverable amount, being the estimated future cash flow discounted at the original effective interest rate of the instrument and continues unwinding the discount as interest income. Interest income on impaired loan and receivables is recognised using the original effective interest rate.

2.23 Leases

As explained in note 2.1.2, the group has changed its accounting policy for leases where the group is the lessee. The new policy is described in note 7 and the impact of the change in note 30.

Until 31 December 2018 leases of property, plant and equipment, where a significant portion of the risks and rewards of ownership were not transferred to the group as lessee were classified as operating leases (note commitments). Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

The group has no financial lease obligations.

2.24 Business combinations
The acquisition method of accounting is used to account for all business combinations, regardless of whether equity instruments or other assets are acquired. The consideration transferred for the acquisition of a subsidiary comprises the:
- fair values of the assets transferred
- liabilities incurred to the former owners of the acquired business
- equity interests issued by the group
- fair value of any asset or liability resulting from a contingent consideration arrangement, and
- fair value of any pre-existing equity interest in the subsidiary

Identifiable assets acquired, and liabilities and contingent liabilities assumed in a business combination are, with limited exceptions, measured initially at their fair values at the acquisition date. The group recognises any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets.
Acquisition-related costs are expensed as incurred.

The excess of the:
- consideration transferred,
- amount of any non-controlling interest in the acquired entity, and
- acquisition-date fair value of any previous equity interest in the acquired entity over the fair value of the net identifiable assets acquired is recorded as goodwill.

If those amounts are less than the fair value of the net identifiable assets of the business acquired, the difference is recognised directly in profit or loss as a bargain purchase. Where settlement of any part of cash consideration is deferred, the amounts payable in the future are discounted to their present value as at the date of exchange. The discount rate used is the entity's incremental borrowing rate, being the rate at which a similar borrowing could be obtained from an independent financier under comparable terms and conditions. Contingent consideration is classified either as equity or a financial liability. Amounts classified as a financial liability are subsequently remeasured to fair value, with changes in fair value recognised in profit or loss.

If the business combination is achieved in stages, the acquisition date carrying value of the acquirer's previously held equity interest in the acquiree is remeasured to fair value at the acquisition date. Any gains or losses arising from such remeasurement are recognised in profit or loss.

2.25 Earnings per share
a) Basic earnings per share
Basic earnings per share is calculated by dividing:
- The profit attributable to owners of the company, excluding any costs of servicing equity other than ordinary shares
- By the weighted average number of ordinary shares outstanding during the financial year, adjusted for bonus elements in ordinary shares issued during the year and excluding treasury shares (note 13).

b) Diluted earnings per share
Diluted earnings per share adjusts the figures used in the determination of basic earnings per share to take into account:
- The after-income tax effect of interest and other financing costs associated with dilutive potential ordinary shares
- The weighted average number of additional ordinary shares that would have been outstanding assuming the conversion of all dilutive potential ordinary shares.

3. Financial risk management

3.1 Financial risk factors
The group's activities expose it to a variety of financial risks: market risk (including currency risk, interest rate risk, cash flow interest rate risk and price risk), credit risk and liquidity risk. The group's risk-management programme focuses on the unpredictable nature of financial markets and seeks to limit any potential adverse effects on financial performance.

Risk management is carried out by the central Finance & Accounting department (Group F&A) under policies approved by the Management Board. Group F&A identifies, evaluates and covers financial risks in close cooperation with the group's operating units. The board provides principles for overall risk management, as well as written policies covering specific areas such as foreign-exchange risk, interest rate risk, credit risk, use of non-derivative financial instruments, and investment of excess liquidity.

Financial instrument by category
Financial assets:

in Euro x 1,000		As at 31 December	
	Notes	**2019**	**2018**
Trade receivables	11	2,644	4,752
Other receivables	11	8,897	4,555
Cash and cash equivalents	12	45,443	83,302

Financial liabilities:

in Euro x 1,000		As at 31 December	
	Notes	**2019**	**2018**
Trade payables	16	3,727	2,605
Other liabilities	16	5,418	4,718
Deferred government grant	16	8,223	2,202
Lease liabilities	7	1,534	-

The carrying amounts of these financial assets and liabilities are assumed to approximate their fair values due to their short-term nature. Also refer to note 16 for an overview of trade and other payables.

(a) Currency risk
The group operates internationally and is exposed to foreign exchange risk primarily in relation to the US dollar. Foreign exchange risk arises from future commercial transactions, recognised assets and liabilities. Management has set up a policy that requires group companies to manage their foreign exchange risk against their functional currency. The group companies are required to close commercial transactions in Euros. Certain US-based customers negotiate US-dollar contracts. There are a limited number of these contracts, and the group companies can only close these with management's written approval. The group's operations are therefore not subject to significant foreign exchange rate risks. Foreign exchange risk arises when future commercial transactions or recognised assets and liabilities are denominated in a currency that is not the entity's functional currency.

The group had outstanding trade receivables in US dollars of $109,000 (2018: $702). The group had no trade receivables in another foreign currency. The group had outstanding trade payables in US dollars of $68,000 (2018: $131,000), in British pound of £14,000 (2018: nil) and in Japanese Yen of ¥5,236,000 (2018: nil).

If at 31 December 2019, the euro had weakened by 10% against the US dollar with all other variables held constant, post-tax result for the year would have been €4,000 lower (2018: €13,000 lower). The US dollar cash position as at 31 December 2019 is $12,680. The group had no cash position in other foreign currencies.

(b) Credit risk
Credit risk is managed on group basis. The group does not have any significant concentrations of credit risk and is limited to outstanding trade receivables, cash and cash equivalents. On 31 December 2019, the largest single client exposure consisted of 15% of the outstanding trade receivables. The group clients are subject to creditworthiness tests. Sales are subject to payment conditions varying between payments in advance and 30 days after invoice date. For certain projects, deviations to this rule may apply only after approval of group F&A, in which case additional security, including guarantees and documentary credits, may be required. Management does not expect any losses from non-performance by its clients nor from concentration of this risk.

In 2019, nil Euro (2018: nil) of trade or other receivables was written off; €1,587,000 was past due, of which 73% had been paid before 5 March 2020.

in Euro x 1,000	As at 31 December	
	2019	**2018**
Up to 3 months past due	1,587	2,802
3 – 6 months past due	-	799
	1,587	**3,601**

Impairment provisions for trade receivables are recognised based on the simplified approach within IFRS 9 to measuring expected credit losses which uses a lifetime expected loss allowance for all trade receivables and contract assets.

To measure the expected credit losses, trade receivables and contract assets have been grouped based on shared credit risk characteristics and the days past due. The contract assets relate to unbilled work in progress and have substantially the same risk characteristics as the trade receivables for the same types of contracts. The group has therefore concluded no provision for credit losses is required on trade receivables and contract assets, since after careful consideration of each customer's payment profile and likelihood to default on payments, the credit losses was deemed to be immaterial.

The maximum exposure to credit risk at the reporting date is the carrying value of each class of receivable mentioned above. The group does not hold any collateral as security. The long-term credit ratings of banks used by the group, as at 31 December 2019 at Moody's and S&P subsequently, are as follows. Group funds are held at Rabobank with a long-term credit rating of Aa3 and A+, Deutsche bank with a long-term credit rating between A3 and Baa3, ABN AMRO bank with a long-term credit rating of between A1 and A, and at ING Bank with a long-term credit rating between Baa1 and A-.

(c) Liquidity risk
Prudent liquidity risk management implies maintaining sufficient cash and marketable securities, the availability of funding through an adequate amount of committed credit facilities and the ability to close out market positions.
As at the end of 2019, the group has a committed banking facility with Rabobank of €4.0 million, which has not been utilised. All assets, excluding the intangible assets are pledged to Rabobank. Furthermore, the group has a €2.0 million bank guarantee facility with Rabobank. Management monitors monthly rolling forecasts of the group's cash and cash equivalents (note 12) on the basis of actual results and expected cash flow.

The table below analyses the group's financial liabilities into relevant maturity groupings based on the remaining period at the balance sheet to the contractual maturity. The amounts disclosed in the table are the contractual undiscounted cash flows for continuing operations. The specific time buckets are not mandated by the standard but are based on a choice of management.

At December 31, 2019:

in Euro x 1,000	Less than 1 year	Between 1 and 2 years	Between 2 and 5 year	Over 5 years	Total
Lease liabilities	1,534	1,309	5,333	2,622	10,798
Trade payables	3,727	-	-	-	3,727
Deferred government grant	8,223	-	-	-	8,223
Other current liabilities	5,418	-	-	-	5,418
	18,902	**1,309**	**5,333**	**2,622**	**28,166**

At December 31, 2018:

in Euro x 1,000	Less than 1 year	Between 1 and 2 years	Between 2 and 5 year	Over 5 years	Total
Lease liabilities	-	-	-	-	
Trade payables	2,605	-	-	-	2,605
Deferred government grant	2,202			-	2,202
Other current liabilities	4,718	-	-	-	4,718
	9,525	**0**	**0**	**0**	**9,525**

The carrying amounts of these financial liabilities are assumed to approximate their fair values due to their short-term nature.

3.2 Capital management
The group's objective when managing capital is to safeguard its ability to continue as a going concern (also refer to 2.1.1) in order to provide returns for shareholders and benefits for other stakeholders, and to maintain an optimal capital structure to reduce the cost of capital. To maintain or adjust the capital structure, the group monitors capital on the basis of its adjusted solvency ratio. This ratio is calculated as adjusted equity divided by the adjusted balance sheet total.

The adjusted equity is calculated as equity:
- Minus the intangible assets, participating interests and receivables from shareholders

The adjusted balance sheet total is calculated as total assets:
- Minus the intangible assets, participating interest, receivables from shareholders and shares held in the own company

The adjusted solvency ratios at 31 December 2019 and 2018 were as follows:

in Euro x 1,000	2019	2018
Equity attributable to owners of the parent	68,215	91,157
Intangible assets	(684)	(722)
Adjusted equity total	67,531	90,435
Adjusted balance sheet total	95,834	113,204
Adjusted solvency ratio	**70%**	**80%**

4. Critical accounting estimates and judgments

Estimates and judgments are continually evaluated, and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

The group makes estimates and assumptions concerning the future. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are addressed below.

(a) Income taxes
The group, which has a history of recent tax losses, recognises deferred tax assets arising from unused tax losses or tax credits only to the extent that the relevant fiscal unity has sufficient taxable temporary differences or there is convincing other evidence that sufficient taxable profit will be available against which the unused tax losses or unused tax credits can be utilised by the fiscal unity. Management's judgment is that there is not a high degree of certainty that sufficient profits will be earned to utilise the losses. Consequently, based on management's judgment, sufficient convincing other evidence is not available, and a deferred tax asset is therefore not recognised.

(b) Share-based payments
Share options granted to employees are measured at the fair value of the options granted (indirect method of measurement). For the company's share option plan, management's judgment is that the Black-Scholes valuation method is most appropriate for determining fair values. The assumptions and estimates used in the valuation are further discussed in note 14 to the consolidated financial statements.

The result of the share option valuations and the related compensation expense is dependent on the model and input parameters used. Even though management considers the fair values reasonable and defensible based on the methodologies applied and the information available, others might derive at a different fair value for the options granted under the company's share option plan.

(c) Research and development expenditures
The project stage forms the basis in the decision of whether costs made for the group's product development programmes should be capitalised or not. Management judgment is required in determining when the group should start capitalising development costs as intangible assets.

Management determined that for a system, commercial feasibility is, in general, probable when the group has built a successful prototype and has interested customers for the commercial product. Management determined that for product development, (note 2.6) commercial feasibility is, in general, probable when the group has successfully completed essential testing phases and are in a late stage of discussions with potential partners for commercialisation opportunities.

(d) Revenue recognition
The group recognises revenue over time or at point in time depending on the agreed contract performance obligations. For systems and services contracts the group recognises revenue over time as performance of the contract progresses. The performance on a contract relates to fixed-price contracts to construct tailor-made Flowrence® systems which the customers controls and cannot be of alternative use to the company. For the Flowrence® systems, the stage of completion is measured by reference to the total contract costs incurred up to the end of the reporting year as a percentage of total estimated costs for each contract. Value is delivered to customers up to each of these points. For services, recognising revenue over time, it requires the group to estimate the series of distinct services performed to date as a proportion of the total services to be performed, where also stage gates are present, and value is added up to that point. To define the recognised revenues, the group estimates the required total costs (Flowrence®) or manhours (services and Avantium Renewable Chemistries) to complete each project.

(e) Going concern
For the critical accounting judgment with regard to the going concern assumption, see note 2.1.1.

(f) Government grants
The group uses the percentage-of-completion (POC) method in accounting for its granted governmental subsidies. For subsidy programmes, use of the POC method requires the group to estimate the services/actions performed to date as a proportion of the total services or actions to be performed. For further considerations and assumptions with regards to the critical accounting estimate in relation to government grants, see note 2.21.

(g) JV accounting
Following the joint venture agreement with BASF, a situation of joint control was present up to and including 15 January 2019, where all decisions within the shareholder meetings required unanimous consent. The joint arrangement with BASF was classified as a joint venture in accordance with IFRS 11, and therefore was accounted for as an investment using the equity method. Please also refer to note 8 for the JV accounting.

