

AllThings.Bio PRO

First customised content package

September 2021 (M13)

D2.3
WP 2

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AllThings.bioPRO - Game changer for the bio-based economy
H2020-BBI-JTI-2019



Technical References

| | |
|---------------------|---|
| Project Acronym | Allthings.bioPRO |
| Project Title | Allthings.bioPRO - Game changer for the bio-based economy |
| Project Coordinator | Anne Warnig Fachagentur Nachwachsende Rohstoffe e.V. A.Warnig@fnr.de |
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| | |
|----------------------------------|--|
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¹ PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)

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| 1.0 | 13 August 2021 | BTG | John Vos |
| 2.0 | 25 August 201 | BTG | John Vos and Anne Warnig |
| | | | |



Summary

The aim of Allthings.bioPRO Work Package (WP) 2 is identifying, accessing and preparing content related to the bioeconomy in general and to specific bio-based products in detail as relevant for other WPs of the project.

The current Deliverable 2.3 “*First customised content package*” summarises the content developed during the first project year (September 2020-August 2021), as follows:

- Documenting mapping results
- Preparing fact sheets for mission engagement
- Development of customised content
- Content development for smartphone app

The discussed content was developed and provided by task members BTG and FNR, as requested by the regional partners dealing with engaged stakeholders (WP3), the game developers (WP4) or the journalists and communication experts (WP5).

Developing the materials required, and requires, continuous refining, prioritisation and adaptation of existing information pieces as well as the creation of new content. The content will be used in different Allthings.bioPRO formats such as journalistic articles, news, quizzes, human interest stories, videos or short-clips, workshop guides, factsheets, presentations, the game or smart phone app, etc.

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List of Abbreviations and Acronyms

| Abbreviation | Definition |
|--------------|--|
| BTG | BTG Biomass Technology Group BV |
| FNR | Fachagentur Nachwachsende Rohstoffe e.V. |
| ICONS | Foundazione iCons |
| NG | nurogames GmbH |
| PI | Prospex Institute |
| WP | Work Package |

1 Introduction

1.1 Objective of Allthings.bioPRO

The overarching objective of **Allthings.bioPRO - Game changer for the bio-based economy** is to devise effective ways of increasing awareness, participation and co-creation of the bio-based industry among citizens. This will help harvest valuable feedback and inputs for the bio-based industry on current perceptions. Specifically, the project will:

- Deploy a smart combination of gamification, serious gaming, a mobile app and a communication campaign to engage citizens. This will help gather information and data on their ideas and priorities on specific topics relating to the bioeconomy; these insights will be valuable for the bio-based industry and the Knowledge Centre for Bioeconomy.
- Exploit and further develop the www.AllThings.Bio Platform to communicate on the bio-based economy with the broader public. It will achieve this by linking the platform with the serious game, the smart phone app and a European Bioeconomy Citizen Action Network.
- Ensure the uptake of results through early and regular involvement of regional partners and citizens, as well as with key bio-based economy stakeholders, policy makers and the [Knowledge Centre for Bioeconomy](#).

1.2 Objective of Work Package 2

The aim of Work Package (WP) 2 is identifying, accessing and preparing content related to the bioeconomy in general and bio-based products in detail relevant for other Work Packages, including Engagement and Co-creation (WP3), Game Design and Development (WP4) and Communication and Dissemination (WP5). All these WPs depend on relevant content to implement their objectives. E.g. WP3, dealing with different stakeholder groups will require specific input to inform participants on the selected missions and how they relate to the bio-based economy and specific bio-based products. Game developers in WP4 will need the content to use it in the game and WP5 requires interesting information, which can be used in order to raise the awareness of the general public on bio-based products through the Allthings.bioPRO information formats.

1.3 Objective of Task 2.3

Task 2.3 will develop customised content on the following product groups and or application areas:

- Food packaging (e.g. packaging based on cart board and paper, plastic packaging, glass and metal)
- Fashion and textiles (e.g. bio-based fabrics or shoes)
- Products used in an school environment (e.g. office products, furniture, toys, sports equipment)

Task 2.3 will also zoom in on specific markets and bioeconomy sectors that are relevant for the mission on the job market. However relevant themes could be:

- Companies in the bio-based industry (e.g. biorefineries or other chemical companies)
- Sectors and job profiles

Task members BTG and FNR will develop and provide content on demand, as requested by the engaged stakeholders (WP3), the game developers (WP4) or the journalists and communication experts (WP5). This will require a constant process of refining, prioritisation and adaptation of existing information pieces as well as the creation of new content. The content will be used in different formats such as journalistic articles, news, quizzes, human interest stories, videos or short-clips, workshop guides, factsheets, presentations, the game or

smart phone app, etc. Since content will be produced on demand it cannot be detailed beforehand which content will be developed.

