

Bio-based strategies and roadmaps for enhanced rural and regional development in the EU



Briefing paper: Concept for a pop-up store with bio-based products and participatory events

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EXECUTIVE SUMMARY

This report introduces the concept of bio-based pop-up stores and explains why it is a suitable instrument to inform about the bioeconomy and aspects of the larger sustainability debate (Sustainable Development Goals).

From a theoretical viewpoint, it embeds the bio-based pop up store into the larger BE-Rural framework and explains how it will contribute to achieving the project objectives. As in all other project activities, the Open Innovation Platforms will play a decisive role to enable collaborative stakeholder engagement, knowledge exchange and capacity building. Concretising the concept, the report provides design visualization examples and lists potential educational materials (publications, videos, apps, games etc.), which will be made available to guests alongside the exhibits. It also includes a preliminary overview during which regional events the bio-based pop-up stores will be organised. Additionally, the promotion and evaluation of the store are briefly raised.

The annex includes a list of bio-based products that are currently considered to be included into the pop-up stores. The final list of products will depend on the input of partners, the availability of new innovations released during the duration of BE-Rural as well as their accessibility.

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Abbreviations

OIPs	Open Innovation Platforms
R&I	Research and Innovation
SDGs	Sustainable Development Goals
SME	Small and medium-sized enterprise
SWGs	Stakeholder Working Groups

1 Introduction

1.1 What is a (bio-based) pop-up store?

Pop-up stores usually appear for a limited amount of time in an unusual location. To attract the customers' attention, fascinating products are chosen and presented in an inviting and innovative atmosphere. Typically, a pop-up store occupies only a small area in a central location.

In contrast to a conventional pop-up store, the BE-Rural bio-based edition will include a variety of different products from diverse brands. Instead of presenting the novelties of an exclusive brand, the shop will exhibit the immense diversity of bio-based alternatives that are already on the market or in their pilot phase. The displayed products will not be offered for sale, but each item will include information on whether it is already on the market and where it can be purchased. In addition, information will be given on the raw material and sustainability aspects.

One of the first ever bio-based pop-up stores was organised in the municipality of Bergen op Zoom in the Netherlands from mid-November 2016 until January 2017 (see also figure 1). The store was set up to inform the public about bioeconomy, to raise awareness for bio-based products, materials, applications and processes. The store attracted attention beyond the region and enjoyed a wide media coverage. BE-Rural bio-based pop-up stores will differ in so far as the materials will not be as much in the spotlight as in Bergen op Zoom and a connection to the Sustainable Development Goals (SDGs) will be drawn.

1.2 Why organise a bio-based pop-up store?

To date, bio-based products are still niche products and awareness of their existence is very low (Pfau 2017). At the same time, more and more people start placing environmental topics first and demanding more environmental and climate protection on all levels. One reason for this discrepancy between environmental awareness and lack of knowledge on alternatives may be that bio-based products are very diverse; often it is difficult to understand what ingredients they include and what their sustainability benefit is. Also, due to the higher production cost, they are more expensive and cannot yet benefit from economies of scale. In many cases, they are only available online, which may be an obstacle for a first-time consumer. Pop-up stores can serve as an intermediary – they can raise awareness, intrigue and offer access. In the store, people will be able to touch the different objects, read about their production process and sustainability aspiration.

The main objective of the pop-up stores in the context of BE-Rural is to provide local citizens with information on the bioeconomy to enable them to get engaged in "informed discussions". As elaborated in the BioSTEP project¹, there are different modes of public participation: Education and Information (Informative participation), Dialogue (Consultative participation) and Co-production of knowledge (Functional participation). As summarized in Ribeiro and Millar (2015), informative participation involves scientists and experts who inform the public. Consultative participation is more open to societal debate – the limits between expert and lay knowledge become blurrier. In functional participation, citizens and other interest groups are actively involved in the process of knowledge production. The BE-Rural bio-based pop-up store fits into the first category of informative participation. The products in the store give a hands-on introduction into the diverse application fields of the bioeconomy. By showing actual products and explaining the bio-based content or special production procedure comprehensively, the store picks up people also with little previous knowledge. The assembly of products, books, games, videos shall enable the visitor to get a first idea of what bioeconomy entails and inspire to start thinking about the own personal lifestyle. Additionally, the diverse assembly of innovations can trigger discussions and thoughts on the use of local resources. Each visitor is invited to fill in an evaluation form to evaluate whether the pop-up store has succeeded

¹ Promoting Stakeholder Engagement and Public Awareness for a Participative Governance of the European Bioeconomy (BioSTEP), see www.bio-step.eu

to increase the knowledge of bioeconomy. Further, all visitors are invited to register for the newsletter or to follow the project on social media platforms.