Upon the exit of BASF on 15 January 2019, Avantium N.V. gained full control over the investment in the joint venture and consequently this investment was reclassified from interests in joint ventures and associates to investments in subsidiaries. Please also refer to note 9 for the accounting of business combinations.

(g) Onerous contract provision
The exit notice of BASF on 18 December 2018 triggered an onerous contract following IAS 37, for this reason the group provided for an onerous contract expense in 2018. The provision for an onerous contract was based on the unavoidable costs expected to be incurred by the company due to the exit notice received from BASF. Management's key assumptions are disclosed in note 8. This provision subsequently reversed in 2019 following the settlement that was made in January 2019.

In 2019, the group implemented IFRS 16 and as at the date of initial application of the new standard, the group included an onerous lease provision, estimated at €492,000. Please also refer to note 30 for further information.

5. Property, plant and equipment

in Euro x 1,000	Leasehold improvements	Laboratory equipment	Hardware	Office furniture and equipment	Construction in progress	Total
At 1 January 2018						
Cost	8,907	24,237	2,385	1,763	4,123	41,414
Accumulated depreciation	(6,727)	(22,004)	(2,202)	(1,672)	-	(32,604)
Net book amount	**2,180**	**2,234**	**183**	**91**	**4,123**	**8,811**
Year ended 31 December 2018						
Opening net book amount	2,180	2,234	183	91	4,123	8,811
Additions	3,961	368	127	42	3,461	7,958
Disposals	-	(16)	(1)	-	-	(17)
Transfers	(15)	210	(1)	-	(210)	(16)
Depreciation charge	(577)	(806)	(138)	(29)	-	(1,550)
Closing net book amount	**5,549**	**1,990**	**170**	**103**	**7,374**	**15,186**
At 31 December 2018						
Cost	12,853	24,798	2,511	1,805	7,374	49,341
Accumulated depreciation	(7,304)	(22,810)	(2,340)	(1,701)	-	(34,155)
Net book amount	**5,549**	**1,988**	**170**	**104**	**7,374**	**15,186**
Year ended 31 December 2019						
Opening net book amount	5,549	1,988	170	104	7,374	15,186
Acquisition subsidiary	613	7,060	-	263	226	8,163
Additions	5,640	603	72	53	2,091	8,458
Disposals	-	-	-	-	-	-
Transfers	-	-	-	-	-	-
Depreciation charge	(1,704)	(2,085)	(171)	(170)	-	(4,130)
Closing net book amount	**10,097**	**7,567**	**71**	**249**	**9,691**	**27,677**
At 31 December 2019						
Cost	19,106	32,462	2,582	2,121	9,691	65,962
Accumulated depreciation	(9,009)	(24,895)	(2,511)	(1,871)	-	(38,286)
Net book amount	**10,097**	**7,567**	**71**	**249**	**9,691**	**27,677**

The additions are predominantly related to the finalisation of engineering and construction of pilot plant in Delfzijl for the Avantium Renewable Chemistries segment, the investment in the flagship plant Process design package for the Avantium Renewable Polymers segment and investment of an RCT unit for the Avantium Catalysis segment.

6. Intangible assets

(In Euro x 1,000)	Development costs	Software	Intellectual Property	Other	Total
At 1 January 2018					
Cost	2,159	6,954	433	992	10,537
Accumulated amortization and impairment	(2,159)	(6,579)	-	(967)	(9,705)
Net book amount	**-**	**376**	**433**	**24**	**833**
Year ended 31 December 2018					
Opening net book amount	-	376	433	24	833
Additions	-	69	-	51	120
Transfers	-	18	-	-	18
Amortization charge	-	(249)	-	-	(249)
Closing net book amount	**-**	**214**	**433**	**75**	**722**
At 31 December 2018					
Cost	2,159	7,042	433	1,042	10,676
Accumulated amortization and impairment	(2,159)	(6,828)	-	(967)	(9,954)
Net book amount	**-**	**214**	**433**	**75**	**722**
Year ended 31 December 2018					
Opening net book amount	-	214	433	75	722
Acquisition of subsidiary	-	63	-	-	63
Additions	-	65	-	22	86
Transfers	-	(5)	-	-	(5)
Amortization charge	-	(183)	-	-	(183)
Closing net book amount	**-**	**155**	**433**	**97**	**684**
At 31 December 2019					
Cost	2,159	7,169	433	1,064	10,825
Accumulated amortization and impairment	(2,159)	(7,011)	-	(967)	(10,137)
Net book amount	**-**	**155**	**433**	**97**	**684**

Development costs
The development costs consist of the development and prototype expenses of the Flowrence system and are all fully amortised.

Software and other intangibles
Software mainly comprises purchased general laboratory and office-related software. Other intangibles are the in-kind contribution of a shareholder relating to software at the foundation of the group and compensation paid to a third party to exclusively use parts of their technology.

Intellectual property
Following the Liquid Light acquisition in 2016, the company records intellectual property (patent portfolio acquired) on its consolidated balance sheet, which will subsequently be lowered with accumulated amortisation the following years, when the technology on which the intellectual property is filed, is ready to deploy commercially. As at 31 December 2019, the recoverable amount of the intellectual property exceeds the carrying amount.

Impairment tests
Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units). Non-financial assets that have suffered impairment are reviewed for possible reversal of the impairment at each reporting date.

Total of research expenditures recognised as an expense in the consolidated statement of comprehensive income amounted to €591,000, and mainly constitute of early stage research trials.

7. Leases

This note provides information for leases where the group is a lessee.

(a) Amounts recognised in the balance sheet
The balance sheet shows the following amounts relating to leases:

in Euro x 1,000	31 December **2019**	1 January **2019**
Properties	9,469	8,487
Motor vehicles	263	361
Total right-of-use assets	**9,732**	**8,849**

in Euro x 1,000	31 December 2019	1 January 2019
Current lease liabilities	1,534	1,101
Non-current lease liabilities	9,264	8,595
Total Lease liabilities	**10,798**	**9,696**

For adjustments recognised on adoption of IFRS 16 on 1 January 2019, please refer to note 30.

Included in the right-of-use assets balance position for properties as at 31 December 2019, is the lease liability acquired during the step-up acquisition of the Joint venture.

The carrying value as at 31 December 2019 of this right-of-use asset is €2,150,000. For further information on the balance position acquired on 15 January 2019, refer to note 9.

Additions to the right-of-use assets during the 2019 financial year were nil.

(b) *Amounts recognised in the statement of comprehensive income*
The statement of profit or loss shows the following amounts relating to leases:

	Year ended 31 December	
in Euro x 1,000	2019	2018
Properties	1,537	-
Motor vehicles	99	-
Total depreciation charge of right-of-use assets	**1,635**	**-**

	Year ended 31 December	
in Euro x 1,000	2019	2018
Interest expense included in finance cost	239	-
Total interest charge on lease liabilities	**239**	**-**

(c) *The group's leasing activities and how these are accounted for*
The group leases various offices, an apartment for Ph.D students and a number of vehicles. Rental contracts are generally made for fixed periods of 3 to 10 years but may have extension options. Lease terms are negotiated on an individual basis and contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

Contracts may contain both lease and non-lease components. The group allocates the consideration in the contract to the lease and non-lease components based on their relative stand-alone prices.

Until the end of 2018 financial year, leases of property, plant and equipment were classified as operating leases. Net payments made under operating leases were charged to the consolidated statement of comprehensive income on a straight-line basis over the period of the lease.

From 1 January 2019, leases are recognised as a right-of-use asset and a corresponding liability at the date at which the leased asset is available for use by the group. Each lease payment is allocated between the lease liability and finance cost. The finance cost is charged to the statement of comprehensive income over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. Right-of-use assets are depreciated on a straight-line basis over the remaining term of the lease or over the remaining economic life of the asset, if this is judged to be shorter than the lease term.

Assets and liabilities arising from a lease are initially measured on a present value basis. Lease liabilities include the net present value of the following lease payments:
- fixed payments (including in-substance fixed payments), less any lease incentives receivable
- variable lease payment that are based on an index or a rate - decommissioning costs
- payments of penalties for terminating the lease, if the lease term reflects the lessee exercising that option.

The lease payments are discounted using the interest rate implicit in the lease. If that rate cannot be determined, the lessee's incremental borrowing rate is used, being the rate that the lessee would have to pay to borrow the funds necessary to obtain an asset of similar value in a similar economic environment with similar terms and conditions.

Right-of-use assets are measured at cost comprising the following:
- the amount of the initial measurement of lease liability
- any lease payments made at or before the commencement date less any lease incentives received - any initial direct costs, and
- onerous contract provisions

Right-of-use assets are generally depreciated over the shorter of the asset's useful life and the lease term on a straight-line basis. If the group is reasonably certain to exercise a purchase option, the right-of-use asset is depreciated over the underlying asset's useful life. While the group revalues its land and buildings that are presented within property, plant and equipment, it has chosen not to do so for the right-of-use buildings held by the group.

Payments associated with short-term leases and leases of low-value assets are recognised on a straight-line basis as an expense in profit or loss. Short-term leases are leases with a lease term of 12 months or less. Low-value assets comprise IT-equipment and small items of office furniture.

The cash flow related to principal elements of the lease payments during 2019 amounted to €2,020,000 (2018: €nil).

8. Investments in joint ventures and associates

On 30 November 2016, Avantium established a joint venture with BASF, Synvina C.V., in which it had a non-controlling interest of 49%, to commercialise the YXY technology, to which Avantium contributed the YXY technology, the pilot plant in Geleen, the related patents and know-how and employees.

On 18 December 2018, BASF notified Avantium of its exit from the Synvina joint venture. The economic transfer took place on 15 January 2019, whereas the legal transfer of control took place on 25 January 2019. Upon the exit of BASF, Avantium N.V. gained full control over the investment in the joint venture and consequently this investment was reclassified from interests in joint ventures and associates to investments in subsidiaries. For further information of this step-up acquisition, refer to note 9.

The carrying amount of the equity-accounted investments changed as follows:

At December 31, 2017	**48,197**
Share in loss of joint venture	(7,011)
Impairment and write-off charges	(36,937)
Dividend	-
At December 31, 2018	**4,249**
Share in loss of joint venture	(259)
Dividend	-
At January 15, 2019	**3,990**
Unwinding of joint venture	(3,990)
At December 31, 2019	**-**

The share in loss of the joint venture of €259,000 is the result of the 49% stake in the Synvina joint venture up to and including 15 January 2019, which after the Joint venture was unwound and the unwinding interest reclassified as an investment in subsidiaries, refer to note 9.

In accordance with the original joint venture agreement, upon exit of BASF before Financial Investment Decision 2 (FID2), it was mandatory for Avantium to take back all employees, IP and assets of Synvina. Based on the joint venture agreement the company was obliged to repurchase BASF shares in Synvina. Considering this, the exit notice of BASF, resulted in contractual unavoidable cost of €13,088,000 which was recognised as an onerous contract provision in the Avantium N.V. in the statement of comprehensive income during 2018. This amount was based on the contractual unavoidable cost incurred by Avantium in January 2019 minus the estimated fair value of the assets and liabilities obtained by Avantium on 15 January 2019.

9. Business combinations

On 15 January 2019 Avantium N.V. acquired 51% of the issued shares in Synvina C.V., for a consideration of €17.4 million in cash.

Given Avantium N.V., before the full acquisition of Synvina, held 49% investment in the Joint venture, the full acquisition of Synvina is considered to be a step-acquisition, and is accounted for using the acquisition method at the acquisition date.

The assets and liabilities recognised as a result of the acquisition are as follows:

	15 January
in Euro x 1,000	2019
Property, plant and equipment	8,163
Intangible assets	63
Right of use assets	2,869
Inventories	137
Cash and cash equivalents	12,434
Other receivables	1,249
Other payables	(5,494)
Other current liabilities	(8,373)
Lease liabilities	(2,869)
Net identifiable assets as at 15.01.2019	**8,179**
Unwinding of Joint venture	(3,990)
Onerous contract provision settlement	13,088
Onerous contract expense	232
Other intercompany settlements	(100)
Total consideration paid 15.01.2019	**17,409**

The group's previously held interest in Synvina was re-measured to its fair value at acquisition date. Given the composition of the assets acquired in Synvina, mainly consisted of recently acquired property, plant and equipment, receivables/payables and other financial assets, the assets fair value was deemed to be equal to their respective carrying values as at 15 January 2019. For this reason, the consideration transferred for the controlling interest in the Subsidiary, amounted to €4,189,000 with existing interest valued at €3,990,000 that was transferred from the investment in joint venture and associates.

No goodwill was recorded, as the difference between the consideration paid and fair value of assets and liabilities obtained was recorded as onerous contract provision in 2018 and 2019, respectively.

The acquired business had the following impact on the statement of comprehensive income and statement of cash flows for 2019 and 2018 respectively:

Impact on Statement of comprehensive income

in Euro x 1,000	2019	2018
Share loss in joint-venture	(259)	(7,011)
Impairment and write-off charges	-	(36,937)
Expense due for onerous contract	(232)	(13,088)
Revenues	170	-
Expenses	(10,526)	-
Other income	558	-

Impact on Statement of cash flows

in Euro x 1,000	2019	2018
Acquisition of Subsidary	(4,189)	-
Settlement of onerous contract provision	(13,088)	-
Acquisition of Subsidary admin costs	(232)	-
Other intercompany settlements	100	-

If the acquisition had occurred on 1 January 2019, consolidated pro-forma revenue and net loss for the year ended 31 December 2019 would have been €13,875,000 and €23,592,000 respectively.