To give a comprehensive and up-to-date overview, the current Deliverable summarises all content developed during the first project year, in Task 2.3 as well as other Work packages, as follows:

- Documenting mapping results (Task 2.1)
- Preparing fact sheets for mission engagement (Task 2.2)
- Development of customised content (Task 2.3)
- Content development for smartphone app (Task 2.4)

2 Work completed in the first project year

2.1 Documenting mapping results

Task 2.1 involved the mapping of the most relevant information and documentation available online within the scope of the four Allthings.bioPRO mission themes: A. Jobs & Careers, B. Fashion & Textiles, C. Food Packaging and D. Kids & Schools. The mapping was initially conducted in the period September - November 2020, during the first three months of the project. A quantification of the mapping results is provided in Table 1. At the cut-off date (17.11.2020) close to 40 different projects, the majority of which are EU-funded, and about 150 unique resources had been mapped.

Table 1 Documentation mapping results – indicative numbers (17 November 2020)

| Topic | Projects | Linked resources | Non-projects | Linked resources |
|--------------------|-----------|------------------|--------------|------------------|
| Job & Careers | 8 | 19 | 6 | 21 |
| Fashion & Textiles | 10 | 18 | 9 | 27 |
| Food Packaging | 13 | 25 | 6 | 13 |
| Kids & Schools | 4 | 6 | 8 | 14 |
| General / Other | 6 | 3 | 8 | 7 |
| Total | 41 | 71 | 37 | 82 |

The full results of Task 2.1 are presented in a detailed Excel overview, accessible to the project consortium partners at the online project data-sharing platform Alfresco.

The collection of mapped resources is a “living collection”, and in the nine months since producing the initial inventory (this is in the period December 2020 - August 2021) the Task 2.3 team periodically updated (expanded) the mapping results. This resulted in the addition of 34 new resources from 9 new projects and 6 new non-projects, as detailed in Table 2.

Table 2 Documentation mapping results – indicative numbers (25 August 2021)

| Topic | Projects | Linked resources | Non-projects | Linked resources |
|--------------------|----------------|------------------|----------------|------------------|
| Job & Careers | 8 (+0) | 21 (+2) | 6 (+0) | 21 (+0) |
| Fashion & Textiles | 10 (+0) | 21 (+3) | 12 (+3) | 33 (+6) |
| Food Packaging | 16 (+3) | 34 (+9) | 6 (+0) | 13 (+0) |
| Kids & Schools | 7 (+3) | 11 (+5) | 9 (+1) | 15 (+1) |
| General / Other | 9 (+3) | 9 (+6) | 10 (+2) | 10 (+3) |
| Total | 50 (+9) | 96 (+25) | 43 (+6) | 91 (+9) |

2.2 Preparing fact sheets for mission engagement

Task 2.2 involved the development of an initial series of informative factsheets on the products and application areas relevant for the different game missions as well as on cross-cutting issues. To produce the factsheets, the following work was to be completed:

1. Planning the factsheet development
2. Factsheet content development
3. Visual attractive editing of the factsheets (English language versions)
4. Translation and customisation of factsheets (fine-tuning them for local use)
5. Visual attractive editing of translated factsheets
6. Disseminating the initial collection of factsheets
7. Using and maintaining the collection of factsheets

By the end of February 2021 (M6), when the associated Deliverable was due, a series of five factsheet had been prepared in English. These were subsequently translated in two or more language versions.

The English language versions of the factsheets were included in the Annex of Deliverable D2.2 “Factsheets for mission engagement”.

The formally edited versions of the factsheets can be found in the restricted-access project repository Alfresco (PPT versions, accessible to all consortium partners) and at the project website www.allthings.bio (PDF versions, accessible to all), see Figure 1 below.

Figure 1: Factsheet topics and language versions

[Allthings.bioPRO flyer](#)

Let the bioeconomy inspire you to live a more sustainable lifestyle. Bio-based products are already available on the market and AllThings Bio covers sectors relevant to people's daily lives. Download the flyer to discover how you can contribute. Also available in: [Dutch](#), [Estonian](#), [German](#), [Italian](#), [Swedish](#).