Apart from this, the pop-up stores will serve as a tool to mobilise engagement among citizens in the development of bioeconomy strategies and roadmaps. For this, the project partners² will develop region-specific instruments to enable people to express their needs and concerns on themes such as bioeconomy development in their regions, sustainable consumption, climate and nature protection etc. and to actively involve them in the strategy development process.

1.3 Who will be visiting the BE-Rural bio-based pop-up store?

Accessibility will be a cornerstone when selecting the locations for the bio-based pop-up stores. The stores will be set up in locations recommended by the regional Open Innovation Platform (OIP) partners. We will scout for locations which are easily accessible and where a lot of people pass by. The goal is to attract the interested general public – people with different backgrounds who may or may not have heard about the bioeconomy before.

1.4 Linking the Bioeconomy to the Sustainable Development Goals

According to the definition of the European Union, the bioeconomy “includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services”³. With this very broad and comprehensive approach, the bioeconomy has the potential to advance several of the UN SDGs. More information on how BE-Rural can and will contribute to realizing the SDGs can be taken from Deliverable 1.1, the Conceptual Framework of the project. Novel bio-based products and processes can potentially contribute to:

- SDG 1 (End poverty in all forms everywhere) by creating new jobs in cities and rural areas.
- SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture) by focusing on protein-rich and currently undervalued resources for nutrition and discovering novel sources of probiotics and essential nutrients.
- SDG 3 (Ensure healthy lives and promote well-being for all at all ages) by integrating bioactive compounds into health or cosmetic products.
- SDG 9 (Industry, Innovation and Infrastructure) by enabling 3D printing with biological materials and bio-inspired structures or – combining biosciences with digitization – the development of smart farming apps, which again optimize the use of resources, such as water.
- SDG 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) by inventing new filtration systems such moss plantation in large cities or aquaponics.
- SDG 12 (Ensure sustainable consumption and production patterns) by using renewable resources and residues for everyday products, such as textiles.
- SDG 13 (Take urgent action to combat climate change and its impact) by replacing fossil resources with renewable resources and using CO₂ as a feedstock and low-carbon production.
- SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) by developing alternatives to fossil-based plastics and using resources such as the caught fish entirely, including its residues.

² A dedicated sessions on this topic will take place in the context of the next project meeting in November 2019.

³ European Commission (2019): Overview bioeconomy. Retrieved from:
https://ec.europa.eu/knowledge4policy/bioeconomy/topic/policy_en

- SDG 15 (Life on Land) by using natural resources sustainably, avoiding scarce resources and land degradation

Of course, the bioeconomy is only advantageous if potential negative spill over effects are monitored and counteracted. Novel bio-based products can have a positive impact, but it is uncontested that they are no miracle solution to all sustainability challenges. They can but contribute to a sustainability transformation along with a consumption decreases and an extension of product life.

2 Concept of the BE-Rural bio-based pop-up store

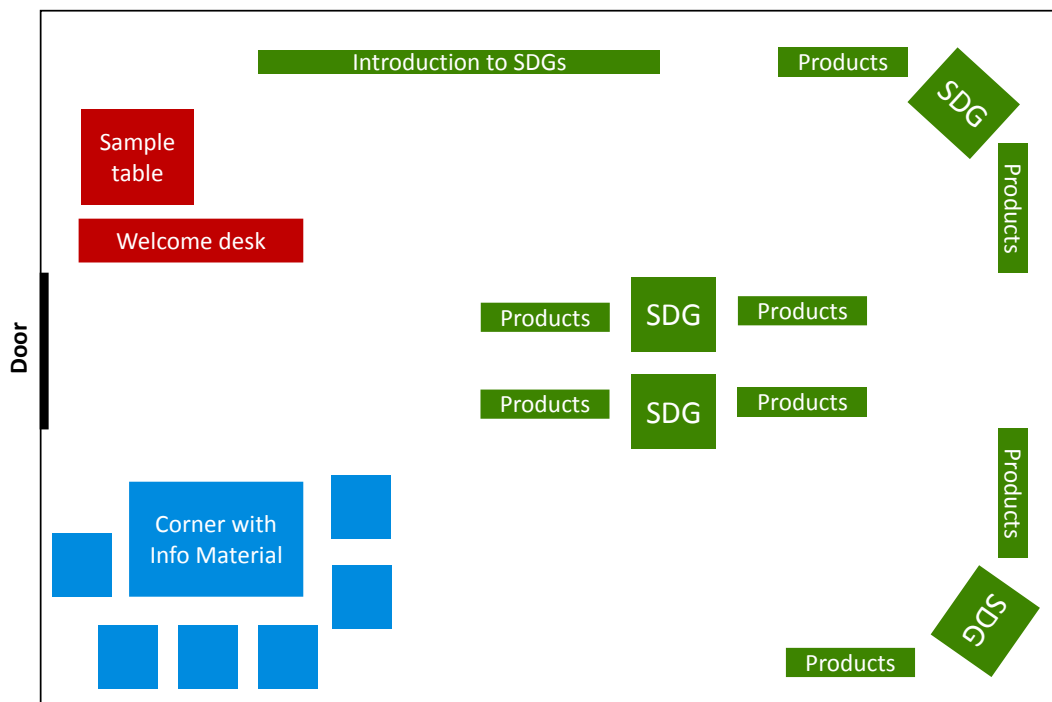
The BE-Rural bio-based pop-up store has a threefold approach: to shed the spotlight on innovative bioeconomy products, to discuss how these can contribute to selected SDGs, and to inspire people to think of regional resources and innovative business models.