These amounts have been calculated using the subsidiary's results.

10. Inventories

	Year ended 31 December	
(In Euro x 1,000)	2019	2018
Raw materials	992	945
Work in progress	448	215
	1,440	**1,160**

The costs of inventories recognised as an expense and included in raw materials and contract costs, amounted to €273,000 (2018: €244,000).

11. Trade and other receivables

	Year ended 31 December	
(In Euro x 1,000)	2019	2018
Trade receivables	2,644	4,752
Social security and other taxes	2,062	187
Prepayments	224	166
Contract assets	4,379	2,740
Other receivables	2,233	1,463
Current portion	**11,541**	**9,307**

In 2019, €0 (2018: €0) of trade receivables was written off and €1,587,000 (30 days or more after invoice date) was past due, of which 73% was paid before 5 March 2020 and of the remaining 27%, 18% is for one credit worthy customer. The company does not foresee a risk of impairment considering the fact that a large portion of this balance has been collected after year-end and based on individual client payment history no provisions are deemed necessary (see also note 3.1). The carrying amounts of these financial assets are assumed to approximate their fair values.

Impairment provisions for trade receivables are recognised based on the simplified approach within IFRS 9 to measuring expected credit losses which uses a lifetime expected loss allowance for all trade receivables and contract assets.
To measure the expected credit losses, trade receivables and contract assets have been grouped based on shared credit risk characteristics and the days past due. The contract assets relate to unbilled work in progress and have substantially the same risk characteristics as the trade receivables for the same types of contracts. The group has therefore concluded no provision for credit losses is required on trade receivables and contract assets, since after careful consideration of each customer's payment profile and likelihood to default on payments, the credit losses was deemed to be immaterial.

12. Cash and cash equivalents

	Year ended 31 December	
(In Euro x 1,000)	**2019**	**2018**
Cash at bank and on hand	45,443	83,302
Cash equivalents	-	-
Cash and cash equivalents	**45,443**	**83,302**

The carrying amounts of these financial assets are assumed to approximate their fair values. A notional cash pool agreement is in place for all Rabobank accounts where balances are netted on a daily basis. Within the cash pool, there are €0 overdrafts.

Cash and cash equivalents include the following for the purpose of the statement of cash flows:

	Year ended 31 December	
(In Euro x 1,000)	**2019**	**2018**
Cash and cash equivalents	45,443	83,302
Cash and cash equivalents	**45,443**	**83,302**

13. Share capital and other reserves

Avantium N.V. listed on Euronext Amsterdam and Euronext Brussels on 15 March 2017. The listing follows the company's successful IPO, with a total offering and total gross cash proceeds of €109 million (including over-allotment exercise).

13.1 Ordinary shares

The authorised share capital amounted to €4,500,000 consisting of 45,000,000 ordinary shares, with a nominal value of €0.10 each. The issued share capital at 31 December 2019 comprises 25,831,817 ordinary shares (2018: 25,831,817). In 2019, 22,260 options were exercised by employees and delivered in shares covered by shares held in treasury with the Stichting Administratiekantoor. At 31 December 2019, 53,297 (2018: 48,850) shares were held by the Stichting Administratiekantoor Avantium (the Foundation) and nil employee shares were repurchased. All 25,831,817 shares issued are fully paid and stated at its par value of €0.10 each.

13.2 Other reserves

The costs of equity settled share-based payments to employees are recognised in the statement of comprehensive income, together with a corresponding increase in equity during the vesting period, taking into account (deferral of) corporate income taxes. The accumulated expense of the share incentive plan recognised in the statement of comprehensive income is shown as a total of the equity category 'other reserves' in the consolidated statement of changes in equity.

13.3 Currency translation difference

The group does not hold a company reporting in any other currency than euros and therefore does not hold a currency translation reserve.

13.4 Treasury shares

The total value of treasury shares outstanding at 31 December 2019 is €622,000.

14. Share-based payment

The group operates share-based compensation plans for its employees, which consists of an Employee Share Option Plan (ESOP) and a Long-term Incentive Plan (LTIP). These plans are classified as equity-settled share-based payment plans which was initially adopted in 2006 and replaced by the new share-based compensation plans at the IPO in 2017. Note that there was a reverse share split in 2017, where the nominal value of the shares increased from €0.01 to €0.10.

Long-term Investment Plan (LTIP)

The members of the Management Team are obligated to invest a percentage of their (net) bonus in (depositary receipts for) shares to be delivered by the company under the LTIP. Each Investment share relates to one share. The cash component of the bonus may, at the discretion of the relevant member of the Management Team, also be invested in Investment shares. The Investment shares are subject to a retention period of five years, during which the investment shares cannot be sold. After the end of the retention period, the company will match the (depository receipts for) shares granted under the LTIP at a 1:1 ratio, i.e. one Matching share is granted for each Investment share.

The entitlement to receive Matching shares will be reduced as follows in the case of termination: 100% if the termination date is prior to the first anniversary of the date of Award; 66.67% if the termination date is prior to the second anniversary but after the first anniversary of the date of Award; 33.33% if the termination date is prior to the third anniversary but after the second anniversary of the date of Award.

In 2019, 22,578 additional awards were granted under the Long term Investment Plan (LTIP). These awards consist of 11,289 Investment shares and 11,289 Matching shares.
Further details on the grants in 2019 can be found in the table below:

Grant date	Plan	Number of awards granted - New LTIP plan	Share price in Euro at grant date
21 March 2019	LTIP	22,578	2.64

The movements in outstanding LTIP awards with the Management Board and senior management can be summarised as follows:

Long Term Ivestment Plan	**2019**		**2018**	
	Number	Weighted Average share price at grant date (in Euro)	Number	Weighted Average share price at grant date (in Euro)
Number of awards outstanding 1 January	**76,416**	**5.98**	**5,418**	**10.50**
Number of matching shares forfeited	(11,740)	4.13	-	-
Number of awards granted (including matching shares)	22,578	2.64	70,998	5.63
Number of awards outstanding 31 December	**87,254**	**5.36**	**76,416**	**5.98**

Employee Share Option Plan (ESOP)

On an annual basis and on certain other occasions set out in the plan rules, options under the Employee Share Option Plan (ESOP) may be conditionally granted to eligible employees of the company. The Options will vest yearly over a three-year vesting period. The vested options have an exercise period of five years after vesting, after which the option expires.

In 2019, 615,000 share options were granted. In 2019, 22,260 options were exercised with a weighted-average share price of €2.59 at the date of exercise by the employees.
Further details on the grants in 2019 can be found in the table below.

Grant date	Plan	Number of options granted - New ESOP plan	Exercise price in Euro per option
16 May 2019	ESOP	615,000	2.60

The movements in outstanding options with the Management Board, senior management and certain other employees can be summarised as follows:

Share Option	2019		2018	
	Number	Weighted Average exercise price	Number	Weighted Average exercise price
		(in Euro)		(in Euro)
Number of options outstanding 1 January	**1,758,906**	**2,79**	**1,505,045**	**2,15**
Number of options exercised	(22,260)	2,59	(70,111)	0,10
Number of options forfeited	(202,059)	5,75	(16,028)	8,28
Number of options expired	-	-	-	-
Number of options granted	615,000	2,60	340,000	5,34
Number of options outstanding 31 December	**2,149,587**	**2,46**	**1,758,906**	**2,79**

Share options outstanding at the end amounted to 2,149,587, with various expiry dates and exercise prices.
Avantium N.V. has issued shares resulting from the exercise of options to the Stichting Administratiekantoor Avantium (the Foundation).

The Foundation has issued depository receipts to members of the Management Board, senior management and certain other employees. The Foundation is a consolidated special purpose entity set up by Avantium N.V. The shares held by the Foundation, however, only represent the voting rights associated with the issued shares and depository receipts representing all economic benefits issued by the Foundation to members of the Management Board, senior management and certain other employees, and consequently the shares held by the Foundation are not considered treasury shares.

The number of options which are exercisable at the end of the period (i.e. vested, but not yet exercised) amounted to 1,049,515.

LTIP awards outstanding at the end of the year had the following share price at grant date:

Grant date	Share price at grant date in Euro	Number of awards
1 July 2017	10,50	5,418
16 March 2018	5,36	65,155
21 March 2019	2,64	16,681
At 31-12-19		**87,254**

The fair value of LTIP awards under the Long-term Investment Plan is determined by the share price at grant date and the weighted average fair value of LTIP awards granted during 2019 was €2.64 per award (2018: €5.63)

The fair value of options under the equity-settled share-based payment plans is determined using the Black-Scholes valuation model and the weighted average fair value of options granted during 2019 was €0.99 per option (2018: €1.85).

The significant inputs into this model were as follows:

	May-19	Mar-18
Input price	2.63	5.34
Volatility	35%	32%
Risk free interest rate	0.20%	0.34%
Dividend yield	-	-
Expected life	7.6 years	7.6 years
Early exercise rate	5%	5%

The historical volatility used is based on the volatility of the company's own shares in combination with the historical volatility of a peer group (five companies in total which are considered to be comparable listed companies), of which the daily stock returns over a period equal to the maturities of each plan related to the valuation dates was used.

During the year, a reclassification was made from other reserves to retained earnings, totalling €69,437, to reflect the effect of exercised and lapsed options in 2019.

15. Earnings per share

(a) Earnings per share
Earnings per share for the years 2019 and 2018 are derived below:

	Year ended 31 December	
Earnings per share	2019	2018
Profit / (Loss) from continuing operations	(23,544,000)	(68,377,574,58)
Profit / (Loss) for the period - basic	**(23,544,000)**	**(68,377,575)**
Dillutive adjustments	-	-
Profit / (Loss) for the period - diluted	**(23,544,000)**	**(68,377,575)**
Weighted average number of ordinary shares	**25,831,817**	**25,806,875**
Options per end of the year	2,149,586	1,758,906
LTIP awards per end of the year	87,254	76,416
Other relevant dilutive securities	-	-
Effect of dilutive / anti-dilutive securities	**2,236,840**	**1,835,322**
Weighted average number of shares - diluted	**25,831,817**	**25,806,875**
Earnings per share - basic	**(0.91)**	**(2.65)**
Earnings per share - diluted	**(0.91)**	**(2.65)**

Basic earnings per share are calculated by dividing the net result for the period by the weighted average number of ordinary shares. Diluted earnings per share are calculated by dividing the net results for the period on a diluted basis by the weighted average number of shares on a diluted basis. As the company is in a loss-making position, the options have an antidilutive impact on the diluted earnings per share, for this reason the options for the year are not considered in the calculation of diluted earnings per share.

16. Trade and other payables

(In Euro x 1,000)	Year ended 31 December 2019	2018
Trade payables	3,727	2,605
Social security and other taxes	-	794
Holiday pay and holiday days	991	788
Contract liabilities	1,326	1,618
Deferred government grants	8,223	2,202
Other current liabilities	3,101	1,518
	17,367	**9,525**

The other current liabilities comprise primarily of other staff pay related accruals (€1,630,000) and accrued expenses (€1,471,000). Deferred government grants comprise of advances received in relation to government grants. The carrying amounts of these financial liabilities are assumed to approximate their fair values.

Contract liabilities relating to systems contracts are balances due to customers under construction contracts. These arise if a particular milestone payment exceeds the revenue recognised to date under the percentage-of-completion method. Contract liabilities relating to services are balances due to customers under services contracts. These arise if particular services are to be rendered over time for which a prepayment has been received.

The following table shows how much of the revenue recognised in the current reporting period relates to carried-forward contract liabilities:

(In Euro x 1,000)	Year ended 31 December 2019	2018
Revenue recognized that was included in the contract liability balance at the beginning of the period		
- Systems contracts	482	238
- Services contracts	211	143
- Renewable chemisties	-	-
	692	**381**

17. Borrowings

The group had no borrowings in 2019 and 2018.

(a) Bank overdrafts
At the end of 2019, the group has an unutilised committed banking facility with Rabobank of €4.0 million with an interest rate determined on the basis of the average one-month EURIBOR +0,70% per annum (see also note 28). As at 31 December 2019, the group had not drawn down any amounts under this facility.

