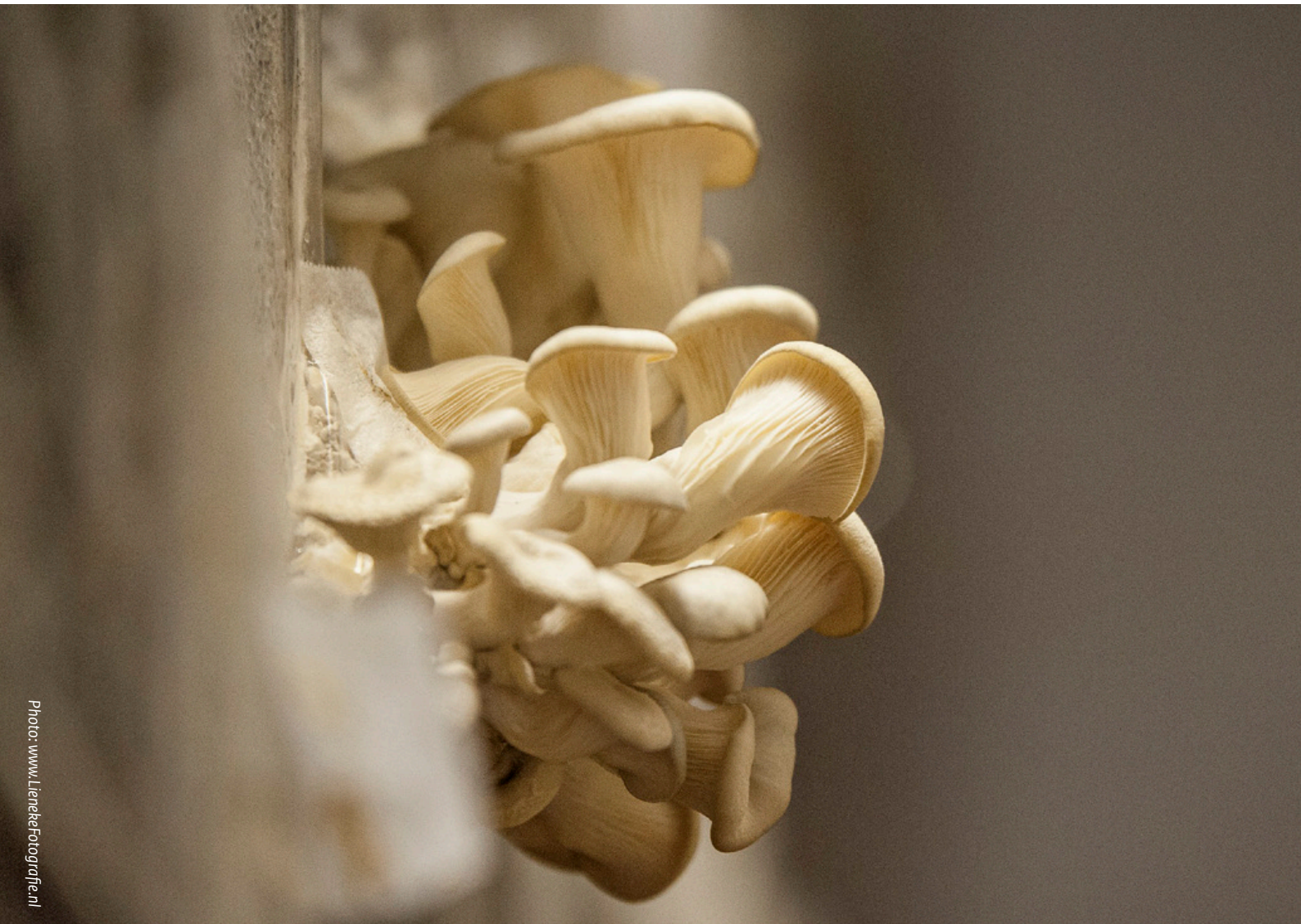
Ministry of Economic Affairs
and Climate Policy

The position of the bioeconomy in the Netherlands



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The position of the bioeconomy in the Netherlands

This pamphlet establishes frameworks for the development of the bioeconomy in the Netherlands and the position of the Dutch government in this regard. Ten action points have been formulated based on existing policy and goals achieved.