[Allthings.bioPRO | Factsheet - Sustainable fashion](#)

Dig into the sustainable side of fashion and learn how much it is being impacted by the bioeconomy. Also available in: [Dutch](#), [German](#), [Swedish](#).

[Allthings.bioPRO | Factsheet - Jobs and Careers in the Bioeconomy](#)

Employing 8.2% of the European workforce, the bioeconomy is an important contributor to a prosperous European Union. Read this publication to know about new career perspectives, job opportunities and obtain the relative skills required. Also available in: [German](#), [Italian](#).

[Allthings.bioPRO | Factsheet - The Bioeconomy: a brief introduction](#)

Learn about the basics of bioeconomy through this engaging publication! The economic opportunities and latest technologies are presented, along with insights and useful links. Also available in: [Dutch](#), [Estonian](#), [German](#), [Italian](#), [Swedish](#).

[Allthings.bioPRO | Factsheet - Food Packaging](#)

Food consumption is nowadays under scrutiny, despite being such a common occurrence. People are increasingly sensitive about how food is being packaged and there's much societal pressure to reduce the use of plastic. Have a look at different bio-based alternatives. Also available in: [Dutch](#), [German](#).

[Allthings.bioPRO | Factsheet - Kids and Schools](#)

Care to involve a younger public? Download our factsheet about Bioeconomy aimed at kids aged 10 to 14: you'll be sure to get them to know a few basic facts about the employment of organic resources in an age-appropriate language. Also available in: [Estonian](#), [German](#).

2.3 Development of customised content

In Task 2.3, BTG and FNR will develop and provide customised content on demand, as requested by other consortium members. Since content will be produced on demand, it cannot be determined beforehand which content will be needed.

In the period March – June 2021, various consortium partners advised BTG and FNR what information they would need for use in their respective work packages. All content that they were asked to deliver, BTG and FNR developed and implemented/uploaded already, as shown in Table 3 below.

Table 3 Overview of consortium requests to develop customised content

| Information request | Requested by | Status (mid-August 2021) |
|---|--|--|
| A. Info providing European context (slide decks for each of the four mission themes) | In WP3 by BSS, for use in the second series of co-creation workshops | Implemented by BTG and FNR. Formally edited (in the style of Task 2.2 factsheets) by ICONS |
| B. Content development for the project's smartphone app | In WP4 by Nurogames (NG), as information for use in the app | BTG and FNR awaiting further NG guidance/suggestions how to proceed |
| C. Info from fellow EU-funded projects (short profiles and key online resources) | In WP5 by ICONS, for publication at project website | Implemented by BTG. (To be) published online by ICONS @ www.allthings.bio/fellow-projects |
| D. Selecting names/coordinates of relevant stakeholders in different categories | In WP6 by Prospex Institute (PI), as prospective interview candidates | Implemented (first batch) by BTG, FNR and ICONS |
| E. Drafting consortium posts (online articles) | In WP5 , by ICONS, for publication at project website | (In year 2 or 3) BTG and FNR will develop six consortium posts |

The slide decks providing information on the European context for each of the four mission themes (item A in Table 3) are attached as an Annex to the current document. Screenshots showing a sample page of each of the four slide decks are shown in Figure 2 below. The focus on the European context was chosen to make it clear to the participants of the WP3 engagement events that they are part of a larger European project even when the focus groups and co-creation workshops are organised locally in the regional partner countries. A different approach was selected for the mission Kids & Schools, as here the European focus did not provide any advantages. Instead, the provided information focuses on labels for bio-based and biodegradable products and further present key facts and figures on bioeconomy topics on European level in a way that kids can easily relate to the given information.

Figure 2: Sample pages taken from the four slide decks providing European context



AllThings.Bio PRO
Background

- The bioeconomy accounts for 8% of the EU's workforce. Bio-based industries could create up to 1 million green jobs by 2030.



AllThings.Bio PRO
European policy

- The **2018 EU Plastics Strategy** aims to transform the way plastic products are designed, produced, used and recycled in the EU.
- The **Packaging and Packaging Waste Directive** seeks to prevent or reduce the generation of waste.
- Various single-use plastics have been banned under the **Directive on single use plastics and fishing gear**: for example single-use cutlery, plates and beverage cups are banned from 03 July 2021.



AllThings.Bio PRO
Take home messages

- Any product made from oil can be made from biomass as well.
- Bio-based products can help to protect our climate by reducing CO₂ emissions.
- You already use bio-based products in your everyday life.
- Bio-based products can provide new and better functions.