18. Provisions for other liabilities and charges

(In Euro x 1,000)	Warranty provision	Onerous contract with Synvina provision	Total
At January 1, 2018	**137**	**-**	**137**
Additional provision	62	13,088	13,150
Unwinding of discount	-	-	-
Unused amounts reversed	(13)	-	(13)
Used during the year	(30)	-	(30)
At December 31, 2018	**157**	**13,088**	**13,244**
At January 1, 2019	**157**	**13,088**	**13,244**
Additional provision	68	-	68
Unwinding of discount	-	-	-
Unused amounts reversed	(78)	-	(78)
Settlement of provision	-	(13,088)	
Used during the year	(10)	-	(10)
At December 31, 2019	**137**	**(0)**	**137**

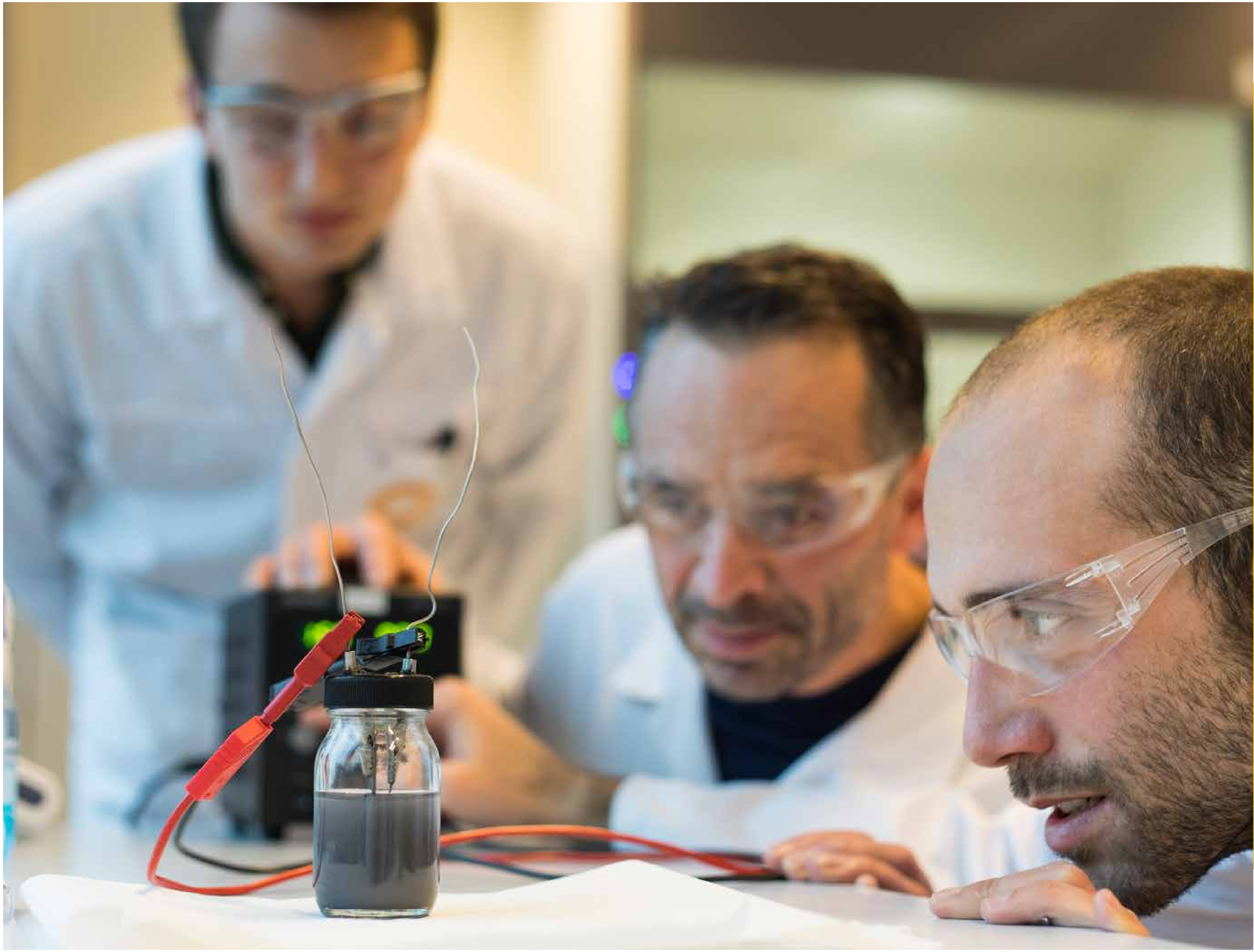
a) Onerous contract
The provision as at 31 December 2018 for an onerous contract relates to the exit payment which was to be made to BASF for their exit from the Synvina joint venture. The provision was expensed via the statement of comprehensive income in 2018 (see note 8) and subsequently settled in 2019.

b) Warranty
The provision for warranty consists of estimated costs for repairs of installed products during the warranty period of one year. This estimate is based on historical experience of broken or repaired units and the costs associated with that. This provision is current (shorter than one year). Unused amounts are reversed after expiration of the warranty period.

19. Segment information

a) Description of the segments and principal activities
In the company, the Executive Board (known under the name Management Team) is considered the chief operating decision maker. This team consists of the Chief Executive Officer, Chief Financial Officer, Chief Technology Officer, Group Legal Counsel, and the Managing Directors of Avantium Renewable Chemistries, Avantium Catalysis, and Avantium Renewable Polymers. It has identified three separate segments:

- Avantium Catalysis: parallel fixed bed reactor equipment for catalysis R&D at industrial conditions and process R&D projects for the industry, tailored to specific applications. Catalysis offers two specific types of R&D solutions for organisations looking to advance their catalysis and chemical process development.
- Avantium Renewable Chemistries: a portfolio of development projects based on renewable chemistry and catalytic process technology. The common basis, on which each activity rests, is formed by Avantium's unique technological capabilities that have been validated through the execution of millions of experiments, covering a broad range of chemistries, including highly complex and challenging R&D projects. The portfolio of programmes includes the Volta programme, and the Dawn Technology and Ray Technology™.
- Avantium Renewable Polymers aims to commercialise our YXY plants-to-plastics Technology®. This technology catalytically converts plant-based sugars into FDCA (furandicarboxylic acid) and materials such as the new plant-based packaging material PEF (polyethylene furanoate). PEF is a 100% plant-based, 100% recyclable plastic with superior performance properties compared to today's widely used petroleum-based packaging materials.



b) EBITDA

The main KPI of the company within the profit & loss account is EBITDA. Note that the EBITDA figure excludes company overheads and shared service activities.

The EBITDA is calculated in the following manner:
Operating profit/loss + depreciation & amortisation

The EBITDA figures of the company segments are as follows.

(In Euro x 1,000)	2019	2018
Catalysis	3,735	2,285
Renewable Chemistries	(2,971)	(3,866)
Renewable Polymers	(7,941)	-
Total EBITDA of business segments	**(7,177)**	**(1,581)**

Revenue is only generated from external customers and no transactions with other segments have taken place.

c) Revenues per segment

(In Euro x 1,000)	2019	2018
Catalysis	12,456	10,873
Renewable Chemistries	1,195	410
Renewable Polymers	170	-
Total segment revenue	**13,821**	**11,283**

d) Reconciliation

(In Euro x 1,000)	2019	2018
Total EBITDA of business segments	(7,177)	(1,581)
Amortisation	(183)	(249)
Depreciation	(5,764)	(1,550)
Finance costs - net	(319)	(68)
Share based compensation	(813)	(1,384)
Rent	(193)	(1,006)
Share in loss of joint ventures	(259)	(43,948)
Expense due for onerous contract	(724)	(13,088)
Company overheads/other	(8,112)	(7,452)
Loss before income tax from continuing operations	**(23,544)**	**(68,378)**

The 'Other' costs category comprises mainly of company overhead costs. The increase in other costs in 2019 is mainly due to an increase in wages, due to organisational growth and investments in the company's operating segments.

e) Other profit and loss disclosures

2019 (in Euro x 1,000)	Subsidies recognized	Depreciation and amortisation
Catalysis	85	(558)
Renewable Chemistries	3,467	(1,991)
Renewable Polymers	531	(1,840)
Unallocated items	134	(1,558)
Total	**4,217**	**(5,948)**

2018 (in Euro x 1,000)	Subsidies recognized	Depreciation and amortisation
Catalysis	-	(597)
Renewable Chemistries	3,637	(777)
YXY	-	-
Unallocated items	-	(429)
Total	**3,637**	**(1,804)**

20. Revenues

Reported consolidated revenue from continuing operations increased by 22% from €11.3 million in 2018 to €13.8 million in 2019, all recognised over time, except for revenues from renewable chemistry development agreements, systems revenue generated out of spare parts sold and Material offtake agreements from Renewable Polymers (see note 2.20). Revenues per segment are reported under note 19. All revenue reported originates in the Netherlands.

The following table depicts the disaggregation of revenue from contracts with customers:

2019 (in Euro x 1,000)	Services revenue	Systems revenue	Renewable chemisty develop-ment agreements	Renewable Polymers MTA agreements	Total
Segment revenue	3,064	9,391	1,195	170	13,821
Revenue from external customers	**3,064**	**9,391**	**1,195**	**170**	**13,821**
Timing of revenue recognition					
- At a point in time	-	-	1,195	170	1,365
- Over time	3,064	9,391	-	-	12,456
Total	**3,064**	**9,391**	**1,195**	**170**	**13,821**

2018 (in Euro x 1,000)	Services revenue	Systems revenue	Renewable chemisty develop-ment agreements	Renewable Polymers MTA agreements	Total
Segment revenue	3,767	7,106	410	-	11,283
Revenue from external customers	**3,767**	**7,106**	**410**	**-**	**11,283**
Timing of revenue recognition					
- At a point in time	-	597	410	-	1,007
- Over time	3,767	6,510	-	-	10,276
Total	**3,767**	**7,106**	**410**	**-**	**11,283**

As of 31 December 2019, the aggregate amount of the transaction price allocated to the remaining performance obligation is €8.8 million and the group will recognise this revenue as the progress on each contract is completed, which is estimated to occur over the next 9–24 months.

21. Other income

(In Euro x 1,000)	2019	2018
Subsidies recognized	(4,217)	(3,637)
	(4,217)	**(3,637)**

The group recognised total government grants of €4,217,000 (2018: €3,637,000) to contribute to the Avantium's development programmes, where efforts are focused on developing a new catalytic process for making bio-based ethylene-glycol and on developing an economical viable chemical process to convert ligno-cellulosic biomass into high quality glucose as feedstock for bio-based chemical, and in Renewable Polymers, for its plant-to-plastics YXY Technology®.

22. Expenses by nature

Overall operational costs in 2019 amounted to €41.0 million (2018: €39.3 million). In 2019 the group included Avantium Renewable Polymers to its cost base which resulted in an additional €10.5 million operational costs in 2019. In addition to this, the group implemented IFRS 16 as of 1 January 2019, resulting in an increase of €1,635,000 in Depreciation, amortisation and impairment charges and a corresponding decrease in office and housing expenses. The increase in operational costs in 2019 was partially offset by the provision of onerous contract expense raised in 2018 of €13.1 million.

Raw materials and contract costs in 2019 amounted to €3,666,000 (2018: €3,065,000) and comprises of cost of goods sold, costs of laboratory consumables directly attributable to revenue projects, and other specific costs related to revenues. This increase is mainly the result of higher revenues on systems sold due to improved progress made on existing contracts and increase in landing new deals, with associated higher costs of goods sold.

Employee benefit expenses in 2019 amounted to €19,747,000 (2018: €13,731,000) and includes wages and salaries, social security costs, share options granted to directors and employees, pension costs, and government grants received. The increase in employee benefit expenses during 2019, mainly relates to the increase in FTE, since Renewable Polymers was included as an additional business unit in the consolidated financial statements as of 2019. The increase solely related to Avantium Renewable Polymers amounting to €5.0 million, the residual increase was related to a termination benefit provided for at year end as a result of the departure announcement of the CFO during 2019 and less external consultants engaged as more fixed staff was employed.

Depreciation, amortisation and impairment charges increased to €5,948,000 (2018: €1,799,000). This increase is mainly attributable to the inclusion of Renewable Polymers property, plant and equipment and its corresponding depreciation and amortisation into the cost base of Avantium's consolidated financials. Additionally, the implementation of IFRS 16, lead to an increase in depreciation, as rent expenses on operating leases is replaced by depreciation and interest expenses, refer to note 7. Apart from the implementation of IFRS 16, and Avantium Renewable Polymers, depreciation commenced on the investments in the Dawn Technology, and in the air treatment and ventilation systems of the Penta 1 building in Amsterdam.

Office and housing expenses in 2019 amounted to €1,800,000 (2018: €2,208,000) and comprises of short-term rental agreements, other facility related costs, telephony and other IT related office materials and costs. The decrease in costs is related to implementation of IFRS 16 as rent expenses previously recorded under operating leases has now been replaced by depreciation and interest expenses. Laboratory expenses in 2019 amounted to €3,606,000 (2018: €1,737,000) and comprises of laboratory consumables, spare parts, maintenance and repair work in the laboratory, and small laboratory projects. The increase in costs mainly relates to the incorporation of Renewable Polymers B.V into the cost base of Avantium. Patent, license, legal and advisory costs in 2019 amounted to €3,185,000 (2018: €1,897,000).

Advertising and representation expenses relate to external and internal marketing, communications, and business development efforts, including travel. They exclude wages for internal business development staff, which are included under employee benefit expenses.
Other operating expenses in 2019 amounted to €890,000 (2018: €447,000) and comprises external development costs, such as trials, and other general costs including company insurances. The increase is mainly related to the incorporation of Renewable Polymers external development costs related to the reference plant.

23. Employee benefits

(In Euro x 1,000)	2019	2018
Wages and salaries	18,813	11,547
Government grants R&D (WBSO)	(2,939)	(1,262)
Social security costs	2,201	1,513
Share options granted to directors and employees (note 12)	574	970
Expense related to accelerated vesting of options (note 12)	-	0
Expense related to LTIP shares granted	239	415
Pension costs – defined contribution plans	859	549
	19,747	**13,731**
Number of full time equivalent employees at December 31	**209.0**	**168.5**

The average number of FTEs during 2019 was 213 (2018: 155), of which 55 of this average accounts for Renewable Polymers in 2019.

