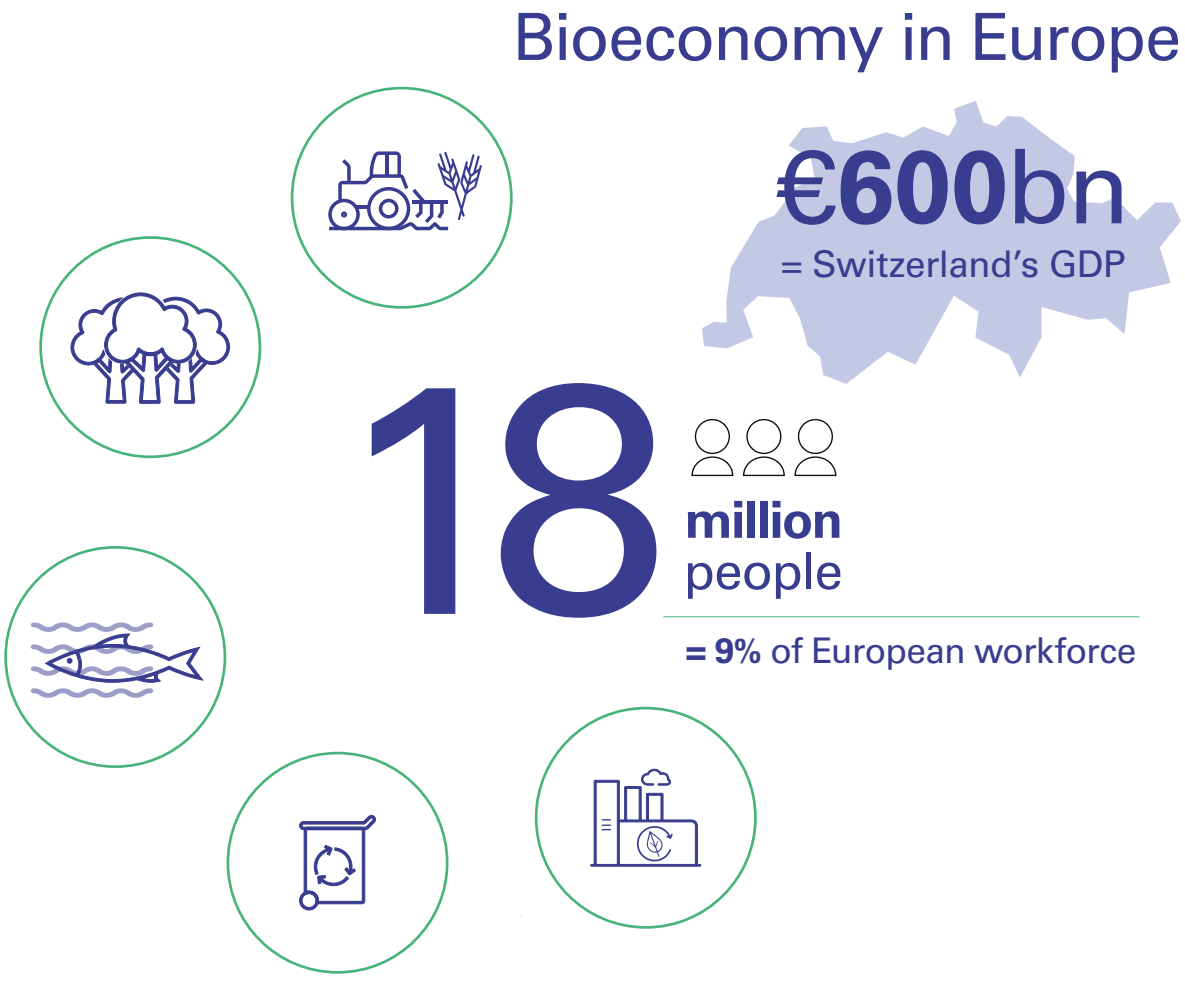
How the Bioeconomy can help seal the European Green Deal

The bioeconomy opportunity

The bioeconomy is an important sector for Europe. It employs around 18 million Europeans today, around 9% of the total workforce,[1] and adds €600 billion of economic value,[2] equal to the GDP of Switzerland.[3] It spans agriculture, aquaculture, forestry, and all the products and waste streams that arise from these activities, including food and feed, forest and crop residues, sewage and manure, bioenergy, biofuels, and bio-based chemicals and materials.