Task 2.3 also includes the content development for the serious game that will be developed. This will be carried out by BTG and FNR once NG develops the basic framework for the game based on the results from the co-creation process. Information on the four game missions' topics will be provided in a way that motivates players to learn and arouses their curiosity, such as short text boxes, quizzes, puzzles or similar.

A screenshot of the information regarding EU-funded fellow projects, and their main resources (item C in Table 3) is provided in Figure 3 below.

Figure 3: Information regarding EU-funded fellow projects

Enjoy some of the most remarkable resources produced in the field of bioeconomy by our fellow projects and initiatives!



BE-Rural

Bioeconomy Going Rural: Developing Rural Bioeconomies by focusing on Regional Strengths

[Educational resources on bioeconomy for teachers \(PPT slides, workshops, quizzes and games\)](#)

[Concept for a pop-up store with bio-based products and participatory events](#)



BIOBEC

Preparing the creation of Bio-Based Education Centres to meet industry needs and boost the contribution of the bioeconomy to societal challenges.



BIOBRIDGES

BIOBRIDGES project tackles the key challenge of improving the marketability of bio-based products (BBPs) by fostering close cooperation and partnerships among bio-based industries, brand owners and consumers' representatives.

[Video following a young lady discovering how bio-based products can substitute fossil-based ones in every day's lives](#)

[Series of cards that can be used in social media messages](#)

[Results of a survey on consumer's awareness of bio-based products](#)



BIOSWITCH

BIOSWITCH aims to bring Europe to the forefront of the bio-based economy by encouraging and supporting brand owners from different sectors to switch to bio-based approaches.

[A set of \(learning and awareness, adoption and consolidation\) tools to support the switch to bio-based](#)



BIOVOICES

BIOVOICES aims at engaging all relevant stakeholder groups "voices" in order to address societal, environmental and economic challenges related to bio-based products and applications.

[A catalogue presenting 60 artistic pictures that associate commonly known feedstock with their surprising bio-based applications](#)

[Catalogue with examples of innovative bio-based products and brands](#)

[Collection of 20 educational cards, briefly explaining key bioeconomy issues](#)



BIOWAYS

The BIOWAYS mission is to promote the huge potential of bio-based research results and raise public awareness of bio-based products, using a variety of communication techniques and through public engagement activities and the development of educational tools and materials.

[Games and quizzes to learn about bioeconomy in a fun and engaging way](#)

[The BioWays toolkit contains a collection of traditional and innovative knowledge assets](#)



BLOOM

The project's main objective is to establish open and informed dialogues between different stakeholders about the bioeconomy. BLOOM elaborates live hubs (communities of practice) that allow for an iterative process enabling cross-fertilization and idea generation through shared knowledge and experiences.

[Factsheet with general introduction to the bioeconomy](#)

[Easy to understand key messages on different aspects of the bioeconomy, sustainable development and climate change](#)

[A suitcase packed with great products for your journey to the bioeconomy](#)



LIFT

LIFT will maximise the impact of bioeconomy related CSAs by valorising their outcomes and promoting the collaboration among them, aiming at identifying gaps to be addressed to ensure a stimulating environment boosting the Bio-Based economy.

The LIFT Bioeconomy theme involves access to results of more than 40 FFI/Market-related projects

Revolutionising Bioeconomy for

2.4 Content development for smartphone app

In Task 2.4, partners FNR and BTG will develop and provide content for the smartphone app. Although formally the work on this does not start until M13 (September 2021), FNR and BTG already met online with WP4 leader Nurogames in May/June 2021 to discuss practicalities, opportunities and expectations with regard to the smartphone app. Currently (September 2021), FNR and BTG are awaiting further guidance from Nurogames.

3 Annex

The slide decks providing info on the European context for each of the four mission themes (A. Jobs & Careers, B. Fashion & Textiles, C. Food Packaging and D. Kids & Schools) are attached as an Annex.



European Bioeconomy

| Sector | Employment (million jobs) | Value added (billion €) | Value added (shared tot) |
|---|------------------------------|----------------------------|-----------------------------|
| Agriculture | 9.3 | 189 | 31% |
| Forestry | 0.5 | 25 | 4% |
| Fishing and Aquaculture | 0.2 | 7 | 1% |
| Food, beverages and other agro-manufacturing | | | |
| | 4.4 | 215 | 35% |
| Bio-based textiles | 0.7 | 21 | 3% |
| Wood products and furniture | 1.4 | 47 | 8% |
| Paper | 0.6 | 42 | 7% |
| Bio-based chemicals and pharmaceuticals, plastics and rubber | | | |
| | 0.4 | 60 | 10% |
| Liquid biofuels | 0.02 | 3 | 1% |
| Bioelectricity | 0.02 | 4 | 1% |

Data 2017 – EU-27; Source: based on Ronzon et al, 2020. <https://dot.org/10.3390/Su12114507>

Background

- The bioeconomy accounts for 8% of the EU's workforce. Bio-based industries could create up to 1 million green jobs by 2030.