What is the bioeconomy?

The European Commission defines the bioeconomy as follows: 'The production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy.' This includes agriculture, forestry, fishing, aquaculture, food production, paper and pulp, as well as sections of the chemical, biotechnological and energy production sectors. These sectors have massive potential for innovation as a vast range of scientific disciplines and technologies (including biotechnology, nanotechnology and ICT) are involved with these sectors and they make use of local user knowledge.

Why adopt this strategy?

The Netherlands and Europe are facing major social challenges, such as meeting climate objectives, becoming less dependent on scarce raw materials, sustainable and safe food production and jobs, and development of rural areas. The bioeconomy can help meet all of these challenges. It closely examines a wide range of sectors (agriculture, forestry, marine raw materials) and the use of biomass in food, energy and bio-based materials.

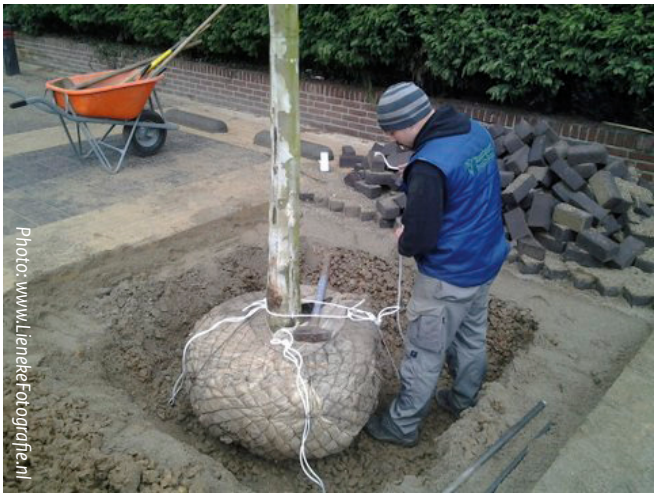
In this regard, the Netherlands has a lot to offer the global community. It is a world leader in green resources and has a solid infrastructure to profit fully from these. The country also has excellent research facilities and supports bioeconomic innovation. In this regard, collaboration between the government, business sector and research institutes is vital.

Circular economy

The bioeconomy is all about sustainable production and the use of biomass, while the circular economy is about sustainable use and reuse of products and closing the loop within key cycles. There is plenty of overlap – or more accurately, synergy – between the objectives of both economies:

- Feeding the world population
- Preventing resources from being exhausted
- Preventing environmental pollution
- Combating climate change

The circular economy strives to meet these objectives via reuse, recycling and closing loops, while the bioeconomy focuses on renewable raw materials.



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State of the bioeconomy in the Netherlands: what has been achieved so far?

Thanks to its well-developed agricultural, transport and chemical sectors, the Netherlands has laid extremely solid foundations for the development of a successful bioeconomy. Existing sustainability agreements between these sectors within the scope of the Top Sector Policy and the energy transition offer solid footholds for the development of the bioeconomy. Examples of this include the 'Green Deals', within which agreements have been made concerning the production of bio-based chemicals, biopolymers, biofuels and electricity. In this regard, attention is being paid to the development of sustainable chains, with a particular focus on the development of business models and removing legislative obstacles.

In the Netherlands, around 1,200 companies are active in the bio-based economy, most of which are in the small and medium enterprise (SME) sector. A quarter of these businesses develop and manufacture bio-based materials and chemicals. In comparison, there are approximately 55,000 businesses in the agricultural sector, several hundred in the fishing industry and over 4,000 in the food and food-processing sectors. New businesses can help boost the bioeconomy, as newcomers tend to invest significantly in innovative production.