At the entrance of the store, a knowledgeable person will greet the visitor and offer a brochure on the different products exhibited in the room. Close to the entrance, bioeconomy and the SDGs will be explained in a concise and comprehensive manner. On different posters, an overview of all SDGs will be given, the connection to the bioeconomy explained and potential positive and negative effects outlined. For example, renewable resources can replace fossil resources, but the increased demand for biomass can also lead to an overutilization of land and biodiversity. Residues can provide the basis for many new and innovative products, but at the same time, they might already fulfil a role in the ecosystem and – if used differently – be missed as e.g. organic fertilizer (see also Kiresiewa and Hasenheit, 2019).

Different SDGs will be explained in connection to the innovative products. For the BE-Rural pop-up store, SDG2, SDG3, SDG9, SDG11, SDG12, SDG13 and SDG14 will play a role. SDG15 will be taken into consideration to discuss the potential negative effects a bio-based economy may have, e.g. in terms of land-use and ecosystem changes. SDG2 has been selected as agriculture is a main employment and income sector in the majority of the OIP regions. Bio-based products under this SDG contain more sustainable food ingredients such as composite material from natural fibre, algae or insects. SDG3 is touched upon with regard to bio-based ingredients for cosmetics or nutritional supplements. Moss walls to filter CO₂ from the air or algae reactors address SDG9, SDG11 and SDG13 topics. SDG12 about sustainable consumption covers a range of different subtopics – e.g. innovative textile solutions or furniture. SDG14 addresses the oceans. This SDG is included as one OIP strongly focuses on the oceans for its bioeconomy options.

As an introduction, each of the selected SDGs will be explained in a concise text with illustrations. The bio-based products will be selected from different regions with a focus on the Eastern and South-eastern European states – especially the BE-Rural OIP regions. They will cover a range of different bioeconomy aspects – such as being made of renewable material instead of fossil parts, consisting of residues that would have otherwise filled the landfills or having been constructed with the help of enzymes. These products will also explained: bio-based content, manufacturer, availability and website. Although the products will not be sold, the information given will be sufficient to find the product online. The visitors will be able and allowed to touch the different products on the shelf.

Different multimedia materials such as books, videos and games will be made available to the visitors in a comfortable corner of the store inviting them to browse and learn (see also section 2.3). Before exiting the store, each visitor will be offered to try something bio-based, such as a piece of an insect bar, an algae chocolate or a straw made of apple residues. The goal is to offer an experience in which the visitor can see the bio-based products, touch them and – although just one sample – eat them.

Figure 1: Potential layout plan for a BE-Rural bio-based pop-up store

From a design perspective, the pop-up store will find a balance between improvised industrial chic and ecological minimalism. Namely, each product, or in some cases product family will be exhibited in wooden cases. Whenever feasible, the raw material will be displayed as well. The wooden cases are flexible, can be adjusted and piled depending on the requirements of the location. They are often used in pop-up stores and can be easily transported, which is highly relevant as the pop-up store will be built up in all five OIP regions.

2.1 The bio-based pop up store in the BE-Rural framework

The pop-up stores will be embedded in the BE-Rural Conceptual Framework. As in all other BE-Rural activities, the OIP will support and facilitate the pop-up stores within the selected regions, and provide the foundations necessary to enable collaborative stakeholder engagement, knowledge exchange and capacity building. The consortium will build on Action Research (see D1.1, the Conceptual Framework to the project) when planning and implementing the pop-up stores. In line with this research concept, the stores will strive to build practical 'how to' knowledge and involve active cooperation between a range of different – primarily local – stakeholders. Instead of following a linear path, Action Research goes from planning, to action, to description and evaluation, to reflection and then to planning and action again. These will be the steps followed in the bio-based stores – once one store has been organised the planning for the next store starts and will include and build upon the lessons learnt. As all OIP regions are different, all stakeholder engagement processes will unite different actors, set-up distinct Stakeholder Working Groups (SWGs) and follow individual timelines. Additionally, the bio-based pop-up stores cannot be organized in parallel as the product innovations are only available as single copies. As a result, compromises have to be found and each pop-up store in each region will have a slightly different contribution to the overall BE-Rural objectives, depending on the period in time where it is organized. This will be discussed and decided in close cooperation with the respective regional partner, the coordinator and other relevant consortium members. Generally, each bio-based pop-up store has the potential to contribute to the following activities:

- Host the SWGs for engagement activities with different local actors, e.g. civil society organisations and/or citizens (WP4 & WP5).
- Host members of the BE-Rural consortium to share project insights to the SWGs – conceivable are presentations on the technical options or business models for bio-based economies or a comprehensively presented summary of the handbook on regional and bio-

based economies (WP2 results). These presentations would be developed in close cooperation with the regional partners to ensure that the emphasis is on bottom-up learning within the region and does not promote a top-down approach.

- Host educational events on sustainability and the bioeconomy (Task 3.2).
- Host participative review meetings on the analysis of the bioeconomy potential of the OIP regions with the local stakeholders (Task 2.5).
- Help to recruit participants for the research & innovation (R&I) capacity building workshops for (early career) researchers and research-oriented SMEs from the OIP regions. These workshops will be on 'how to' participate in international R&I projects, access inter/national funding, find R&I partners, write project proposals, prepare conference posters etc.
- Ensure transparency and display information and contact details to allow local stakeholders to enter the regional strategy and roadmap development activities also at later stages of the participatory process.
- Consult visitors to collect recommendations: e.g. to inquire how awareness of the bioeconomy can be increased in rural regions or what bio-based products they could imagine for their region based on their resources.
- Disseminate information and invite to the Romanian Cluster Conference as well as the final conference, both of which will have an international audience and serve to present and discuss BE-Rural best-practices and results.
- Disseminate information on the BE-Rural summer school (Task 3.1)
- Disseminate the educational material on the theme of sustainability and the bioeconomy, focusing e.g. on the potential contribution of the bioeconomy to zero hunger (SDG 2), affordable and reliable, sustainable energy (SDG 7), good health and well-being (SDG 3), ensuring sustainable consumption and production patterns (SDG 12), combating climate change (SDG 13) and strengthening the means of implementing and revitalising global partnerships for sustainable development (SDG 17). This information will also be taken up for the explanatory texts which are produced to introduce the bio-based pop-up stores.
- Disseminate the handbook on regional and local bio-based economies to visitors of the store who may be decision makers, investors, farmers, foresters, land owners, small bioeconomy industries, science and academia, and the civil society (Task 2.3)

Each pop-up store will be staffed with people who speak the respective language and who will be trained by BIOCOM staff to be able to explain the different innovations exhibited. These people will either come from the OIP partner institutions or be recruited by BIOCOM and the local OIP partner institution together. The BIOCOM team will be responsible for the overall concept, organising the innovative products as well as the explanatory and communication materials. Transport, build-up and dismantling will also be a BIOCOM task. However, all these processes will be closely accompanied and supported by the respective regional partners. Their input is crucial as they know the regional culture, language and channels to reach the people. They will set the suitable timeframe, organise the location and be in contact with the local service providers. Together with BIOCOM they will coordinate the promotion and coordinate the people staffing the store.

2.2 Design visualisation examples

The following pictures show examples of how bio-based pop-up stores can be implemented. BE-Rural bio-based pop-up stores will all be designed similarly, but still differ significantly as each location in the OIP will offer different possibilities and limitations.

Figure 2: Examples of bio-based pop-up stores



Source: Bikini Berlin, FoodBuzz Pop up Box



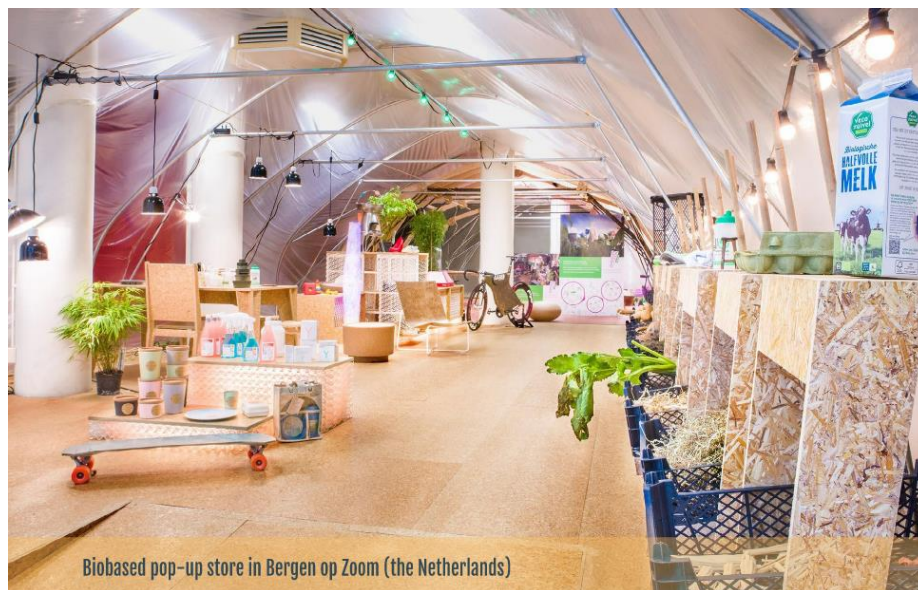
Source: Flickr / Normann Copenhagen / Normann Copenhagen Pop up shop /