A thriving bioeconomy will be crucial for meeting the goals of the European Green Deal and the Paris Accord on climate. It will reduce greenhouse gas emissions through a combination of forestry, better agricultural practices, bioenergy and more efficient use of waste, reflecting the latest evidence in the IPCC Special Report on Climate Change and Land.[4] It will bring rural communities and regions back into the heart of the European economy and enable the Green Deal's "Farm to Fork" programme by fostering new green jobs, stimulating innovation and contributing to a more circular economy, while also bringing other social and environmental benefits.

Time is short, and the bioeconomy can make an impact now. EU emissions from the energy and transport sectors need to halve from 2020 to 2030. We will also need substantial emissions reductions from agriculture and other land use. The bioeconomy can start contributing quickly, cost-efficiently and at scale to these goals. As Europe begins the challenging recovery from the Covid-19 pandemic, this is an ideal time to draw on the bioeconomy to help build a green future now.



There are four areas where the bioeconomy can make a significant contribution to achieving the European Green Deal:

- **Economic growth, just transition and innovation**

An innovative bioeconomy sector can put farmers and rural communities once again at the forefront of innovation and progress, creating high-quality jobs and improving agricultural productivity. One million new green jobs could be created in the bio-based industries alone by 2030.[5]

- **Sustainable land use**

Precision farming, reforestation, soil restoration, regenerative land use, growing bioenergy feedstocks and carbon sequestration in soil can all deliver climate change mitigation and improve soil quality, food security and biodiversity.

- **Decarbonising hard-to-abate sectors**

Sustainable biofuels can deliver rapid and significant decarbonisation in road transport, in the crucial period before 2030, when electrification can first be expected to make a substantial impact. It will be needed for that and in other hard-to-abate sectors such as shipping and aviation, as well as heavy industry, for decades to come.

- **Circular economy**

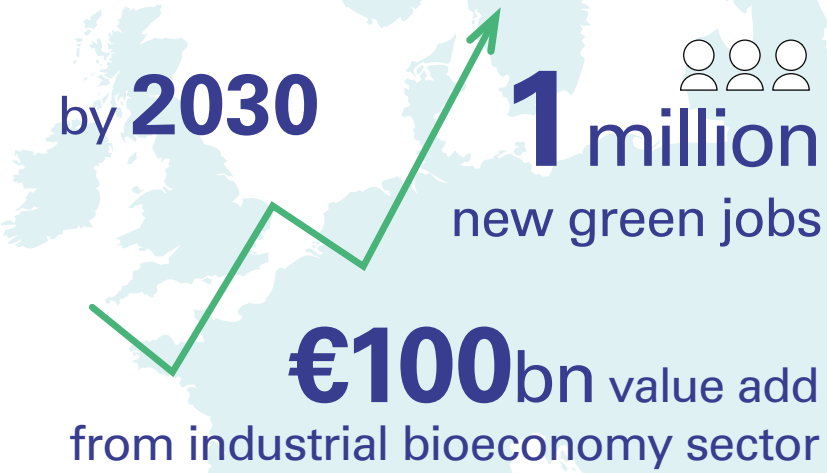
Making productive use of bio-based waste streams and locally-grown feedstocks creates economic and environmental benefits,[5] including reduced landfill, waste-to-energy solutions, returning nutrients to the soil and less dependence on fossil fuels. For example, better utilisation of municipal and agricultural waste could provide the equivalent energy of almost 30 million barrels of oil annually by 2030 for transport and heavy industry.[6]

The solutions are ready, but the bioeconomy needs a better policy framework to achieve its full potential. In this paper we highlight the potential of the bioeconomy and some of the policy changes needed to achieve it.

Economic growth, just transition and innovation

Spur inclusive economic growth and innovation, especially in rural areas.