The group received government grants in 2019 and 2018. In 2019, €2,939,000 (2018: €1,262,000) government grants were recognised relating to research and development (WBSO).

24. Finance income and costs

(In Euro x 1,000)	2019	2018
Finance costs:		
- Net foreign exchange (gains) loss	12	5
- Interest current accounts	17	24
- Leases	239	-
- Other finance costs	77	58
Finance costs	**345**	**87**
Finance income:		
- Interest current accounts	(27)	(19)
Finance income	**(27)**	**(19)**
Finance costs - net	**319**	**68**

25. Income tax expense

No tax charges or tax income were recognised in 2019 since the company was in a loss-making position and no deferred tax asset was recognised for carry-forward losses. The loss in 2019 was mainly driven by the incorporation of Renewable Polymers cost base into the consolidated financial statements of Avantium as well as significant investments in product development programmes. As a result of the significant investment in our product development programmes, the company does not expect any taxable income in the following year(s).

The company forms an income tax group with its subsidiaries. Under the standard conditions, the members of the tax group are jointly and severally liable for any taxes payable by the group.

Tax loss carry-forward is subject to a time limitation of nine years. As from 1 January 2019 the carry forward term has been reduced from nine to six years, however for the tax losses incurred prior to 2019 the loss carry forward term remains nine years.

In 2011, the company completed a fiscally approved transaction that decreased but at the same time extended and refreshed a significant part of our losses carried forward. For corporate income tax purposes IP is valued and being amortised over a period of 10 years resulting in an additional depreciation which ensures that the carry-forward losses will increase again. The total amount of tax losses carried forward as of 31 December 2019 is estimated at €152,532,000 and a first part (the loss of 2012) will expire in 2021, which is estimated at €11,051,000.

(In Euro x 1,000)	2019	2018
Current tax	-	-
Deferred tax	-	-
	-	-
Profit / (Loss) before tax	**(23,544)**	**(68,378)**
Temporary differences	-	-
Expenses not deductible for tax purposes	-	-
Loss for the year offset against available tax losses	(23,544)	(68,378)
Tax losses for which no deferred income tax asset was recognized	-	-
Tax charge	**-**	**-**

The nominal tax rates and amount in 2019 are 19% up to €200,000 and 25% over €200,000.

26. Dividends

The company declared no dividends for any of the years presented in these consolidated financial statements.

27. Cash flow statement

In the cash flow statement, purchases of property, plant and equipment comprise:

(In Euro x 1,000)	2019	2018
Additions according to note 5	8,458	7,958
Purchases of property, plant and equipment	**8,458**	**7,958**

28. Contingencies

The assets of the following legal entities, excluding the intangible assets and a permitted security (currently not utilised), are pledged to the Rabobank for our €4.0 million committed credit facility:

- Avantium N.V.
- Avantium Technologies B.V.
- Avantium Knowledge Center B.V.
- Avantium Support B.V.
- Renewable Technologies B.V.
- Furanix Technologies B.V.
- Feedstock Technologies B.V.
- Avantium Chemicals B.V.
- Avantium Renewable Polymers B.V.

The consolidated statement of financial position of these entities forms the credit base and the credit agreement requires a tangible net worth above €60.0 million. The tangible net worth of the credit base was €67.5 million on 31 December 2019.

29. Commitments

Operating lease commitments

The group leases various offices and vehicles under non-cancellable operating leases expiring within six months to eight years. The leases have varying terms, escalation clauses and renewal rights. On renewal, the terms of the leases are renegotiated.

From 1 January 2019, the group has recognised right-of-use assets for these leases, except for short-term and low-value leases, see note 7 and note 30 for further information.

As at 31 December 2019, the group's future aggregate minimum lease payments under non-cancellable operating leases for continuing operations was €nil (2018: €10,171,000).

Guarantees

Guarantees to third parties issued by Avantium total €2,133,000, which are primarily issued in relation to payments from customers following a systems deal for which a bank guarantee had to be issued.

30. Changes in accounting policies

IAS 20- Government grants

As a result a change in the entity's accounting policy on government grants, prior year financial statements had to be restated.

In prior years, the group disclosed government grant income under employee benefit expenses as a deduction from the related expense, however as the related expense from the government grant income also include other components such as depreciation and laboratory expenses, the company opted to change its account policy on disclosure of this income to be presented as other income. For further information on this change in account policy please refer to note 21.

This change in accounting policy lead to an increase in employee benefit expenses in prior year that amounted to €3,637,000 and an increase in other income a similar amount.

IFRS 16- Leases

This note explains the impact of the adoption of IFRS 16 Leases on the group's financial statements and discloses the new accounting policies that has been applied from 1 January 2019 in note 7.

On adoption of IFRS 16, the group recognised lease liabilities in relation to leases, previously classified as 'operating leases' under the principles of IAS 17 Leases. These liabilities were measured at the present value of the remaining lease payments, discounted using the respective incremental borrowing rate as of 1 January 2019. The weighted average incremental borrowing rate applied to the lease liabilities on 1 January 2019 was 2.1%.

(a) Transition Method and Practical Expedients utilised

The group has adopted IFRS 16 using the modified retrospective approach with initial application as of 1 January 2019. In applying IFRS 16 for the first time, the group has used the following practical expedients permitted by the standard:

- the use of a single discount rate to a portfolio of leases with reasonably similar characteristics;
- adjust the asset on transition by the amount of any previously recognised onerous lease provision, as an alternative to performing an impairment review;
- the accounting for operating leases with a remaining lease term of less than 12 months as at 1 January 2019 as short-term leases.

The group has also elected not to reassess whether a contract is or contains a lease at the date of initial application. Instead, for contracts entered into before the transition date the group relied on its assessment made by applying IAS 17.

(b) Measurement of lease liabilities	in Euro x 1,000
Operating lease commitments disclosed as at 31 December 2018	10,171
(Less): short-term leases recognised on a straight-line basis as expense	-
(Less): Low-value leases recognised on a straight-line basis as expense	-
Add/(less): effect of estimated decomissioning costs	466
Add/(less): adjustments in the index or rate affecting variable payments	-
Undiscounted lease future lease payments	10,637
(Less): effect of discounting using the incremental borrowing rate as at the date of initial application	(941)
Lease liability recognised as at 1 January 2019	9,696
Of which are:	
Current lease liabilities	1,101
Non-current lease liabilities	8,595
	9,696

(c) Measurement of right-of-use assets
The associated right-of-use assets recognised by the group was measured at the amount equal to the lease liability, adjusted by any amounts prepaid or accrued payments relating to the lease recognised as at 1 January 2019.

There was one onerous lease contract that required an adjustment to the right-of-use assets at the date of initial application, estimated at €492,000.

(d) Adjustments recognised in the balance sheet on 1 January 2019
The change in accounting policy affected the following balance sheet positions on 1 January 2019:
- Right-of-use assets increased by €8,849,000
- Lease liabilities – increased by €9,696,000.

The net impact on retained earnings on 1 January 2019 was nil.

31. Related-party transactions

Avantium does not grant its key management with any personal loans, guarantees or advance payments.

The following transactions were carried out with related parties:

a) Key management compensation

Key management is defined as those persons having legal authority and responsibility for planning, directing and controlling the activities of the entity, directly or indirectly, including any director (whether executive or otherwise) of that entity. Our key management comprises the members of the Management Board and the Supervisory Board.

Tom van Aken, Chief Executive Officer, became the sole member of the Management Board on 31 December 2019, as Frank Roerink, Chief Financial Officer stepped down effective 31 December 2019

At the Annual General Meeting on 15 May 2019 the following changes to the Supervisory Board occurred: Jonathan Wolfson, who was appointed to the Avantium Supervisory Board in 2013, stepped down; Gabrielle Reijnen, member of the Avantium Supervisory Board since 2015, also stepped down; Denis Lucquin was reappointed as member of the Supervisory Board for an additional two years and; Rob van Leen was appointed as member of the Supervisory Board of Avantium for a term of four years.

At an Extraordinary General Meeting (EGM) on 20 December 2019, Kees Verhaar stepped down as Chairperson and member of the Supervisory Board. Rob van Leen also resigned from Avantium's Supervisory Board effective 31 December 2019. At the same EGM, Edwin Moses was appointed as a Supervisory Board member for a term of four years. Directly after the EGM, the Supervisory Board appointed Edwin Moses as the new Chairperson of the Supervisory Board.

On 15 January 2020, Avantium announced the nomination of Michelle Jou for appointment to the Supervisory Board, and this nomination is expected to be ratified at the Annual General Meeting on 14 May 2020.

The following persons were members of the Supervisory Board on 31 December 2019:
· Edwin Moses, Chairperson
· Margret Kleinsman, Vice Chairperson
· Denis Lucquin

The total remuneration paid to or for the benefit of members of the Management Board and independent members of the Supervisory Board in 2019 amounted to €1,208,000 and €262,000 respectively. Included in the Management Board remuneration of 2019 is a severance payment of €235,000 in connection with his resignation Frank Roerink. This severance payment is in line with the Dutch Corporate Governance Code; not exceeding one year's (gross) salary. Frank Roerink remained eligible for variable remuneration over the financial year 2019. He will receive his variable remuneration over 2019 (including the LTIP component), fully in cash. The award under the LTIP serve as a long-term investment in the company and aim to align the respective interests with those of the other shareholders. Now that Frank Roerink has stepped down and left the company, this is no longer applicable.

The following table provides a breakdown of the remuneration in 2019 of the members of the Management Board and Supervisory Board:

(In Euro x 1,000)	Salary	Other benefits*	Cash bonus	Investment share bonus	Share-based payments	Post-employee benefits	Severance payments	Total Remuneration
Management Board								
Tom van Aken								
2019	**261**	**27**	**59**	**59**	**116**	**17**	**-**	**540**
2018	261	27	0	-	145	18	-	451
Frank Roerink								-
2019	235	32	92	0	58	17	235	668
2018	235	27	0	-	87	17	-	367
Total - 2019	**496**	**59**	**151**	**59**	**174**	**34**	**235**	**1,208**
Total - 2018	496	55	0	0	232	35	0	818

*Other benefits mainly include contributions to social security plans, benefits in kind such as company cars, medical expenses and legal expenses.

(In Euro x 1,000)	Salary	Bonus	Share-based payments	Post-employee benefits	Total
Supervisory Board					
K. Verhaar					
2019	**90**	**-**	**-**	**-**	**90**
2018	80	-	-	-	80
D. Lucquin					
2019	**50**	**-**	**-**	**-**	**50**
2018	50	-	-	-	50
G. Reijnen					
2019	**21**	**-**	**-**	**-**	**21**
2018	55	-	-	-	55
J. Wolfson					
2019	**18**	**-**	**-**	**-**	**18**
2018	50	-	-	-	50
M. Kleinsman					
2019	**50**	**-**	**-**	**-**	**50**
2018	50	-	-	-	50
R. van Leen					
2019	**30**	**-**	**-**	**-**	**30**
2018	-	-	-	-	-
E. Moses					
2019	**3**	**-**	**-**	**-**	**3**
2018	-	-	-	-	-
Total - 2019	**262**	**0**	**0**	**0**	**262**
Total - 2018	285	0	0	0	285

b) Transactions with the Synvina joint venture

There were no transactions recorded between the group and Synvina in 2019, primarily due to the unwinding of the joint venture in January 2019. Compared to last year's several transactions relating to the service level agreements for which Avantium's support departments delivered services to the joint venture, on which the below are the outstanding balances as at 31 December 2019:

Synvina transactions (In Euro x 1,000)	2019	2018
Receivable recorded by the group	-	930
Payable recorded by the group	-	415
Total reimbursement recorded in the consolidated statement of comprehensive income	-	1,352

There are no related party transactions that would need to be disclosed other than those described above.

32. Proposed appropriation of result

According to article 31 of the company's Articles of Association, the annual General Meeting determines the appropriation of the company's net result for the year.

In anticipation of the annual General Meeting's adoption of the annual accounts, the net loss for the year of €23,544,000 has been added to retained earnings (accumulated deficit).

33. Events after the balance sheet date

Early January 2020, Avantium announced that Avantium Renewable Polymers signed a letter of intent with a regional consortium to locate the 5-kiloton flagship plant at Chemie Park Delfzijl, the Netherlands. Avantium and the regional consortium, comprising the Province of Groningen, Groningen Seaports, NOM (Investment and Development Agency for the Northern Netherlands), FondsNieuweDoen, Investeringsfonds Groningen and Groeifonds, believe the new plant will be an important step in helping transition the chemicals industry away from fossil resources and towards sustainable feedstocks.

The regional consortium members and Avantium Renewable Polymers also entered into a letter of intent relating to a conditional financing of €30 million for the engineering and construction of the flagship plant, working capital, start-up costs and operations of Avantium Renewable Polymers. The financing of the regional consortium is subject to customary conditions, including due diligence and completion of documentation, and formal decisions by Avantium on the construction of the plant and the associated capital expenditure. The definitive financing mix is to be determined in 2020 and is intended to comprise grants, equity and debt.