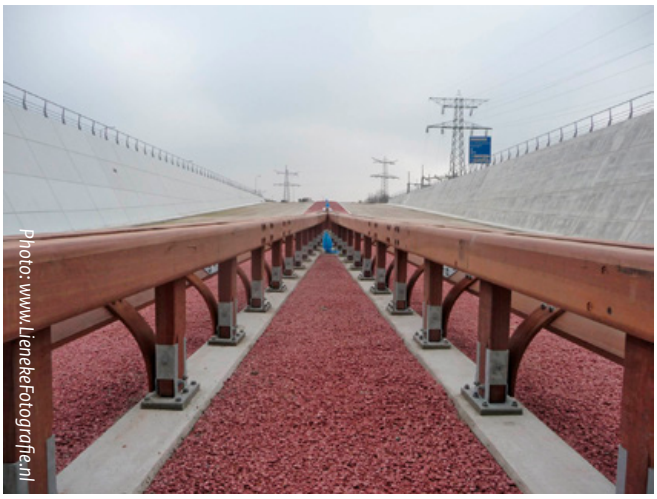
Turnover and jobs in the classic bioeconomy (e.g. the agriculture, food and chemical sectors) are an important part of the Dutch business sector, with agriculture, forestry and fishing making up a combined total of over 4% of GNP. In 2016, the entire agri-food chain contributed €28 billion to the Dutch economy, making it the second biggest industrial sector in our country.

Turnover in the bioeconomy is estimated at between €114 billion and €120 billion, while the bio-based economy's turnover is €21 billion. In absolute terms, this amount is rather average at the European level, although when you convert it to turnover per square kilometre, the Netherlands is second only to Belgium.

In 2016, companies in the bio-based economy invested over €200 million in research and development. The government supports research in a variety of ways, such as reduction of income tax and national insurance contributions, investment subsidies and financial support for research programmes. The bioeconomy creates a vast number of jobs, estimated to be 350,000. It is important that the innovative nature of the bioeconomy contributes to an increasing number of high-end jobs.

However, despite the development of the bioeconomy, the transition from fossil fuels and raw materials in the Netherlands is far from complete. Biomass is the biggest source of sustainable energy, for example via co-firing in coal-based power stations and burning of waste. In 2016, the Netherlands produced around 80 million m³ of biogas. Part of this total is from burning of waste, while one third is from processing manure in 'co-fermenters'. Research into fermentation of pure manure is currently in progress. Other applications, such as production of bio-based chemicals, are still limited in scale.

In the future, a radical change is expected in the way biomass is used. By applying the principle of 'cascading' – which focuses strongly on biorefining – products can be created that offer substantial added value, such as for medical applications, chemical products and polymers. By-products are used in high-quality production chains to the greatest possible degree. Applications with lower added value (e.g. electricity and heating) are therefore mainly powered by biomass that cannot be used for other applications.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Eight pillars

Eight themes are vital in the development of bioeconomic policy:

Using resources within the planetary boundaries

Finite resources must be used in the most effective, efficient and sustainable manner possible for the production of food, feed, materials, chemicals and energy. The bioeconomy must be developed within the natural boundaries of the land and biomass. In this regard, principles of the circular economy – such as efficient use of natural resources, biodegradability and smart consumption – must be employed, in addition to nurturing and encouraging innovation and changing people's lifestyles and diets.

Reducing climate change

The Paris Agreement aims to reduce global temperature increase to less than two degrees Celsius. It emphasises the urgent need to reduce greenhouse gas emissions and to maintain and increase carbon capture and storage within ecosystems, land and forests. The bioeconomy represents a crucial opportunity to replace fossil raw materials, yet this goal must be realised efficiently and not by exhausting existing carbon stocks within ecosystems.

Production for people

The bioeconomy creates substantial opportunities for new jobs and enterprise, although workers' rights must be guaranteed. Sustainable, new and innovative products, business models and production processes based on biomass can encourage new enterprise and guarantee jobs in the agricultural, fishing, aquaculture and forestry sectors. At the same time, this must not detract from land rights, human rights or the availability of food and water.

Sustainable resource management

The bioeconomy must help to achieve objectives concerning sustainable production, maintenance of biodiversity, prevention of local and global deforestation, reversal of land degradation, recovery of ecosystems and improvement of food production and water security. The bioeconomy should also help boost the resilience of ecosystems and develop sustainable production and consumption patterns.

A stable and predictable legal framework

The development of a sustainable bioeconomy in Europe demands coherent, transparent and predictable policy. Removing organisational uncertainty encourages innovators and entrepreneurs to invest in the development of new or improved bio-based products.