Background

- Socio-economic analysis highlights **distinct groups of Member States**, ranging from those specialised in bio-based sectors that are labour intense but have a lower labour productivity, such as agriculture (e.g. Bulgaria and Romania), to those whose labour market is less concentrated in bioeconomy sectors but for which high-productivity sectors play a more important role (e.g. Finland, where the bio-based chemicals sector has grown a lot recently).



Background

- The different socio-economic characteristics across Member States and bio-based sectors lead to a **wide range of opportunities for jobs and demand for job skills.** And to a corresponding demand for a matching bioeconomy curriculum.



Interdisciplinary cooperation is called for

- The circular sustainable bioeconomy requires interdisciplinary cooperation in the workforce to address the scientific, technical, economic and social challenges of our times.
- The 2018 [European Bioeconomy Strategy](#) action 2.4 Promote education, training and skills across the bioeconomy aims at reducing skills shortages and skills mismatches across the bioeconomy by supporting development of new and updated curricula which respond to the diverse and evolving needs of stakeholders and sectors in the bioeconomy.
- The issue was discussed at the European Commission's [Workshop on Promoting Education, Training and Skills across the Bioeconomy](#) that was held in Brussels on 15 October 2019
- The Global Bioeconomy Summit 2020, organised in Berlin, Germany zoomed in on tertiary level bioeconomy education at its (online) workshop: [How to shape education for a sustainable bioeconomy?](#)



Horizon 2020 & Horizon Europe projects



- Several EU-funded coordination and support projects consider aspects of bioeconomy education.
- Among others, [LIFT](#) explored the main outcomes and insights from EU-funded [bioeconomy education-related projects](#) including UrBioFuture, BioCannDo, BioWays, BLOOM, BiOVOICES, etc. Key project results were collected in the [European Bioeconomy Library](#)
- Future EU-funded projects on bioeconomy education will include:
 - BIOBEC - Preparing the creation of Bio-Based Education Centres (will run from Sept 2021 until February 2024).
 - Those to be funded under Horizon Europe call topics GOV-01-08: Improving understanding of and engagement in bio-based systems with training and skills development and GOV-01-11: Education on the bioeconomy including bio-based sectors for young people in primary and secondary education in Europe

Further European initiatives

- [Erasmus Plus projects](#) like Askfood, FIELDS, BoostEDU and ABBEE. E.g. the project [ABBEE](#) initiated the tandem-wise development of educational materials for four bioeconomy master courses, and their embedding in the curriculum of the respective university.
- The [European Bioeconomy University](#) (EBU) provides a model for a theme-based, system- and future-oriented university that focuses on inter- and transdisciplinary as well as sectoral and European collaboration
- The [Community of Practice for Bioeconomy Education](#) (CoP Bio-Ed) aims to enhance the quality, offer and diversity of education for the circular bioeconomy in Europe
- The [European Bioeconomy Network](#) (EUBioNet) initiated a bioeconomy education working group that will deliver policy briefs, factsheets and recommendations
- The [BISC-E Biobased Innovation Student Challenge Europe](#), is an initiative giving students the opportunity to explore the emerging bio-based field.

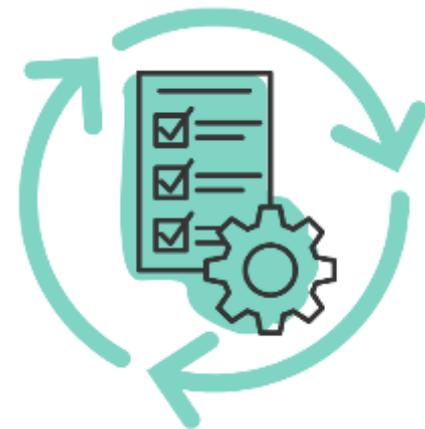
European Bioeconomy

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|  Paper | 0.6 | 42 | 7% |
| <hr/> | | | |
|  Bio-based chemicals and pharmaceuticals, plastics and rubber | 0.4 | 60 | 10% |
|  Liquid biofuels | 0.02 | 3 | 1% |
|  Bioelectricity | 0.02 | 4 | 1% |

Data 2017 – EU-27; Source: based on Ronzon et al, 2020. <https://dot.org/10.3390/Su12114507>

European policy

- On 5 January 2021 the European Commission published the roadmap for the upcoming consultation on the EU's “**strategy for sustainable textiles**”
- „As part of the European Green Deal, the Commission has outlined a set of **measures that could become legally binding** and aim to prioritize energy efficiency, as well as **circular economy practices in the fashion industry.**“



European fashion

The EU is a **net importer** of textiles (mainly finished products from Asia).