Source: Amazon



Source: Wiebke Jann, Folkdays Pop-up store



Biobased pop-up store in Bergen op Zoom (the Netherlands)

Source: BioSTEP Guidelines for Practitioners 2017

2.3 Insights on the multimedia corner

The multimedia corner will be composed of literature, videos, games and apps. The various items will give insights into bioeconomy and explain the SDGs. Depending on the country where the store is build up, items in the corresponding language will be included and movies translated. Several options for this corner have been researched already and are presented in the following.

Literature options

- The Seaweed Cookbook: A Guide to Edible Seaweeds and How to Cook with Them (Caroline Warwick-Evans and Tim van Berkel, The Cornish Seaweed Company)
- The Insect Cookbook: Food for a Sustainable Planet (Arts and Traditions of the Table: Perspectives on Culinary History (Arnold Van Huis et al)
- Bioeconomy: Shaping the Transition to a Sustainable, Biobased Economy (Iris Lewandowski)
- Bioeconomy for Sustainable Development (Chetan Keswani) (published November 2019)
- Potential Ecodesign Requirements for Textiles and Furniture (Nordic Council of Ministers)
- Biofuels: Greenhouse Gas Mitigation and Global Warming: Next Generation Biofuels and Role of Biotechnology (Ashwani Kumar, Shinjiro Ogita, Yuan-Yeu Yau). (costs: 175Eur)
- The Sustainable City (Steven Cohen)
- Smart Cities, Smart Mobility: Transforming the Way We Live and Work (Lukas Neckermann)
- Natural Processes in Textile Art: From Rust Dyeing to Found Objects (Alice Fox)
- No.More.Plastic. What you can do to make a difference (Martin Dorey)
- The Best Veggie Burgers on the Planet, revised and updated: More than 100 Plant-Based Recipes for Vegan Burgers, Fries and More
- The Future of Fashion (Tyler Little)
- Legacy: The Sustainable Development Goals in Action (52 authors)
- The Sustainable Development Goals (United Nations Publications)
- In Latvian: LSFRI Silava info materials (LV printed and online pdf.) : <http://www.silava.lv/produkti/faktu-lapas.aspx>
- In Latvian: Bio-economics for schools (LSF book for school teachers) https://www.lvm.lv/images/lvm/lvm_bioekonomika_skolas_web.pdf
- In Latvian: Handbook on Sustainable Short Rotation Coppice
- In Macedonian: <http://ldastruga.org/pdf/Biomass-MK.pdf>, <http://www.ceprosard.org.mk/mk/PDF/Biomasa%20MK%20za%20pecat.pdf>, http://dobrazemja.org/wp-content/uploads/2015/02/Manual-Beginners_MK.pdf, http://www.ceprosard.org.mk/mk/PDF/wool_brosura_cela.pdf, http://www.gefsgpmacedonia.org.mk/dokumenti/letok_%D0%B0mbrozija_biomasa.pdf (among others)

Film options (will all be translated to respective language – subtitles)

- Vegan meat: <https://biooekonomie.de/video/veganes-fleisch> (SDG2)
- New active substances from the sea: <https://biooekonomie.de/video/neue-wirkstoffe-aus-dem-meer> (SDG14)
- Enzyme: <https://biooekonomie.de/video/enzyme>
- Aquaponics: <https://biooekonomie.de/video/aquaponik>
- Green concrete from Africa: <https://biooekonomie.de/video/gruener-beton-aus-afrika>
- In Latvian: Plant the future (Iestādi savu nākotni) <https://youtu.be/n8eNZYjNzIQ>

- In Latvian: Wood -safe, healthy and environmentally friendly material (Koks - videi un veselībai drošs materiāls! LV) <https://youtu.be/hV4IMnxbbq0>
- In Latvian: Wood wool for handcraft: <https://youtu.be/snqzVoBNNfI> and as industrial product: <https://klasmann-deilmann.com/lv/videos/klasmann-deilmann-greenfibre/>
- In Latvian: Videos about forest management – <http://www.mezsaimnieks.lv/video/>
- In Macedonian: <https://www.youtube.com/watch?v=ZV9YH7hTtMc>,
<https://www.youtube.com/watch?v=sdcpA8cPK4> ,
<https://www.youtube.com/watch?v=2Anj65Zzu1Y> ,
<https://www.youtube.com/watch?v=xWXUYfsStlo>