Collaboration in the value chain

The bioeconomy can create unique added value by enabling better collaboration between sectors and value chains and scaling up processes at an earlier stage. This requires a strategy that recognises the position of stakeholders. Increasing visibility for consumers and between sectors will encourage innovation and cultivate demand for new products that can help tackle the major social challenges of our era.

Long-term research and innovation agenda

Research is the cornerstone of the transition to a sustainable bioeconomy. For this reason, it is vital that a long-term research agenda is established, including the allocation of appropriate financial resources. Greater insight is needed into the potential and the vulnerability of particular resources, and socioeconomic and technological research must support the development of new, eco-friendly processes, products and services. Effective coordination will accelerate this development and prevent unnecessary duplication of work. In this regard, free and open access to publicly funded research and innovation is becoming increasingly vital.

Regional strategy and rural development

Regions play a key role in the development of the bioeconomy: a strong bioeconomy helps to boost the economic attractiveness of the regions involved. Important cities and regions must play their part in the development of the bioeconomy. At the regional level, better use must be made of available biomass and agricultural land, and sustainable management of resources must be ensured. The bioeconomy provides new opportunities for high-quality regional production and can help to revitalise the countryside.

In the Netherlands, the government has established a strong link between bioeconomic policy and the transition agenda for the circular economy. By implementing this transition agenda and the other policy items on pages 3 and 4, the government is taking action to boost the bioeconomy in the Netherlands. The Netherlands will commit itself to the following activities to promote the bioeconomy at both the domestic and European levels.

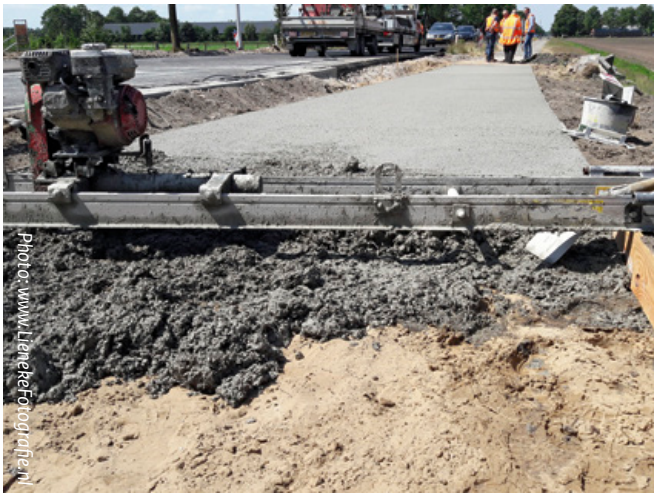
Time for action

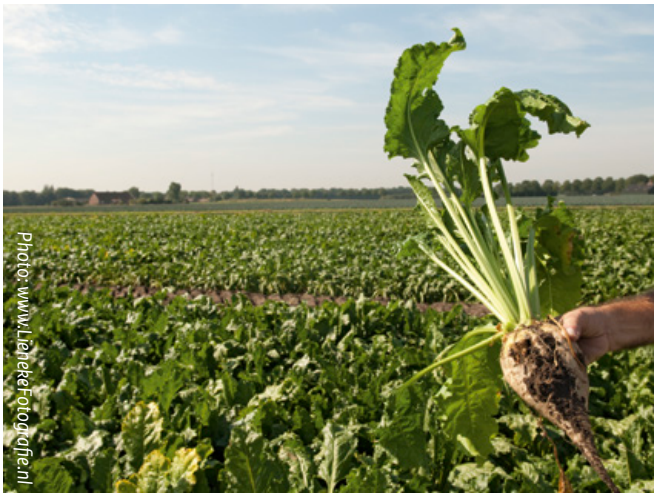
– *in Europe:*

- **MANIFESTO** Use the Manifesto as a guideline for the new Bioeconomic Strategy.
- **SUSTAINABILITY** Establish clearer sustainability principles and broaden the sustainability framework for biomass energy to include bio-based materials; reward long-term underground carbon sequestration and carbon sequestration in products.
- **EXAMPLES** Use good examples from the national bioeconomic strategies, such as the Green Deals.
- **COHERENCE** The European bioeconomy can be boosted by increasing coherence with major European initiatives such as Food 2030, the Common Agricultural Policy, Cohesion Funds and the circular economy.
- **MONITORING** Improving monitoring and exploration capacity. This can be done by monitoring the progress and potential of the bioeconomy, as well as sustainability.