In the EU, there are **around 171 000 companies** in the textile (including wearing apparel) industry, employing 1.7 million people.

In 2017, the EU **produced 7.4 kg of textiles per person** while consuming nearly 26 kg.

Between 1996 and 2018, **clothing prices in the EU dropped by over 30 %**, relative to inflation.

EU consumers **discard about 11 kg** of textiles per person per year.



171K



1.7M



7,4kg



26kg



- 30%



11kg

Bio-based fashion

*Traditional **biopolymers** are made of **cellulose and starch***

*Biopolymers can also be produced from a **broad range of raw materials**, such as **lipids (oils), fungi and algae**.*

*Biopolymers, while **currently a niche solution**, are predicted to grow, although at a small rate in the early years.*

*The most popular **cellulose fibres** are **Viscose, Modal and Lyocell**. They are **natural fibres extracted from wood** through a chemical process.*

*There are currently over **300 million hectares PEFC certified forests** in the world.*

International initiatives

- The mission of **Fashion for Good** is to bring together the entire fashion ecosystem.
- The **Forests for Fashion Initiative** is a partnership of PEFC, UNECE and FAO, linking forest-based materials from sustainably managed forests.
- The **Make Fashion Circular initiative** (led by Ellen MacArthur Foundation) brings together leaders from across the fashion industry. Its aim is to stimulate collaboration
- The **Sustainable Apparel Coalition** is the apparel industry's leading alliance for sustainable production.
- **Textile Exchange** is an international non-profit member organization committed to the responsible expansion of textile sustainability.

The logo for Fashion for Good, featuring the words "FASHION FOR GOOD" in a bold, sans-serif font. The letter "G" in "GOOD" is significantly larger and positioned to the right of the other letters.The logo for the Sustainable Apparel Coalition, featuring a stylized infinity symbol on the left and the text "Sustainable Apparel Coalition" on the right.The logo for Textile Exchange, featuring a stylized "E" symbol on the left and the text "Textile Exchange" on the right, with the tagline "Creating Material Change" below it.

European Bioeconomy

| Sector | Employment (million jobs) | Value added (billion €) | Value added (share tot) |
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Data 2017 – EU-27; Source: based on Ronzon et al, 2020. <https://dot.org/10.3390/Su12114507>

European policy

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- Various single-use plastics have been banned under the **Directive on single use plastics and fishing gear**: for example single-use cutlery, plates and beverage cups are banned from 03 July 2021.



Source: Joint Research Centre, European Commission (2017)