- The bio-based industries alone could create one million new green jobs by 2030.[5] This in turn will stimulate further job creation in rural and coastal areas, and create wider economic growth in Europe.
- An innovative bioeconomy sector will put farmers and rural communities once again at the forefront of innovation and progress. A bioeconomy that fosters green jobs and develops rural communities can enhance the EU's "Farm to Fork" strategy, offering social and economic benefits in agricultural areas that could otherwise be 'left behind'.
- The bioeconomy is an especially significant opportunity for East and Southwestern Europe, where the agricultural productivity in some countries lags behind the European average by up to 40%.[7] Investing in skills, technology and best-practice implementation in these rural areas can increase feedstock availability, and create new and better livelihoods.[2]
- In countries that are affected by the phase-out of coal and which have large agriculture and forestry sectors, boosting the bioeconomy can contribute to offsetting the negative social impacts of the energy transition.[2]
- The bioeconomy can also create high-value research and innovation jobs in sectors including bio-based chemicals and materials. By 2030, the industrial biotechnology sector in Europe is projected to contribute up to €100bn in added value, up from €31bn in 2013. Employment in bio-based chemicals can grow from 5% currently to between 10% and 15% of all jobs in the chemical and pharmaceutical sector by 2030.[8]
- The bioeconomy also creates spill-over benefits for other sectors. Many high-value, high-technology bio-based products are nearing market-readiness in Europe, including several with qualities that make them attractive for use in sectors as diverse as automotive, construction, medicine and personal care.[9]
- Better utilisation of waste biomass, for example by turning it into biomaterials and biofuels, could create up to 300,000 additional jobs by 2030 and provide additional revenue of up to €15 billion in rural areas.[10]
- Increased use of bio-based energy and materials reduces Europe's dependence on fossil fuels, and enhances energy security and independence.



Policy needs:

- Promote and invest in agricultural technology and techniques that improve agricultural livelihoods in countries where there is significant unrealised potential for productivity gains in the farming sector, putting farmers at the forefront of the green and just transition.
- Ensure that "Just Transition" funds apply to all sectors of the European economy where transition towards decarbonisation is necessary, rather than only energy.
- Leverage the Innovation Fund, Horizon Europe and the new EU budget to stimulate innovation in, and production of sustainable and waste-based fossil replacements for transport fuel, chemicals and plastics.
- Ensure that the EU Taxonomy for sustainable activity enables investment in a broad feedstock base that is aligned with those in the RED II Directive.
- Bring rural communities into the "Climate Pact" by promoting low-carbon agriculture and the bioeconomy as solutions in the European Green Deal.
- Support introduction of bio-based products and materials, with the ability to store carbon.[11]

Sustainable land use

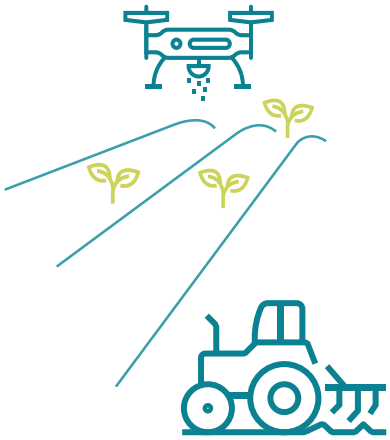
Use land differently to reduce emissions.

- There are many land management techniques that deliver climate change mitigation and improve soil quality, food security and biodiversity. These include: forest management; soil restoration, cultivation on unused, abandoned and degraded land; regenerative land use; sequential cropping, growing feedstocks that can be used for both bioenergy and food protein; and carbon sequestration in soil.[4]
- Technology developments like precision agriculture and sustainable fertilisation are also changing the possibilities for land use in agriculture – for wheat this could mean a 48% increase in production per hectare at the same time as a 69% reduction in greenhouse gas emissions.[12]
- Better forest management also offers significant potential for reducing Europe's net emissions. Forests currently cover more than 40% of Europe's land area[13] and can absorb the equivalent of nearly 10% of total EU greenhouse gas emissions each year.[14] With better management of these resources, it should be possible to nearly double this carbon sink while creating economic value and jobs.[15]
- More than 20 million hectares of agricultural land in the EU is at high risk of abandonment in the period 2015-2030 (more than 10% of the total).[16] There is significant potential to make more productive use of this land – for example, by afforestation, reviving agriculture activities or cultivating energy crops.[17]

New agricultural technologies enable

↑ **48%**

productivity



↓ **69%**

greenhouse gas emissions

Policy needs:

- Focus agricultural subsidies on increasing efficiency, productivity and sustainability, using the best available technologies to allow for more efficient and sustainable use of land, better use of residues, more food production, forest management, and bioenergy production simultaneously.
- Support development and deployment of low-emission fertilisers and other techniques, such as precision farming and soil carbon sequestration, which improve the environmental and climate performance of agriculture.
- Reward bio-based products that exhibit the best sustainability performance to stimulate more sustainable agriculture practices.
- Encourage sustainable management of forestry and ensure that best practices are applied throughout Europe.