– *in the Netherlands:*

- **CIRCULAR ECONOMY** Embracing the circular economy and working on the 'biomass and food' action points in the transition agenda for the circular economy.
- **BIOMASS** Mobilising sustainable biomass and ensuring that sustainable biomass is made more easily available.
- **INNOVATION** Bridging gaps in innovation, encouraging frontrunners and types of collaboration that involve both the government and the business sector (public-private partnerships).
- **SUPPORT** Ensuring greater support for the bioeconomy via effective communication and by listening more closely to the wishes of society.
- **MARKET DEMAND** Developing market demand by encouraging sustainable purchasing and developing business cases.





Developments in existing policy

The European Commission has invested a great deal of time, money and energy to boost the bioeconomy, which will enter a new phase in 2018. It is important to the Netherlands that it works together with the European Commission and the Member States in this regard and seeks optimal collaboration, and a great deal has already been achieved.

European manifesto

The 'European Bioeconomy Stakeholders Manifesto' was established following open consultation and dialogue with a large number of stakeholders in the bioeconomy.
It describes concrete activities that the Bioeconomy Stakeholders Panel and its members could take in order to facilitate the transition to a European bioeconomy. The document recommends policy initiatives such as a revised EU Bioeconomy Strategy, the EU Circular Economy package, Smart Specialisation strategies, agricultural policy, and research and innovation programmes.

SCAR: a European working group

The SCAR BSW working group calls on countries to ensure that their Bioeconomy Strategy and Action Plan:

- is based on a broad definition of the term 'bioeconomy': value creation based on ideas inspired by nature and applying nature-based insights to industrial production.
- links the bioeconomy with other sectors (e.g. construction, engineering, ICT, urban planning) in order to make them more sustainable, more circular, more nature-inspired and more competitive.
- helps to optimise communication in order to boost cohesion and involvement among stakeholders and different government bodies.
- increases funding for the bioeconomy and emphasises the importance of small-scale demonstration and testing factories.
- engages social and economic scientists to conduct research into consumer behaviour, impact assessment and monitoring.
- stimulates the bioeconomy, creates products for bio-based markets, supports start-ups, develops instruments for the SME sector, and supports standardisation, certification and promotion activities. It should also impose charges on CO_2 emissions, internalise external costs, and adjust public tendering processes and legislation in order to create a level playing field.

BBI JU

Bio-based Industries Joint Undertaking (BBI JU) is a public-private collaboration that invests in research and innovation aimed at developing a sustainable European bio-based industry. Its budget for the period 2014–2020 is €3.7 billion, with 25% of the funding provided by the European Commission and the remaining 75% by the business sector. Among other issues, the research and innovation projects are investigating integrated biorefineries and the acceleration of innovative bio-based chemicals and products such as polymers, packaging and fertilisers.

Transition agenda for biomass and food

This Dutch document includes a number of lines of action that can be classified into two groups.

Substantive lines of action:

- Optimal value creation involving biomass and residual flows to realise circular, bio-based products.
- Closing the loop with regard to nutrient cycles and maintaining soil quality.
- Reducing food waste.
- Expanding the supply of sustainably produced biomass.
- The protein transition.
- Boosting sustainability, i.e. 'greening', of megacities as a Dutch revenue model.

Preconditional lines of action:

- Reward underground carbon sequestration and carbon sequestration in products, also in the long term.
- Boost the investment climate for new production capacity.
- Emancipation of waste regulations.

Government-wide Circular Economy Programme

Objectives of the Nationwide Circular Economy Programme 2050 (Raw Materials Agreement):

- Closing the loop' is the core concept.
- All raw materials and residual flows must be kept within the loop for as long as possible while keeping their quality as high as possible.
- Cascading and multifaceted value creation are key ambitions.
- Reduction and replacement of critical non-renewable raw materials with biomass.
- Identifying new methods of production and consumption that encourage the breaking of trends.
- Bringing production and consumption back within planetary boundaries and capacity.