European packaging industry

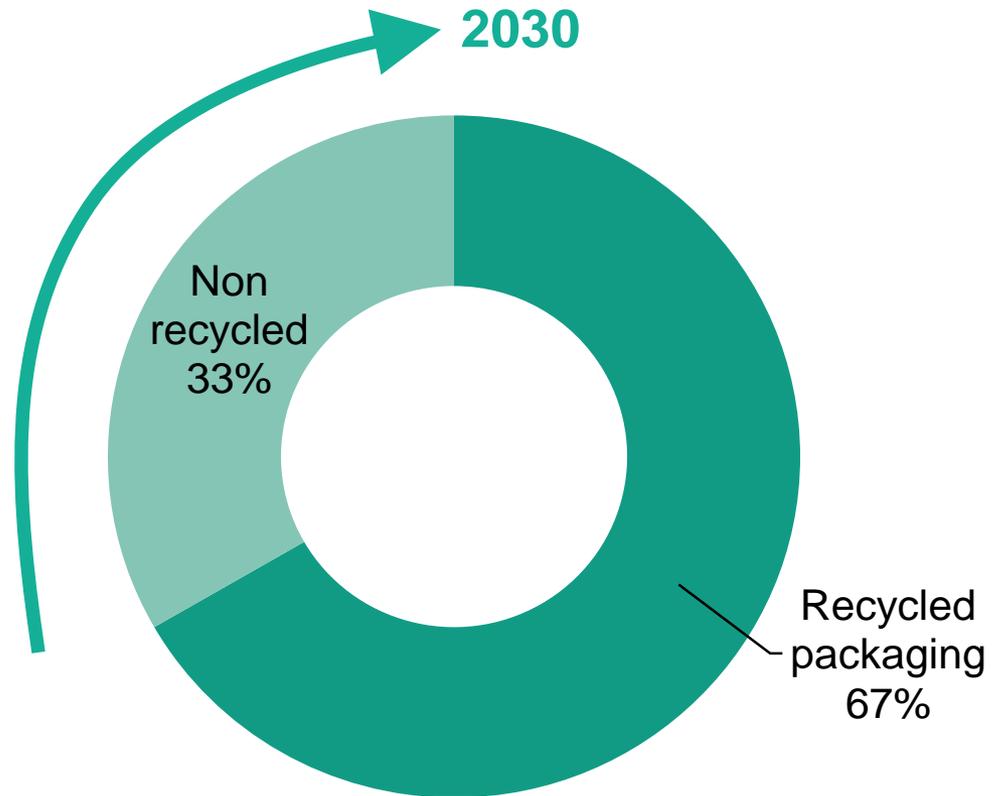
- The European demand for packaging material is **19.9 M tonnes per year** (>26 kg per person per year).
- Food packaging comes in different forms, mostly forms of **paper** (34%) and **plastic** (37%)



European packaging industry

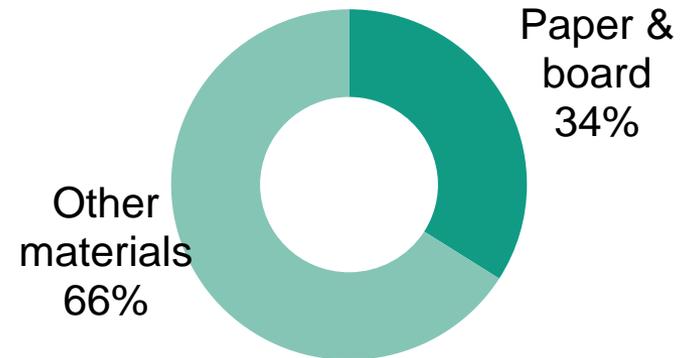
Currently, around 2/3 of packaging is recycled in Europe.

Goal: making all plastic packaging reusable or easily recyclable by 2030

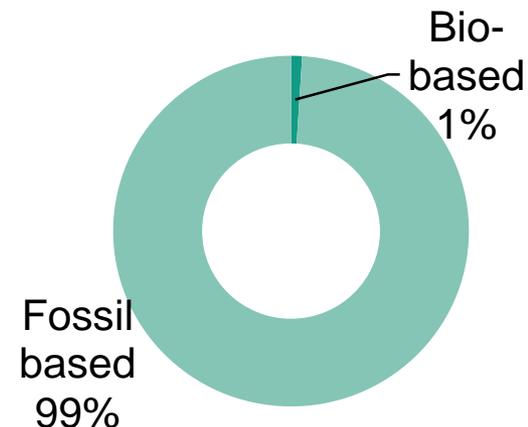


Bio-based packaging

- Currently, **34% of the food packaging is made from paper and board**



- Currently, **only 1% of all plastics packaging is bio-based**. The remaining 99% is still fossil-based



Biopolymers

- Biopolymers, while **currently a niche solution**, are predicted to grow, although at a small rate in the early years.
- **Biopolymers**, for example **cellulose and starch**, are synthesised by living organisms



International initiatives

- The **New Plastics Economy initiative** (led by Ellen MacArthur Foundation), aka 'A line in the sand' unites actors from across the packaging value chain.
- The **European Plastics Pact** sets targets for signatories by 2025 such as:
 - designing all packaging to be re-useable or at least recyclable,
 - reducing virgin plastics by 20%,
 - increasing recycling by 25%,
 - having 30% recycled content.
- The **Sustainable Packaging Alliance** provides private and public sector organisations with a range of packaging tools and services to advance sustainable packaging, eco-design and innovation.
- There are many **European Research & Development projects**