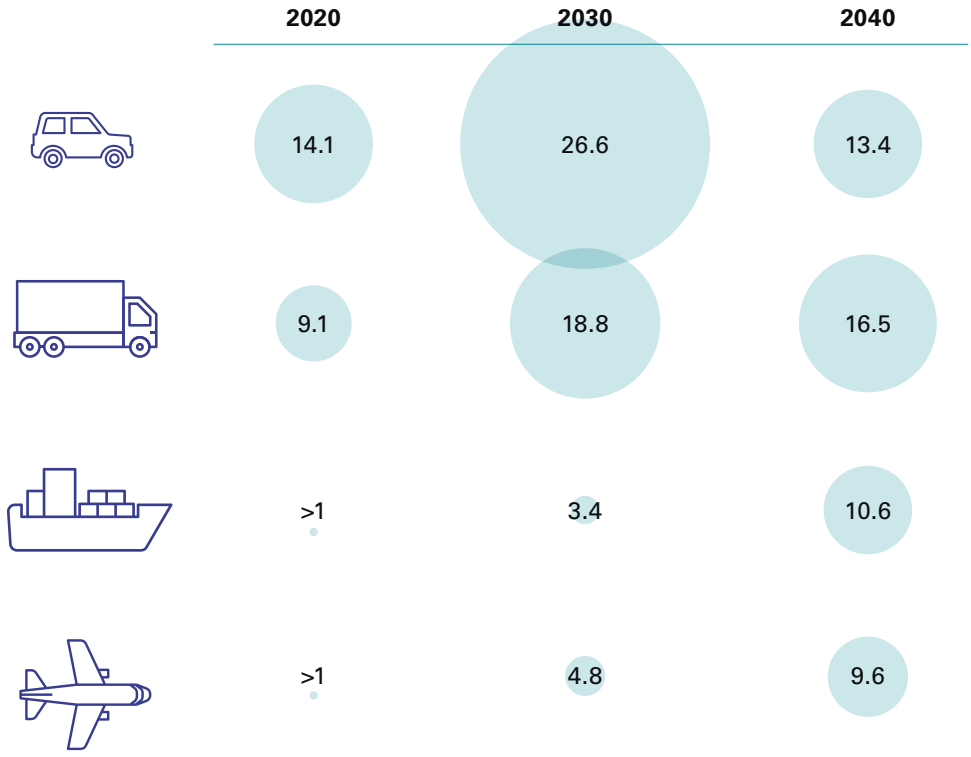
Decarbonising hard-to-abate sectors

Use sustainable low-carbon biofuels to halve emissions by 2030 and beyond.

- With current policy commitments, fossil fuels will account for 74% of global energy use in 2040;[18] enough for an expected global temperature increase of 3.2°C.[19]
- Heavy-duty transport, aviation, shipping and industry make up 30% of EU emissions and these sectors cannot quickly be electrified.[20] Though easier to electrify, light-duty transport will also use internal combustion engines for years to come. Sustainable biofuels are crucial for delivering significant decarbonisation in these sectors before and after 2030.
- Sustainable biofuels exist today that can reduce GHG emissions by 50-90%.[21,22] And with the best technologies available there is potential for even further reductions; for example, through capturing carbon in the ground or the soil.[23]
- Emissions from farming could be reduced by 25-35% by 2030,[24] with many of the necessary technologies already in existence.[12] And using marginal or abandoned land to grow feedstocks can cut emissions even further.[25]
- Transport emissions are increasing annually.[26] About 92% of energy used in road vehicles originates from fossil hydrocarbons and 8% from renewable fuel blending components.[27] It takes around 20 years to replenish the vehicle stock[28] so, while electric vehicles will start to cut emissions in the 2020s, the only way to halve transport emissions by 2030 is by using more low-carbon, sustainable biofuels in existing vehicles.
- Biorefineries will continue to be needed for a long time even after electrification of road transport picks up pace, as sustainable biofuels are likely to remain the only way to decarbonise aviation, shipping and some heavy industry at scale for several decades.[29]
- Currently, much of the EU's industrial biofuel production capacity is not being utilised, so there is scope to increase production and reduce emissions quickly with the right policy framework.[30]

Sustainable biofuels will be needed for decades to come

(numbers in Mtoe)



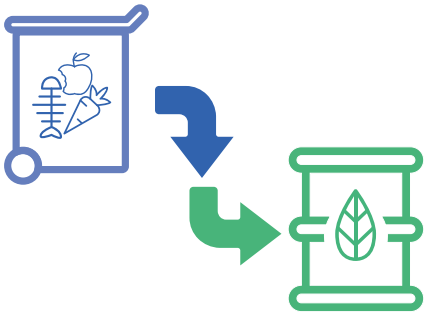
Policy needs:

- Acknowledge the importance of sustainable biofuels alongside electrification in decarbonising different sectors over time, especially for hard-to-abate segments like shipping, aviation and road transport, as well as non-transport heavy industry.
- Stimulate demand for sustainable biofuels by setting more ambitious targets for low-carbon transport fuels in the Renewable Energy Directive.
- Stimulate supply of sustainable biofuels through supportive policies in agriculture, waste, forestry and innovation, with a focus on scaling better and more cost-efficient technologies.
- Acknowledge the use of low-carbon fuels when setting up CO_2 standards for vehicles and road charging, basing the emission reductions on a 'well-to-wheel' approach.
- Include shipping in the emission trading system (ETS) and tighten the quotas, while continuing to use other mechanisms to stimulate demand for low-carbon fuels in shipping and aviation.
- To ensure that Europe as a whole meets the targets set by the European Green Deal, we must urgently consider all available sustainable and technically advanced solutions. This includes securing as wide a sustainable raw material base as possible according to RED II.
- Allow for increased use of sustainable crop-based biofuels with little or no risk of indirect land use change on deforestation, provided they meet rigorous sustainability criteria in EU and third countries, and enable as wide as possible a base of sustainable feedstocks to be used for biofuel production.
- Incentivise biofuels that minimise greenhouse gas emissions more than the minimum threshold in RED II by rewarding them for those additional savings.
- Stimulate investments in new biofuel production plants by providing stable policies over the lifetime of the plants, also beyond RED II.

Circular economy

Make better use of bio-based waste and residues.

- The bioeconomy contributes to a thriving circular economy in Europe, which currently generates almost €147bn in added value annually,[31] by converting waste and side streams into products like bioplastics and fertilisers.
- Europe generates around 900 million tonnes of waste from paper, food, wood and plant material each year. Around 200 million tonnes of this could be sustainably used for energy purposes;[10] even without counting forestry residues, organic waste could provide the equivalent energy of almost 30 million barrels of oil annually by 2030 for transport and heavy industry.[6]
- But today, this waste is not being utilised to its full potential. Of the 90 million tonnes of bio-based municipal waste generated annually in the EU, less than a third is separately collected and processed for use.[32]
- There's also significant potential to make better use of sewage sludge and manure, producing, for example, biogas or synthetic fuels. If fully utilised, the energy from municipal wastewater alone could reduce the EU's fuel demand by about 2%.[33]
- Biorefineries utilising waste feedstocks play a vital role in the circular economy, reducing waste that is inefficiently burned or sent to landfill. The bioeconomy increasingly incorporates the use of residues, side streams and by-products from existing industry and biological waste.[34]
- While some combinations of feedstock and technology will require short-term incentives, others are close to being competitive and require little more than policy certainty,[10] such as biofuels currently produced as a by-product of plant protein production.



Organic waste could provide energy equivalent to

30 million barrels of oil annually by **2030**

Policy needs:

- Expand and standardise municipal waste collection systems, including segregated organic waste collection, across the EU to enable businesses to make efficient use of bio-based waste as well as recycled fossil carbon in and across geographies.
- Create structures that place value on forestry, agricultural and biological manufacturing waste beyond incineration, incentivising treatment and reuse in other industries and enabling regenerative agriculture that returns organic material back to the soil.
- Support the industrialisation of the organic waste supply chain, to create economies of scale and reduce costs.
- In public procurement decisions, incorporate the true costs of products by taking into account externalities, including the cost of waste disposal, use of limited non-renewable resources, greenhouse gas emissions and other environmental impacts.
- Support the development of new circular products with low climate and environmental footprint by making it mandatory for publicly funded R&D programmes to include a plan on how the products will be recycled or reused, and how to maintain and prolong life, in addition to a full life-cycle assessment.