Courses

- <https://unccelearn.org/course/view.php?id=56&page=overview>

Game options

- Bioways/BioSTEP: Bio...What? <http://www.fvaweb.eu/biowhat/>
- BIO Challenge: <http://www.fvaweb.eu/biochallenge/>
- In Latvian: Game about forest management Mežotājs

Apps

- Bio Whaaat? AR version: <http://www.bioways.eu/bio-learn/serious-games>
- PlanetNet Plant Identification - PI@ntNet is an application that allows you to identify plants simply by photographing them with your smartphone.
- Bioeconomics 2050: Bioeconomics 2050 is a virtual reality visualization of an environment based on materials and products made from renewable resources, to make the ideas more tangible. Bioeconomics 2050 is all about opportunities, not problems, difficulties or obstacles.
- Sustainable Development Goals (United Cities and Local Governments): <https://play.google.com/store/apps/details?id=org.uclg.sdgs>
- SDG Game (Social Finance & SDG Foundation): <https://play.google.com/store/apps/details?id=com.sdgfoundation.sdggame>

Interactive websites

- Bio-based food packaging: <http://www.allthings.bio/pageflow/bio-based-food-packaging/>
- Bio-based insulation materials: <http://www.allthings.bio/pageflow/bio-based-insulation-materials/>
- Bio-based household cleaning products: <http://www.allthings.bio/pageflow/bio-based-household-cleaning-products/>
- Slide show with bio-based examples: <http://www.allthings.bio/pageflow/pageflow1/>
- In Latvian and English: Forest management cycle: <https://photos.app.goo.gl/unKZFtbqdakauupy6>

2.4 Insights on the selected products

Bio-based products to be displayed in the pop-up stores are still being researched. A preliminary list of potential products is available in the annex of this document. However, this list only provides a screenshot of the current effort and will be updated on a running basis.

2.5 Locations and Dates

The pop-up stores will be open – depending on the availability of the location – between one and two weeks. The timespan during which it is open will be clearly communicated to avoid that potential visitors think the shop is closed due to economic necessity, but that they are informed that it was a temporary project. The bio-based pop-up store will be set-up in or nearby the city centre or during regional events at suitable locations in order to be accessible for young and old people with different social backgrounds.

2.5.1 Vidzeme Innovation Week – Latvia

Date: 25 February – 1 March 2020

Location: Vidzeme Planning Region

The Innovation Week wants to show that innovation can be part of everyday life and is not only about technology or programming. It is a platform for new initiatives and goals with events taking place throughout the region over five days. It is targeted at employees, entrepreneurs and managers with the goal to encourage them to discover the innovation potential in their daily work.

Figure 3: Goals of the Vidzeme Innovation Week (text taken from the event website)

“To Dare”	“Know How”	“To Do”
Innovation can be present in any company, farm, and even public administration. Everything starts with a desire to change. And no matter who you are – an employee, an entrepreneur, auxiliary worker, an idea generator or a researcher. Be brave and look around! See and evaluate what opportunities are there for you!“	Innovation is not just high-tech solutions, and it can be affordable for everyone. The resource that is at your disposal hides more value than you would initially expect. Just look at it from a different angle. Sometimes the invented wheel stands just behind the corner – take it as a basis and proceed!“	Crowded conferences and seminars are not rare. But how much of what we have heard we have also tried to incorporate into our daily lives? What matters to us is doing. There are no borders, neither for opportunities nor for innovation. Get started!“

2.5.2 Rose Festival – Bulgaria

Date: 31 May – 2 June 2020

Location: Kazanlak

Since 1903, the festival celebrates the importance of the Rosa Damascena to the region – the Bulgarian oil-bearing rose. During the two month of May and June, cultural, dance, music, artistic and social events happen across Kazanlak and the surrounding villages. Concerts, workshops, exhibitions and parades are organised during these time and culminating at the end of May/beginning of June. Kazanlak is located in the heart of Bulgaria – 200 km away from both Sofia and Burgas. The festival attracts many people from other regions and countries.

2.5.3 Strumica Open Festival – North Macedonia

Date: 2020 and 2021 (probably July and August)

Location: Strumica

– Whether the pop-up store will be organised during this event is still being discussed –

The Strumica Open Festival is popular beyond Macedonia. It usually has a two-week program comprised of theatre, film, art, comedy, folklore, music, photography, workshops, trainings and so on. The events at the “Strumica Open Fest” will take place in several locations of the town.