European Bioeconomy

| Sector | Employment (million jobs) | Value added (billion €) | Value added (share tot) |
|---|------------------------------|----------------------------|----------------------------|
|  Agriculture | 9.3 | 189 | 31% |
|  Forestry | 0.5 | 25 | 4% |
|  Fishing and Aquaculture | 0.2 | 7 | 1% |
| Food, beverages and other agro-manufacturing | | | |
|  Food, beverages and other agro-manufacturing | 4.4 | 215 | 35% |
|  Bio-based textiles | 0.7 | 21 | 3% |
|  Wood products and furniture | 1.4 | 47 | 8% |
|  Paper | 0.6 | 42 | 7% |
| Bio-based chemicals and pharmaceuticals, plastics and rubber | | | |
|  Bio-based chemicals and pharmaceuticals, plastics and rubber | 0.4 | 60 | 10% |
|  Liquid biofuels | 0.02 | 3 | 1% |
|  Bioelectricity | 0.02 | 4 | 1% |

Data 2017 – EU-27; Source: based on Ronzon et al, 2020. <https://dot.org/10.3390/Su12114507>

Labels to look out for

Bio-based

- *Bio-based products are made from regrowable biomass instead of fossil resources*
- *They can help to **reduce CO₂ emissions** and are therefore better for the environment*
- *To help you find bio-based products, here are three certified labels you can look for*
- *They identify materials that contain a certain proportion of **bio-based substances***



Labels identifying products with a certain share of bio-based material

Labels to look out for Biodegradable

- *It is not possible to recognise by eye if a plastic is fossil-based or bio-based and if the material will biodegrade easily*
- *Some plastic products are **biodegradable**, which means they can decompose under controlled conditions, such as at an industrial composting site*
- *If a plastic product is suitable for **home composting**, this will be indicated by slightly different labels*
- *Can you spot the difference?*



compostable

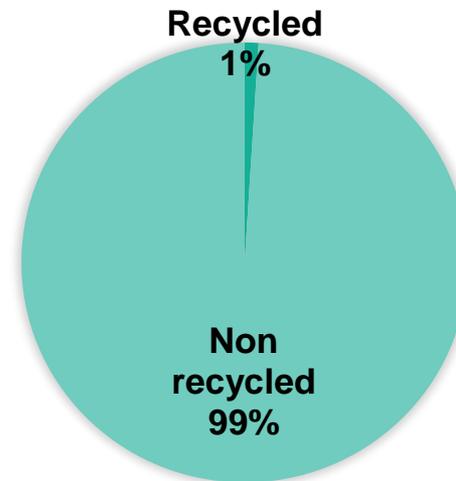
Labels identifying biodegradable products



Labels identifying home compostable products

Did you know...

- ...that per year, one person in Europe uses nearly **26 kg of textiles** and discards about 11 kg
- ...that **less than 1%** of all textiles worldwide **are recycled** into new textiles

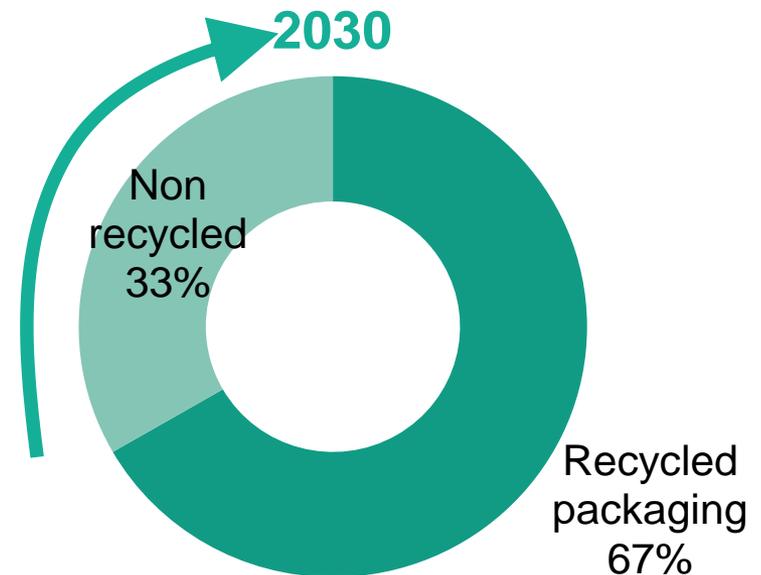


Did you know...

- ...that per year, one person in Europe generates about **174 kg of packaging waste**. That's about as much as a piano weighs.



- ...that currently **2/3 of packaging is recycled in Europe**
- ...that the goal is to make all plastic packaging reusable or easily recyclable by 2030



Take home messages



Any product made from oil can be made from biomass as well.



Bio-based products can help to protect our climate by reducing CO₂ emissions.



You already use bio-based products in your everyday life.



Bio-based products can provide new and better functions.