In respect of the impact of COVID-19 we refer to paragraph 2.1.1 Going concern of the Notes to the Consolidated financial statements.

Company financial statements 2019

Company income statement

in Euro x 1,000	Year ended 31 December 2019	2018
Other revenues	-	-
Expenses		
Employee benefit expenses	(595)	(1,007)
Office and housing expenses	-	(1,006)
Patent, license, legal and advisory expenses	(196)	(117)
Other operating expenses	(1,730)	(115)
Operating profit / (loss)	**(2,521)**	**(2,245)**
Finance costs - net	(213)	(33)
Result before income tax	**(2,735)**	**(2,278)**
Income tax expense	-	-
Result subsidiaries and joint ventures	(20,809)	(66,100)
Profit / (Loss) for the period	**(23,544)**	**(68,378)**

Company balance sheet

(In Euro x 1,000)	Note	As at 31 December 2019	2018
ASSETS			
Non-current assets			
Financial fixed assets	36	44,800	32,445
Right-of-use assets		7,452	-
Total non-current assets		**52,252**	**32,445**
Current assets			
Other receivables		187	127
Cash and cash equivalents		43,638	81,015
Total current assets		**43,825**	**81,142**
Total assets		**96,077**	**113,587**
EQUITY			
Capital and reserves attributable to equity holders of the company			
Share capital	13	2,583	2,583
Share premium	13, 14	204,296	204,296
Other reserves	13, 14	9,862	9,331
Accumulated losses	13	(148,527)	(125,053)
Total equity		**68,215**	**91,157**

LIABILITIES			
Non-current liabilities			
Lease liabilities		8,359	-
Provisions	37	19,228	8,800
Total Non-current liabilities		**27,587**	**8,800**
Current liabilities			
Liabilities to group companies			
Trade payables		190	512
Provisions		-	13,088
Lease liabilities		-	-
Other current liabilities		85	30
Total current liabilities		**276**	**13,630**
Total liabilities		**27,863**	**22,429**
Total equity and liabilities		**96,077**	**113,587**

The balance sheet has been prepared before appropriation of current year result.

Notes to the company balance sheet and company income statement

34. General information

The company statements are part of the 2019 financial statements of Avantium N.V.

For setting the principles for the recognition and measurement of assets and liabilities and determination of the result of its company financial statements, Avantium N.V. makes use of the option provided in Section 2:362 (8) of the Dutch Civil Code. This means that the principles of the recognition and measurements of assets and liabilities and determination of the result (hereinafter referred to as accounting policies) of the company financial statements of Avantium N.V. are the same as those applied for the consolidated financial statements under IFRS (refer to note 2). By applying this option, reconciliation is maintained between the group's equity and the company's equity.

In the company financial statements, investments in group companies are stated as net asset value if the company effectively exercises influence of significance over the operational and financial activities of these investments. The net asset value is determined on the basis of the accounting principles applied by the company. In case the net asset value of an investment in a group company is negative, any existing loans to group companies considered as net investment are impaired. A provision for any remaining equity deficit is recognised when an outflow of resources is probable and can be reliably estimated.

The consolidated financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union. Please refer to the notes to the consolidated financial statements for a description of these principles.

36. Financial fixed assets

The company directly held 100% interests in the following subsidiaries on 31 December 2019:

- Avantium Technologies B.V., Amsterdam
- Renewable Technologies B.V., Amsterdam
- Avantium Support B.V., Amsterdam
- Avantium Knowledge Centre B.V., Amsterdam
- Feedstock Technologies B.V., Amsterdam
- Avantium Renewable Polymers B.V., Amsterdam

The movements in financial fixed assets can be summarised as follows:

(In Euro x 1,000)	Investment in group companies	Loans to group companies	**Financial fixed assets assets**
On January 1, 2019	41,049	(8,604)	**32,445**
Share of profit of group companies	-	-	**-**
Movements in loans to group companies/ provision	(6,192)	18,546	**12,354**
On December 31, 2019	34,857	9,942	**44,800**

The financial fixed assets consist of investments in group companies and loans to group companies. The value of the loans of Avantium N.V. to group companies on 31 December 2019 was €10.0 million.

35. Equity attributable to equity holders of the company

For details of the movements in and components of equity, reference is made to the consolidated statement of changes in equity of the consolidated financial statements and the notes to these.

37. Provisions

(In Euro x 1,000)	Provisions
On January 1, 2019	**(120)**
Share of profit of group companies	-
Movements in loans to group companies/ provision	(19,109)
On December 31, 2019	**(19,228)**

The value of Avantium N.V.'s financial fixed assets as at 31 December 2019 is €19.2 million, with a negative net equity and this is reported under provisions.

The provisions for financial fixed assets with a negative net equity as at 31 December 2019 relate to the following:
- Equity deficit of Feedstock Technologies B.V. of €27,000
- Equity deficit of Avantium Support B.V. of €17,281,000
- Equity deficit of Avantium Renewable Polymers B.V. of €1,619,000
- Equity deficit of Avantium Technologies B.V. of €302,000

38. Commitment and contingencies

Guarantees as defined in Book 2, section 403 of the Dutch Civil Code have been given by Avantium N.V. on behalf of the following group companies in the Netherlands and filed with the Chamber of Commerce:
- Avantium Support B.V.
- Avantium Technologies B.V.

39. Audit fees

The fees listed below relate to the procedures applied to the company and its consolidated group entities by PricewaterhouseCoopers Accountants N.V., the Netherlands, the independent external auditor as referred to in section 1(1) of the Dutch Accounting Firms Oversight Act (Dutch acronym: Wta), as well as by other Dutch and foreign-based PricewaterhouseCoopers individual partnerships and legal entities, including their tax services and advisory groups:

2019 (In Euro x 1,000)	**PwC Accountants N.V.**
Audit of the financial statements	247
Other audit procedures	-
Tax services	-
Other non-audit services	-
Total	**247**

2018 (In Euro x 1,000)	**PwC Accountants N.V.**
Audit of the financial statements	195
Other audit procedures	-
Tax services	-
Other non-audit services	-
Total	**195**

40. Remuneration of the Management Board and the Supervisory Board

The remuneration of the Supervisory Board amounted to €262,000 (2018: €285,000). The total remuneration paid to or for the benefit of members of the Management Board in 2019 amounted to €1,208,000 (2018: €818,000). For further details, refer to note 31 of the consolidated financial statements.

41 Employee information

The company had no employees in 2019 (2018: nil).

Amsterdam, 25 March 2020
Avantium N.V. (Chamber of Commerce number: 34138918)

Management Board
Tom van Aken, Chief Executive Officer

Supervisory Board
Edwin Moses, Chairperson
Margret Kleinsman
Denis Lucquin

The financial statements on pages 71-120 are authorised for issue by the Management Board on 25 March 2020.

T.B. van Aken

Chief Executive Officer

Independent auditor's report

To: the General Meeting and Supervisory Board of Avantium N.V.

Report on the financial statements 2019

Our opinion
In our opinion:
- Avantium N.V.'s financial statements give a true and fair view of the financial position of the Group as at 31 December 2019, and of its result and its cash flows for the year then ended in accordance with International Financial Reporting Standards as adopted by the European Union (EU-IFRS) and with Part 9 of Book 2 of the Dutch Civil Code.
- Avantium N.V.'s Company financial statements give a true and fair view of the financial position of the Company as at 31 December 2019 and of its result for the year then ended in accordance with Part 9 of Book 2 of the Dutch Civil Code.

What we have audited
We have audited the accompanying financial statements 2019 of Avantium N.V., Amsterdam (hereafter: 'the Company'). The financial statements include the consolidated financial statements of Avantium N.V. together with its subsidiaries (together: 'the Group') and the Company financial statements.

The consolidated financial statements comprise:
- the consolidated statement of financial position as at 31 December 2019;
- the following statements for 2019: the consolidated statements of comprehensive income, changes in equity and cash flows; and
- the notes, comprising the significant accounting policies and other explanatory information.

The Company financial statements comprise:
- the Company balance sheet as at 31 December 2019;
- the Company income statement for the year then ended;
- the notes, comprising the significant accounting policies and other explanatory information.

The financial reporting framework applied in the preparation of the consolidated financial statements is EU-IFRS and the relevant provisions of Part 9 of Book 2 of the Dutch Civil Code. The financial reporting framework applied in the preparation of the Company financial statements is Part 9 of Book 2 of the Dutch Civil Code.

The basis for our opinion
We conducted our audit in accordance with Dutch law, including the Dutch Standards on Auditing. We have further described our responsibilities under those standards in the section 'Our responsibilities for the audit of the financial statements' of our report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence
We are independent of Avantium N.V. in accordance with the European Regulation on specific requirements regarding statutory audit of public interest entities, the 'Wet toezicht accountants-organisaties' (Wta, Audit firms supervision act), the 'Verordening inzake de onafhankelijkheid van accountants bij assuranceopdrachten' (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence) and other relevant independence requirements in the Netherlands. Furthermore, we have complied with the 'Verordening gedrags- en beroepsregels accountants' (VGBA, Dutch Code of Ethics).

Our audit approach

Overview and context

Avantium N.V. is a chemical technology Company, developing and commercialising innovative renewable chemistry solutions. As of 31 December 2019, the Company consists of three business units (Renewable Polymers (formerly known as 'Synvina C.V.'), Renewable Chemistries and Catalysis), which were subject to our audit procedures as set out in the section 'The scope of our group audit'. We paid specific attention to the areas of focus driven by the operations of the Group, as set out below. On 18 December 2018, BASF notified the Company of its exit from the Synvina joint venture. In accordance with the joint venture agreement, the Company had an obligation to take back the joint venture upon the exit of BASF. This one-off event triggered an onerous contract expense that was provided for in 2018 due to the exit notice of BASF for an amount of €17.4 million. The provision for an onerous contract was based on the unavoidable costs the Company incurred due to the exit notice received from BASF. In January 2019, Avantium acquired full ownership of Renewable Polymers B.V., bringing the 49% stake of the Company in the B.V. to 100%. Avantium regained full control of the entity and therefore is a wholly owned subsidiary within the Group that is consolidated. This consolidation impacted a broad range of financial statement line items, as disclosed in note 9 to the consolidated financial statements and affected our audit procedures as described in the section 'Key audit matters'.

As part of designing our audit, we determined materiality and assessed the risks of material misstatement in the financial statements. In particular, we considered where the management board made important judgements, for example, in respect of significant accounting estimates that involved making assumptions and considering future events that are inherently uncertain. In paragraph 4 of the consolidated financial statements the Company describes the areas of judgement in applying accounting policies and the key sources of estimation uncertainty. Given the significant estimation uncertainty and the related higher inherent risks of material misstatement related to obtaining the required funding on-time for management to execute their strategic objectives and the valuation of the acquired assets of Synvina C.V., we considered these to be key audit matters. Similar to last year, we also considered the capitalisation of development expenses to be a key audit matter as set out in the section 'Key audit matters' of this report.

Other areas of focus in our audit, that were not considered to be key audit matters, include the share-based compensation plan for employees, accounting for government grants, and the impact of the new accounting standard IFRS 16. Compared to last year we considered project revenue recognition and valuation of contract assets and liabilities an area of focus, instead of a key audit matter. During last year it was considered a key audit matter due to the implementation of IFRS 15 and the associated complexity with implementing the new accounting standard.

As in all of our audits, we also addressed the risk of and management override of internal controls, including evaluating whether there was evidence of bias by the management board that may represent a risk of material misstatement due to fraud.
We ensured that the audit team at group level included the appropriate skills and competences which are needed for the audit of a listed chemical technology Company. We therefore included specialists in the areas of IT audit, and experts in the areas of valuations and share-based payments in our team.

The outline of our audit approach was as follows:

Materiality
- Overall materiality: €750,000.

Audit scope
- All group components were in scope, being Renewable Polymers, Renewable Chemistries and Catalysis business unit. We audited all group components as part of our group audit.
- For all group components the group engagement team performed the work.

Key audit matters
- Meeting funding requirements to execute strategy.
- Acquisition of Renewable Polymers B.V. and impairment assessment of property, plant and equipment.
- Capitalisation of development expenses.

Materiality

The scope of our audit is influenced by the application of materiality which is further explained in the section 'Our responsibilities for the audit of the financial statements'.
Based on our professional judgement, we determined certain quantitative thresholds for materiality, including the overall materiality for the financial statements as a whole as set out in the table below. These, together with qualitative considerations, helped us to determine the nature, timing and extent of our audit procedures on the individual financial statement line items and disclosures and to evaluate the effect of identified misstatements, both individually and in aggregate, on the financial statements as a whole and on our opinion.

Overall group materiality	€750,000 (2018: €260,000).
Basis for determining materiality	We used our professional judgment to determine overall materiality. As a basis for our judgment we used 2% of the adjusted loss before income tax.
Rationale for benchmark applied	We used the result before income tax as the primary benchmark, a generally accepted auditing practice, based on our analysis of the common information needs of users of the financial statements. On this basis, we believe that the result before income tax is an important metric for the financial performance of the Company.

We also take misstatements and/or possible misstatements into account that, in our judgement, are material for qualitative reasons.

We agreed with the supervisory board that we would report to them misstatements identified during our audit above €37,500 (2018: €13,000) as well as misstatements below that amount that, in our view, warranted reporting for qualitative reasons.