2.5.4 St George's Day – Romania

Date: April 2021

Location: Sfântu Gheorghe

– Whether the pop-up store will be organised during this event is still being discussed –

Every year on April 23 the Romanians celebrate Saint George (Sfantul Gheorghe in Romanian). Saint George is one of the most important saints in the Orthodox calendar. On this day, the Romanians decorate their houses to celebrate nature.

2.5.5 Event under discussion – Poland

Date: n/a

Location: n/a

– Whether the pop-up store will be organised during one of these events is still being discussed –

SZCZECIN Lagoon: The Slavs and Vikings fest is a 3-4 days event with numerous workshops organized 2 weeks prior to it. Stepnica Days are more of a local fest focused on the Lagoon Area.

VISTULA Lagoon: Every month there is a regatta in Lagoon waters, where many people from the region and beyond come together. Possible events in this area alongside which the pop-up store could be organised are the Fisherman Days or Tolkmicko Days.

2.6 Events in Pop-up Stores

Several public events will be organised inside the bio-based pop-up stores. Each region has different natural resources. Consequently, each event will be tailored to the specific characteristics of the region. In Task 2.5 of the BE-Rural project, the bioeconomy potential of the OIP regions has been analysed. This analysis will form one basis for the selection and preparation of (at least) two events of the “toolbox” below to take place inside the regional pop-up store. In a webinar, all OIP facilitators will be informed in depth about the different options. In a Q&A session following the presentation, it will be discussed which event type fits best the local conditions and cultural preferences.

- **Bridging the gap – Interactive Workshop:** To bridge the education and information gap on key issues related to sustainability, participants are first guided around the pop-up stores to discuss – after a brief input presentation – the link between the SDGs and the bioeconomy. The results of WP2 will be presented by the project team in short pitches to inform about new technology options for bio-based economies and best practices as well as potential business models. Goal of this event: initiate a multi-stakeholder gathering to inform, but also to discuss (regional) sustainability issues.
- **Taste the future of the bioeconomy –** A lunch event in which an entire menu will be served in the spirit of the bioeconomy. Conceivable would be an algae-based pre-dish, an insect-burger as main dish and lupine ice-cream for desert. All served on biodegradable plates, of course. Goal of this event: taste the bioeconomy!
- **Do it yourself – bio-based edition:** Lots of bio-based fabrics are on the market already. One example is a fabric made from the residues of citrus, another one is made from the Casein from milk that cannot be used for consumption anymore. Wood is another raw material that has come to the attention of designers. Come and sew your own scarf or do your own bio-based art. This event is designed as a workshop and open for everyone after registration (limited number of participants).
- **Meet an entrepreneur:** Pop-up stores are interesting meeting hubs for a variety of actors. In “Meet an entrepreneur”, several entrepreneurs (from the region or – if those don't exist – from the country) are invited to present how they came across the idea for their bio-based innovation,

what hurdles they faced and where they see major opportunities for more bioeconomy in the regional and local communities.

- Your vision of the region – World Café: Event starts with 5-minute pitches by different stakeholders: someone from the regional government representative, one entrepreneur, a university representative and a non-governmental institution on the concrete bioeconomy potential of the region. Then the audience is divided into several working groups to reflect upon the input, formulate own ideas and visions. These are then clustered on a poster and presented in a 5-minute pitch. These posters will be displayed in the pop-up store.
- Open Space Learning: Prior to the pop-up stores teachers from the local schools are contacted and invited to organise a session on sustainable bioeconomy/bioeconomy in the context of the Sustainable Development Goals. The localities will be chosen as to allow an open-space learning approach. The project consortium will support the teachers (if wanted) with multimedia movies about aspects of the bioeconomy that can serve as starting point for a discussion. The session will be open to the ideas of the students and develop from there.

3 Promotion of the store

Prior to each pop-up store, a communication strategy is worked out together with the regional partner and fitting to the regional circumstances. The shops will be promoted via local multipliers offline and online. For the online communication, a hashtag will be identified at an early stage and translated and used in all OIP languages.

4 Evaluation

Template for feedback survey to be disseminated at BE-Rural pop-up store.

Broad engagement is at the centre of BE-Rural. Citizens, teachers and students will be involved in the strategy development process through innovative formats such as bio-based pop-up stores, educational seminars, summer schools or webinars. This survey will help us to better evaluate the bio-based pop-up stores and regional opportunities.

1. General information

- a. What is your home country and region?
- b. What is your age?
- c. Were you familiar with the concept of bioeconomy before visiting the bio-based pop-up store?

2. Bio-based pop-up stores

- a. What brought you to the bioeconomy pop-up store today?

- b. On a scale from 1 to 5 (where 1 is 'my knowledge has not increased' and 5 'my knowledge has definitively increased') – has the visit today helped you to gain a better understanding of what bioeconomy is?