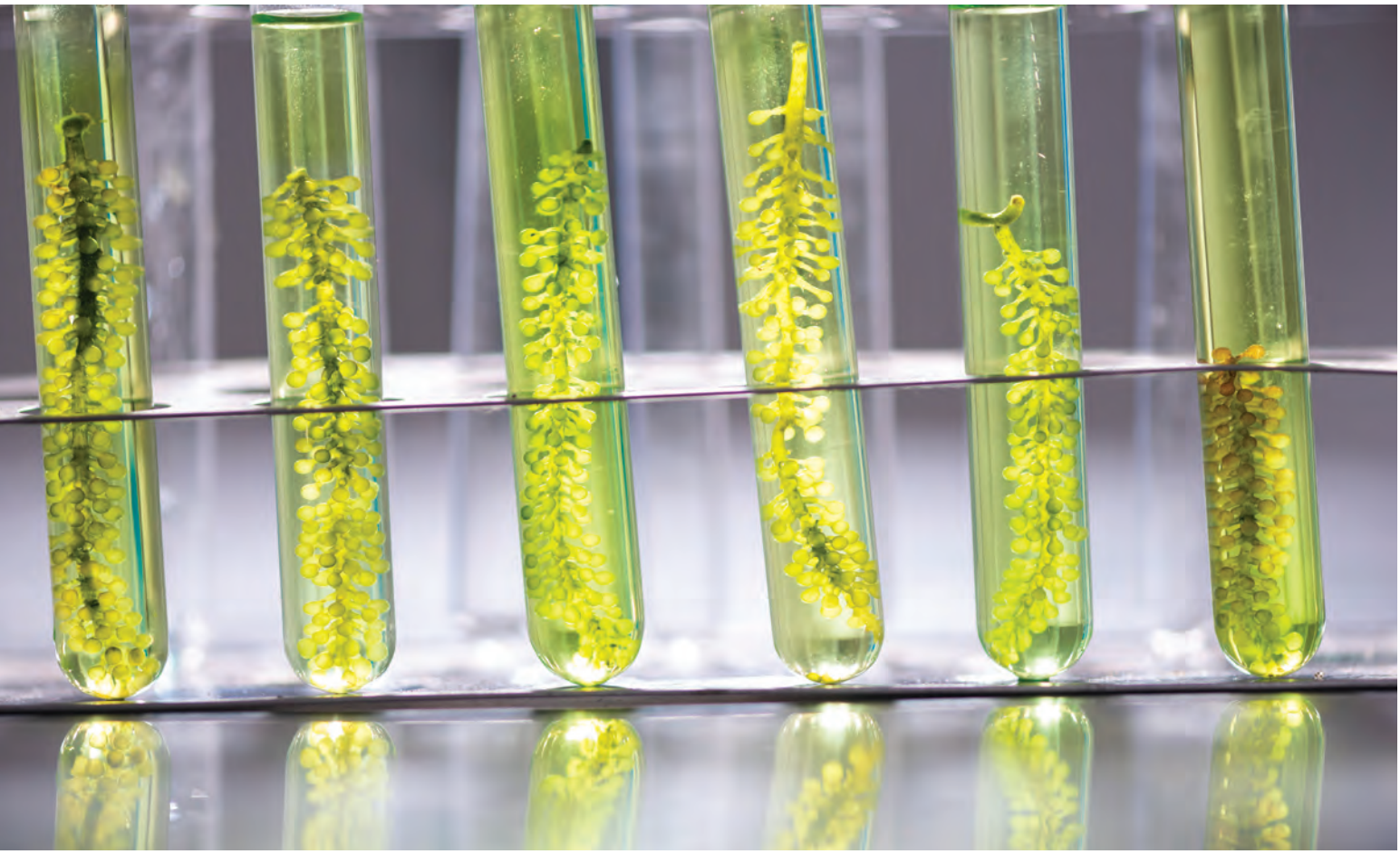
Unleashing the potential of the bioeconomy: a cross-sector partnership

Scania along with Avril, Lantmännen, Novozymes, Neste, Yara and others have been working together to identify opportunities for unleashing growth in the bioeconomy in Europe. We represent many different sectors relevant to the bioeconomy and with activities in a range of geographies across Europe.

Our work has shown that there is significant potential for the bioeconomy to contribute to more sustainable and inclusive growth in Europe, and that it can play a crucial role in meeting the goals of the European Green Deal. But we also recognise that the bioeconomy needs an integrated, effective, common-sense policy framework to meet this potential.

At this important moment in Europe's transition, we are: raising awareness of the potential for the bioeconomy; showcasing best practice in growing, using and re-using bio-based feedstocks; and supporting policymakers to develop policies that deliver cuts in CO_2 emissions at scale, as well as rural growth, jobs, innovation and biodiversity. We will do this by demonstrating the bioeconomy in action and its potential across Europe, and highlighting opportunities to improve policy at EU, national and regional levels to achieve this potential.

SCANIA Avril novozymes Lantmännen NESTE



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Coalition facilitated by XYNTEO
Contact: Philip Smith, Programme Director – ps@xynteo.com