The scope of our group audit

Avantium N.V. is the parent Company of a group of entities. The financial information of this group is included in the consolidated financial statements of Avantium N.V.
We tailored the scope of our audit to ensure that we, in aggregate, provide sufficient coverage of the financial statements for us to be able to give an opinion on the financial statements as a whole, taking into account the management structure of the Group, the nature of operations of its components, the accounting processes and controls, and the markets in which the components of the Group operate. In establishing the overall group audit strategy and plan,

we determined the type of work required to be performed at component level by the group engagement team.
We performed audit procedures on all identified components as part of our group audit procedures. The group engagement team performed the audit work on these components, the group consolidation and financial statements disclosures. By performing the procedures above, we have been able to obtain sufficient and appropriate audit evidence on the Group's financial information, as a whole, to provide a basis for our opinion on the financial statements.

Key audit matters
Key audit matters are those matters that, in our professional judgement, were of most significance in the audit of the financial statements. We have communicated the key audit matters to the supervisory board. The key audit matters are not a comprehensive reflection of all matters identified by our audit and that we discussed. In this section, we described the key audit matters and included a summary of the audit procedures we performed on those matters.

We addressed the key audit matters in the context of our audit of the financial statements as a whole, and in forming our opinion thereon. We do not provide separate opinions on these matters or on specific elements of the financial statements. Any comment or observation we made on the results of our procedures should be read in this context.

The context of our key audit matters is set by Avantium's major activities in 2019. The most significant event of 2019 has been the completion of the acquisition of Renewable Polymers B.V. This has therefore continued to be a key audit matter for our audit in 2019 given the complexity, significant management estimates and judgements required to account for the transaction (including valuation of acquired assets and liabilities and the impact of acquisition accounting) and the broad range of financial statement line items that are impacted. Our other key audit matter covers the developments in the Group's business including consideration of the significant funding requirement of the Company to execute its strategy. So far the entity has not been able to generate enough cash from product revenues/services to meet its current working capital requirements and is dependent for the future on financing arrangements with third parties (including subsidies) to further develop its Renewable Chemistries and Renewable Polymers technologies. We therefore identified meeting funding requirements t0 execute strategy of the Company as a key audit matter as the Company has yet to generate structural positive operating cash flows. The key audit matter 'Capitalization of development expenses' is similar in nature to the key audit matter we reported in 2018 due to the nature of the Company's business and its environment.

Key audit matter	How our audit addressed the matter
Meeting funding requirements to execute strategy Refer to note 2.1.1.	
Avantium is developing multiple technologies at the same time requiring significant funding. Additional funding is required to bring Renewable Chemistries and/or Renewable Polymers projects to the next stage, being commercialization. The Group has not been able to generate enough cash from product/service revenues and it relies on existing cash reserves and Catalysis revenues to cover current expenditure. No formal agreements to obtain sufficient funding to bring Renewable Chemistries and/or Renewable Polymers projects to the next stage are in place at year-end 2019. Therefore, there is a risk that the Company will not be able to obtain sufficient funding to execute their strategy in the upcoming years. As reflected in the management board report and note 2.1.1. of the financial statements, management expects that the 2019 year-end cash balance of €45.4 million will be sufficient to fund the Company for at least one year from the financial statements signing date. Management also assessed the possibility that actual cash inflows might be less, and/or actual cash outflows might be higher than projected. Due to the nature of the business and its stage of development, additional funding is required in the period beyond twelve months as of the signing date of these financial statements. Management assessed that depending on the progress made in the development of the various technologies of Avantium and strategic choices by management, additional funding is required in the upcoming years. As a result, we identified 'meeting funding requirements to execute strategy' of Avantium as a key audit matter.	We evaluated management's cash flow forecasts, and the process by which they were prepared, and challenged the underlying key assumptions such as expected cash inflow from product sales and cash outflow from purchases of inventory, R&D expenses and other operating expenses. Regarding revenue expectations, we challenged the estimates made by management by assessing whether the estimates regarding sales forecasts and sales prices were in line with historical revenues to date and current contracts in place. We also assessed an alternative scenario analysis of management using the low end of revenue forecasts and accompanying key assumptions to ascertain the extent of change in those assumptions, that either individually or collectively would lead to alternative conclusions. Furthermore, we read the board minutes and available written communication with commercial partners in order to understand the plans and to identify potential contradictory information relevant in light of this key audit matter. We challenged management's assumption that they expect to obtain necessary funding to bring Renewable Chemistries and/or Renewable Polymers projects to the next stage. We therefore looked at the Company's history of obtaining funding and found that the Company was historically capable of acquiring the required funding needed for financing its working capital and future research expenditures. Inherently, there are significant risks associated to obtaining the required funding on-time for management to execute their strategic objectives. Additionally, we assessed the adequacy of the disclosures with respect to the funding need, the sensitivities within the forecasts and the going concern assumption and found them to be an appropriate reflection of facts and circumstances recognising the sensitivities and the judgements involved.

Key audit matter	How our audit addressed the matter
Acquisition of Renewable Polymers B.V. and valuation of property, plant and equipment Refer to note 9 The Company acquired 51% of the issued shares in Synvina C.V. for a consideration of €17.4 million. Avantium's shareholding in Synvina therefore increased from 49% to 100%, granting Avantium full control over Synvina, as the Company now holds all voting rights and has the ability to direct relevant activities of Synvina. Management applied judgement to determine whether this transaction needed to be accounted for as a business combination in accordance with IFRS 3. Based on the conditions agreed in the applicable contracts and the transition process of the business, including the settlement of the pre-existing relationship and hiring of employees, management determined that this transaction was the acquisition of a business and consequently IFRS 3 should be applied using the acquisition method at the acquisition date. This acquisition resulted in recording a number of balance sheet positions in the consolidated annual report. Renewable Polymers has a significant balance of property, plant and equipment (€8.8 million), representing mainly the value of the pilot plant. The valuation of the related assets depends on the substantiation of the potential of the YXY Technology. For the purpose of performing the recoverability assessment, management identifies the Renewable Polymers business unit as a single Cash-Generating Unit ('CGU'). The recoverable amount of the underlying CGU is determined based on the higher of the fair value less cost of disposal or the value in use. The assessment contains a number of significant assumptions, both quantitative and qualitative, including revenue growth rate, cost structure, discount rate and timely completion of development projects e.g. the building of the flagship plant. Changes in these assumptions may lead to potential impairment charges on the carrying value of the assets. The use of assumptions in the assessment also requires estimates and judgment which may be affected by unexpected future market, economic or political conditions.	We assessed the appropriateness of accounting for this transaction as a business combination by means of evaluating the criteria of IFRS 3 against the contract terms and the way the business continued after the reacquisition. We found accounting of this transaction under IFRS 3 to be appropriate, including the disclosure. With respect to the valuation aspects of the acquired property, plant and equipment of Renewable Polymers B.V. our audit of this matter focused on management's impairment assessment which included: • assessing the methodology used by management to estimate fair value less cost of disposal. Checking the accuracy and relevance of the input data to supporting evidence, such as approved budgets and considering the reasonableness of these budgets by comparing the budgets to the historical results and the market data; • assessing the appropriateness of cash flows projection in calculation of the fair value less cost of disposal of these assets, challenging the reasonableness of key assumptions such as the future production volume, selling prices and production costs, discount rate, etc. based on our knowledge of the business and industry by comparing the assumptions to historical results and published market and industry data and comparing the current year's actual results with the prior year forecast and other relevant information. Internal valuation expert had been engaged to assist the review on methodology of the fair value less cost of disposal calculations and discount rate; and • performing sensitivity analysis in consideration of the potential impact of reasonably possible downside changes in these key assumptions.

Key audit matter	How our audit addressed the matter
We focused on this area as the acquisition and in specific the acquired assets are significant to the Group's operations and the assessment performed by management involved significant estimates and judgement. Capitalisation of development expenses refer to note 2.6, 6 and 22.	Based on the audit procedures performed, we found that the assumptions made by management that no impairment was required was supported by reasonable assumptions, that were consistently applied. We noted no significant matters.
Capitalisation of development expenses refer to note 2.6 As disclosed in the 'Report of the Management Board' Avantium has various innovative renewable chemistry and polymers product development programs in place for which cost were incurred in 2019. These development programs are ultimately intended for commercialisation. We focused on this area due to the amount of development costs incurred, and the fact that there is significant management judgement involved in assessing whether the requirements for capitalisation of such cost have been met. Significant judgements relevant to management for capitalisation of development expenses include determining if the Company can demonstrate all of the following: • the technical feasibility of completing the intangible assets so that it will be available for use or sale; • its intention to complete the intangible asset and use or sell it; • its ability to use or sell the intangible asset; • how the intangible asset will generate probable future economic benefits; • the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and • its ability to measure reliably the expenditure attributable to the intangible asset during its development. Management's conclusion is that no material element of the spending this year on development expenses meets the criteria for capitalisation on the basis of not yet having secured the financial resources to bring Renewable Chemistries and/or Renewable Polymers projects to the next stage (e.g. development of a flagship plant).	We assessed management's accounting policy for development expenses as disclosed in note 2.6 of the financial statements. We have evaluated management's assessment over the development expenses incurred in 2019, that none of the projects meet all criteria for capitalisation. We have assessed this in particular for the Renewable Chemistries and Renewable Polymers related expenses. We read the board minutes, obtained project progress information and reviewed available written communication with the commercial partners (including subsidies) and determined that available financial resources are not yet sufficient to bring Renewable Chemistries and/or Renewable Polymers projects to the next stage, being commercialization. We found the key assumptions in management's assessment for not capitalising development expenses supportable in light of presently not having secured sufficient financial resources to complete the development of the product development programs.

Emphasis of Matter related to the uncertainty related to the effects of the COVID-19 virus

We draw attention to paragraph 2.1.1 Going concern of the Notes to the Consolidated financial statements in which management has described the possible impact and consequences of the COVID-19 (Corona) virus on the entity and the environment in which the entity operates as well as the measures taken and planned to deal with these events or circumstances. This note also indicates that uncertainties remain and that currently it is not reasonably possible to estimate the future impact. Our opinion is not modified in respect of this matter.

Report on the other information included in the annual report

In addition to the financial statements and our auditor's report thereon, the annual report contains other information that consists of:
- Message from the CEO;
- Company highlights 2019;
- Report of the Management Board;
- Risk management;
- Corporate governance;
- Report of the Supervisory Board;
- Remuneration report;
- Glossary; and
- the other information pursuant to Part 9 of Book 2 of the Dutch Civil Code.

Based on the procedures performed as set out below, we conclude that the other information:
- is consistent with the financial statements and does not contain material misstatements;
- contains the information that is required by Part 9 of Book 2 and the sections 2:135b and 2:145 subsection 2 of the Dutch Civil Code.

We have read the other information. Based on our knowledge and understanding obtained in our audit of the financial statements or otherwise, we have considered whether the other information contains material misstatements.

By performing our procedures, we comply with the requirements of Part 9 of Book 2 and section 2:135b subsection 7 of the Dutch Civil Code and the Dutch Standard 720. The scope of such procedures was substantially less than the scope of those performed in our audit of the financial statements.

The management board is responsible for the preparation of the other information, including the directors' report and the other information in accordance with Part 9 of Book 2 of the Dutch Civil Code and the remuneration report in accordance with the sections 2:135b and 2:145 subsection 2 of the Dutch Civil Code.

Report on other legal and regulatory requirements

Our appointment
We were appointed as auditors of Avantium N.V. on 21 March 2019 by the supervisory board following the passing of a resolution by the shareholders at the annual meeting held on 15 May 2019 and the appointment has been renewed annually by shareholders representing a total period of uninterrupted engagement appointment of sixteen years.

No prohibited non-audit services
To the best of our knowledge and belief, we have not provided prohibited non-audit services as referred to in Article 5(1) of the European Regulation on specific requirements regarding statutory audit of public interest entities.

Services rendered
We have not provided any other services to the Company and its controlled entities, in addition to our audit, for the period to which our statutory audit relates.

Responsibilities for the financial statements and the audit

Responsibilities of the management board and the supervisory board for the financial statements

The management board is responsible for:
- the preparation and fair presentation of the financial statements in accordance with EU-IFRS and with Part 9 of Book 2 of the Dutch Civil Code; and for
- such internal control as the management board determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

As part of the preparation of the financial statements, the management board is responsible for assessing the Company's ability to continue as a going concern. Based on the financial reporting frameworks mentioned, the management board should prepare the financial statements using the going concern basis of accounting unless the management board either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

The management board should disclose events and circumstances that may cast significant doubt on the Company's ability to continue as a going concern in the financial statements.

The supervisory board is responsible for overseeing the Company's financial reporting process.

Our responsibilities for the audit of the financial statements
Our responsibility is to plan and perform an audit engagement in a manner that allows us to obtain sufficient and appropriate audit evidence to provide a basis for our opinion. Our objectives are to obtain reasonable assurance about whether the financial statements are free from material misstatement, whether due to fraud or error and to issue an auditor's report that includes our opinion. Reasonable assurance is a high but not absolute level of assurance which makes it possible that we may not detect all material misstatements. Misstatements may arise due to fraud or error. They are considered to be material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

Materiality affects the nature, timing and extent of our audit procedures and the evaluation of the effect of identified misstatements on our opinion.