For biomass and food, the key principle is to maintain soil balance, with a key focus on maintaining and boosting soil health: a key factor in sustainable production.

- Social sustainability

Food Agenda

The Dutch government is working towards an ecologically sustainable food system that makes economical and efficient use of raw materials, energy, water and nutrients, as well as promoting conservation and sustainable use of natural capital. This means protecting soil, air and water quality, maintaining biodiversity and reducing greenhouse gas emissions.

2030 Government Vision on Biomass

Biomass can be used in the food, feed, materials, transport and energy sectors. To ensure a sufficient quantity of biomass remains available, biomass stocks must be increased and biomass should be used optimally (cascading).

The **long-term** goal is to only use biomass for the non-food and feed sectors when other renewable alternatives are scarcely available:

- Chemicals and materials
- Aviation and shipping
- Heavy long-distance road transport
- High-temperature industrial heating

In the **short term**, the use of biomass is vital in order to realise the goals in the Energy Agreement and the climate policy.

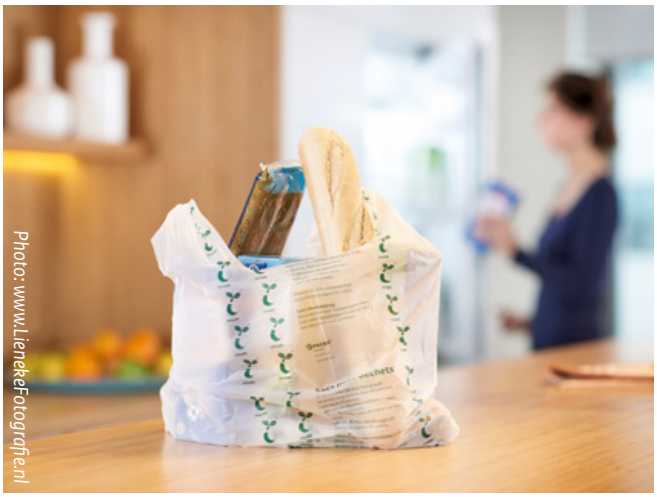
Innovation policy

Within the Top Sectors, the theme of the circular economy focuses on closing loops in key cycles, limiting losses and value creation involving residual flows from the agri-food sector. This involves the entire chain from primary production to end products and their end-of-life processes. The transition to a circular and bio-based economy is creating opportunities to make more careful and effective use of natural resources, connect new markets and boost competitiveness.

Climate and energy transition

The objective of the Energy Agenda is to reduce CO_2 emissions by 80–95% by 2050.

Consultations have been held with civic organisations, the business sector and government bodies in order to determine what can and must be done in order to achieve this goal. Two key pillars of the Energy Agenda are the **Climate Act**, which establishes the key aspects of the climate and energy policy, and the **Climate Agreement**.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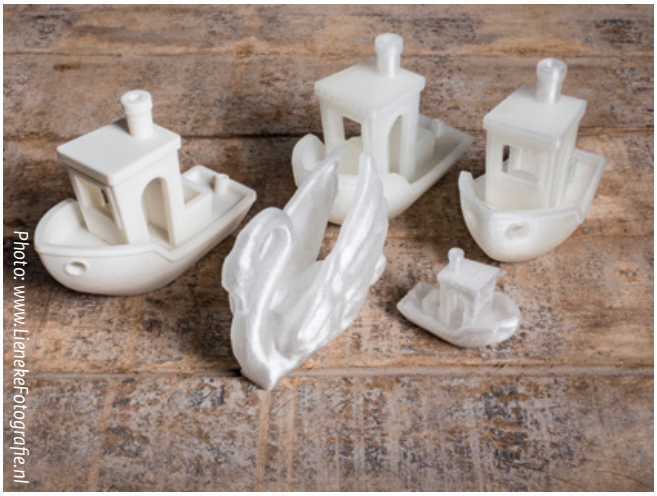
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