A more detailed description of our responsibilities is set out in the appendix to our report.

Rotterdam, 25 March 2020
PricewaterhouseCoopers Accountants N.V.

Original has been signed by A.F. Westerman RA

Appendix to our auditor's report on the financial statements 2019 of Avantium N.V.

In addition to what is included in our auditor's report we have further set out in this appendix our responsibilities for the audit of the financial statements and explained what an audit involves.

The auditor's responsibilities for the audit of the financial statements

We have exercised professional judgement and have maintained professional scepticism throughout the audit in accordance with Dutch Standards on Auditing, ethical requirements and independence requirements. Our audit consisted, among other things of the following:

- Identifying and assessing the risks of material misstatement of the financial statements, whether due to fraud or error, designing and performing audit procedures responsive to those risks, and obtaining audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the intentional override of internal control.
- Obtaining an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
- Evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management board.
- Concluding on the appropriateness of the management board's use of the going concern basis of accounting, and based on the audit evidence obtained, concluding whether a material uncertainty exists related to events and/or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report and are made in the context of our opinion on the financial statements as a whole. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluating the overall presentation, structure and content of the financial statements, including the disclosures, and evaluating whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

Considering our ultimate responsibility for the opinion on the Company's consolidated financial statements we are responsible for the direction, supervision and performance of the group audit. In this context, we have determined the nature and extent of the audit procedures for components of the group to ensure that we performed enough work to be able to give an opinion on the financial statements as a whole. Determining factors are the geographic structure of the group, the significance and/or risk profile of group entities or activities, the accounting processes and controls, and the industry in which the group operates. On this basis, we selected group entities for which an audit or review of financial information or specific balances was considered necessary.

We communicate with the supervisory board regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit. In this respect we also issue an additional report to the audit committee in accordance with Section 11 of the EU Regulation on specific requirements regarding statutory audit of public-interest entities. The information included in this additional report is consistent with our audit opinion in this auditor's report.

We provide the supervisory board with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the supervisory board, we determine those matters that were of most significance in the audit of the financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, not communicating the matter is in the public interest.

Glossary*

Bio-based economy
A bio-based economy exists when predominantly plant-based materials, i.e. biomass rather than fossil-based raw materials like petroleum are used as a feedstock for making chemicals, materials and products we consume.

Bio-based plastic
Plastics derived from man-made polymers that can be made from building blocks that originate from biological (once living) systems. Most of these building blocks (monomers) are derived from sugars. Examples are FDCA and PEF. At Avantium, we prefer to call PEF and FDCA plant-based plastics, in order to prevent confusion with the term bioplastic. Bioplastic is a plastic derived from a biopolymer, such as DNA, insulin, cellulose and starch.

Biodegradability
Biodegradation is the breakdown of organic matter by microorganisms, such as bacteria and fungi, to produce carbon dioxide (CO2) and water. PET is considered to break down in 300-500 years. The first results of tests by OWS (Organic Waste Systems, Gent Belgium) show that PEF degrades much faster than PET under industrial composting conditions (full biodegradation in 250-400 days at 58°C in soil). The biodegradability of PEF in the natural environment (Amsterdam, the Netherlands) is under investigation via a 10-year field trial and we have observed that degradation starts within the first year. PEF biodegradation does not occur during normal use of PEF. Only when a PEF product unintentionally ends up in nature, do the presence of bacteria and fungi will cause it to degrade. How quickly the degradation happens depends on environmental conditions (e.g. moisture (rain), heat, sunlight).

Biomass
Biomass is organic feedstock especially of plant origin. These feedstocks are renewable and originally found in nature in the form of agricultural and forestry products like corn, wheat, sugar beet, sugar cane, rapeseed and woody plants. The residues of these products also contain starch, carbohydrates, fats and proteins.

Biorefinery/ Biorefining
A biorefinery is a factory that processes biomass into a range of products and where the goal is to make the most efficient use of the biomass or raw material. Biorefining aims to use every component of the raw material so that nothing goes to waste thereby improving efficiencies and environmental impact. Dawn Technology is the brand name of Avantium's biorefinery technology, which converts non-food plant-based feedstock into industrial sugars and lignin.

Catalysis
Catalysis is the process of increasing the rate of a chemical reaction by adding a substance known as a catalyst, which is not consumed in the catalysed reaction and can continue to act repeatedly. Catalyst testing is an important practice in the process of developing a new or improved catalyst. Over the years, Avantium Catalysis has executed numerous catalyst-testing projects in the various phases of a catalyst development trajectory, varying from discovery, screening, process optimisation, or commercial selection phase.

Catalyst
Substance that enables and accelerates a chemical reaction.

Circular Economy
A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Avantium works to advance new technologies for a more sustainable future. PEF plays a significant role in the circular economy.

CO2
CO2 or carbon dioxide is a greenhouse gas that originates as waste from the burning of fossil fuels, the production of electricity, fertilisers, chemicals, steel and cement. It is the biggest contributor to global warming. The development of electrochemistry has the potential to use CO2 as a feedstock for the sustainable production of chemicals and materials, and is seen as a 'game-changer' for the chemical industry. The result is that greenhouse gas is sequestered into products that can replace plastics and chemicals that are now produced from fossil feedstock. Avantium's Volta technology is the leading electro-catalytic platform developing CO2 utilisation solutions for a circular future.

CO2 Equivalent
CO2 equivalent, or carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO2 that would create the same amount of warming.

Dawn Technology
Dawn Technology is the brand name of Avantium's biorefinery technology, which converts non-food plant-based feedstock into industrial sugars and lignin. These sugars, such as glucose, are an excellent raw material for chemistry and fermentation processes used to produce a broad range of products.

FDCA
2,5-furandicarboxylic acid, an intermediate chemical to make PEF (polyethylene furanoate).

Flowrence Technology
Avantium's Flowrence Technology is an advanced high-throughput platform for high-quality testing of catalysts and adsorbents. The Flowrence Technology can be used for a broad range of industrial applications that operate in gas, vapor or trickle phases. The parallel reactor system combines the reproducibility of larger-scale reactors with the advantages of small-scale reactors such as intrinsic safety, high accuracy, low costs per experiment and, ultimately, faster time-to-market.

Glucose
Glucose is a sugar consisting of six carbon atoms (C6). It is a core building block for the transition to a bio-based economy. Glucose serves as a feedstock for the production of a broad range of chemicals and materials produced via chemistry or fermentation processes. The resulting products can be existing and new plant-based chemicals, such as plant-based mono-ethylene glycol, mono-propylene glycol, FDCA (furandicarboxylic acid) and PEF (polyethylene furanoate, a 100% plant-based recyclable polymer).

Glycols
Glycol is any of a class of organic compounds belonging to the alcohol family. The term is often applied to the simplest member of the class: mono-ethylene glycol, a colourless, oily liquid. Avantium has developed plant-based mono-ethylene glycol, a vital ingredient for the production of polyester textiles and film, polyethylene terephthalate (PET) and polyethylene furanoate (PEF) resins and engine coolants.

Hydrogenolysis process
Hydrogenolysis is a chemical reaction whereby a carbon–carbon or carbon–heteroatom single bond is cleaved or undergoes breakdown by hydrogen. Avantium's plant-based mono-ethylene glycol is produced from ethylene via hydrating ethylene oxide by a catalytic production process.

Life Cycle Analysis (LCA)
A LCA is the compilation and evaluation of the input, output and the potential environmental impact of a product system throughout its life cycle. LCA is fundamental to understanding how Avantium's technologies compete with fossil-based alternatives. LCAs form the bedrock of how we measure our footprint and the potential sustainability benefits of our innovations.
Avantium has conducted an initial Global Warming Potential (GWP) evaluation of the YXY Technology process in collaboration with the Copernicus Institute at the University of Utrecht (Eerhart et al. 2012). A broader LCA, taking into consideration additional sustainability denominators, is due to be performed by the German-based nova-Institut.
Avantium is working with the German firm Thinkstep (a Sphera company) to evaluate the sustainability of Ray Technology.

Lignin
Lignin is the mass that remains after the sugars have been removed from the initial raw material through the Dawn Technology biorefining process. It is more efficient for energy generation as its energy content is up to 40% higher than the original wood chips used in the process. Energy generation is currently the predominant application for lignin. Additional higher value applications are being developed. Interestingly, the lignin looks a lot like the briquettes we use when we grill outside but now not coal-based.

Management Board and Management Team
The Management Board (consisting of the Chief Executive Officer and the Chief Financial Officer) is the statutory executive body

and is, together with the Executive Team of Avantium (known under the name Management Team consisting of the Chief Executive Officer, Chief Financial Officer, Chief Technology Officer, the Group Legal Counsel together with the three Managing Directors of the business units) responsible for the day-to-day management of Avantium.

Mono-ethylene glycol (MEG)
Mono-ethylene glycol – or MEG – is a vital ingredient for the production of polyester textiles and film, polyethylene terephthalate (PET) and polyethylene furanoate (PEF) resins and engine coolants. End uses for plant-based MEG range from clothing and other textiles, through packaging to kitchenware, non-toxic coolants (eg. antifreeze) and solvents (eg. paint and coatings). Ray Technology is the brand name of Avantium's technology to produce plant-based mono-ethylene glycol.

Monomer
A molecule that can be bonded to other identical molecules to form a larger polymer chain.

Mono-propylene glycol (MPG)
Mono-propylene Glycol (MPG) is a valuable intermediate and is used in a wide variety of applications, including unsaturated polyester resins, industrial uses and food, feed and pharma. Unsaturated polyester resins represent 41% of MPG offtake, and are mainly used in fibreglass reinforced plastics for construction marine and transportation industries. Technical application such as functional fluids and solvents account for 30% of MPG offtake. Food, feed and pharma applications make up the remaining 29% of MPG offtake. Ray Technology is the brand name of Avantium's technology to produce plant-based mono-ethylene glycol and MPG as a co-product.

PEF
Polyethylene Furanoate, a polyester made form mono-ethylene glycol (MEG) and FDCA (furandicarboxylic acid). PEF produced by Avantium's YXY Technology is a 100% plant-based and recyclable polymer that can be applied to an enormous range of applications, including packaging of soft drinks, water, alcoholic beverages and fruit juices. PEF's barrier and thermal properties are superior to conventional PET. In combination with a significantly reduced carbon footprint, the added functionality gives PEF all the attributes to become the next-generation polyester.

PET
Polyethylene terephthalate, transparent polyester used for bottles and film. The polyester is made from mono-ethylene glycol and (fossil-based) terephthalic acid.

Polyesters
Polyesters are polymers formed from a dicarboxylic acid and a diol. Polyesters are very stable and strong and are used especially in making fibers for clothing or plastics. As a specific material, it most commonly refers to PET or PEF.

Polymers
A polymer is a chemical compound with molecules bonded together in long repeating chains. The term "polymer" is commonly used today in the plastics and composites industry, and it is often used as a synonym for "plastic" or "resin."

Ray Technology
Ray Technology is the brand name of Avantium's technology to produce plant-based mono-ethylene glycol, developed under the project name Mekong. Internally, Avantium uses river names for its projects and upon commercialisation, the company adopts a brand name.

Recycling
Recycling is the process of converting waste materials into new materials and objects. It is an alternative to waste disposal that can save material and help lower greenhouse gas emissions. Avantium's PEF is a 100% plant-based, 100% recyclable plastic with superior performance properties compared to today's widely used petroleum-based packaging materials. Recycling for PEF is very similar to PET recycling and trials have shown that the existing recycling systems are compatible to PEF, so no systems need to be developed. In addition PEF can easily be distinguished and sorted from PET and other plastics using optical sorting systems used today.

Renewable resources
Agricultural or forestry raw materials, which are not used as food or feed, but as raw material for industrial products. The use of renewable resources by industry saves fossil resources and reduces the amount of greenhouse gas emissions.

Re-using
Re-use involves cleaning and using again of plastic material without recycling. Avantium targets to make PEF suitable for re-using.

Sustainable
An attempt to provide the best outcomes for the human and natural environment both now and into the indefinite future. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. At Avantium, sustainability is built into our very purpose. It drives our employees, informs our technology development and excites our commercial partners.

Volta Technology
Avantium's Volta technology is the leading electro-catalytic platform developing CO2 utilisation solutions for a circular future.

YXY Technology
Avantium's YXY technology helps to produce a wide range of novel 100% plants-based materials and products by converting plant-based sugars (fructose) into plant-based chemicals and plastics, such as polyethylene furanoate (PEF).

1st Generation feedstock
Carbohydrate rich plants such as sugar beet, sugar cane, corn and wheat that can also be used as food are called food crops or 1st generation feedstock. Currently, 1st generation feedstock is the most efficient feedstock for the production of plant-based chemicals like plant-based and plastics such as PEF.

2nd Generation feedstock
This refers to feedstock not suitable for food, such as forestry or agricultural residues. Dawn Technology™ is the brand name of Avantium's biorefinery technology, which converts non-food plant-based feedstock into industrial sugars and lignin.

***Disclaimer**
This glossary has been carefully compiled and we believe it to be accurate. Definitions may however be based on Avantium's interpretation and such use of terms may differ from the meaning assigned to them elsewhere in the industry or otherwise.