1	2	3	4	5

- c. What did you find most interesting and what is your key take-home message?
- d. After having visited the pop-up store, do you think any of the products exhibited could appeal to people from your region/country?
- e. What resources is your region rich in?
- f. What could be a bio-based product from your region based on these resources?
- g. Can you think of emerging sustainability challenges if your region would become 100% bio-based?

3. Engagement opportunities

- a. Would you like to register for our newsletter to receive updates on BE-Rural work?
- b. Would you be willing to revise the strategy document on bioeconomy for your region and provide input?

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5 Annex: List of bio-based products

The attached overviews gives insights into what products have been researched already. It is not a final product list for the bio-based pop-up stores in the regions. New innovations are scouted for on a running basis. The final list of products will be available in early January 2020.

Figure 4: Overview of bio-based products

Product	Raw material	Company	Product description	Country	Website
Clothes	Linen	Jan n June	"There are a lot of ecological and social advantages in the cultivation of organic linen. For example the use of chemical fungicides and insecticides is not allowed. The use of mineral fertilizers is not allowed. Dressed seeds are not allowed. Also, five to seven percent more seeds have to be put out in order to balance the loss trough insect damage. All these aspects are a plus for the soil, the farmer but also us, the consumer, since no yucky stuff gets on our skin."	Poland/GER (production in Poland, roots in Poland)	https://iannjune.com/portfolio-item/organic-linen/
Clothes	Recycled cotton	Jan n June	"In contrary to polyester or polyamide, cotton is recycled mechanically. The process is more difficult and the recycled product lacks in quality compared to virgin cotton yarns. Therefore a fabric can never be 100% recycled cotton. It always needs new cotton yarns to ensure high quality and long lasting fabrics. At JAN 'N JUNE we use recycled cotton for scarves and sweaters."	Poland/GER (production in Poland, roots in Poland)	https://iannjune.com/portfolio-item/recycled-cotton/
Clothes	Wood	Jan n June	"Tencel is produced from sustainably sources wood by environmentally responsible processes"	Poland/GER (production in Poland, roots in Poland)	
Tbd	Rapeseed leftover	Napiferyn Biotech	"NapiFeryn BioTech developed and patented a technology to obtain food grade proteins from the material left over after pressing oil from rapeseed. The rapeseed proteins are characterised with highly qualitative and functional properties which makes them an ideal food ingredient."	Poland	https://www.eitfood.eu/startups/startup/napiferyn

Dishes	Wheat bran	BioTREM	"Biotrem's disposable products, made from wheat bran, are an excellent alternative to any disposable tableware, i.e. made from paper or plastic, which production and utilisation is burdensome to the environment. Our production process does not require significant amounts of water, or mineral resources, or chemical compounds. From 1 ton of pure, edible wheat bran we can produce up to 10,000 units of plates or bowls. What's more important, our products are fully biodegradable – through composting – in just 30 days!"	Poland	http://biotrem.pl/en/
Packaging	Biowaste	Makegrowlab	SCOBYPackaging is weaved through a biological process that turns bio-waste into bio-material	Poland	https://www.makegrowlab.com/
Cosmetics	Natural collagen from skins of freshwater and saltwater fish	Best-Life Biotechnology Sp. z o.o./ Baltic Collagen	Best-Life Biotechnology is a company which manufactures a professional line of collagen cosmetics based on natural collagen – made of top quality ecological material (skins of freshwater and saltwater fish). The development of know-how enabled us to introduce an exclusive line of cosmetics (BALTIC COLLAGEN) designed as anti-aging treatment for the skin.	Poland	http://www.balticcollagen.pl/
Accessories	Fish skin	Laks by Lisa	Items made from fish skin	Poland	https://www.polishcosmetics.pl/en/company/best-life-biotechnology-sp-z-o-o- o// http://www.balticcollagen.pl/
Protein feed	Organic food waste	nasekomo	Develop an efficient and sustainable system that converts organic food waste into insect biomass, which is in turn made into a protein feed alternative for aquaculture and livestock.	Bulgaria	http://www.nasekomo.life/#partner
Packaging	Organic waste	greenwaybg	Usual waste bag	Bulgaria	http://www.greenwaybg.com/en/products/bio-shoppers-and-biodegradable-bags-for-organic-wastes.html

Yoghurt	Lactic acid	alteyaorganics	Lactic acid has been found in yogurt. The interest in lactic acid has many aspects. In addition, this chemical is GRAS (commonly recognized as safe) It can alternatively be produced by fermentation or chemical synthesis and can utilize a wide variety of different waste materials as substrates. Lactic acid has many uses. In skin care, it helps to remove dead cells from the top layer of skin. Lactic acid is used to retain moisture to form a thin oily layer, thus locking the water into the epidermis.	Bulgaria	https://www.alteyaorganics.bg/shop
Daily cream	Snail extract and rose	Damascena	Intensive day cream that aids in cell renewal and rejuvenation and strengthens connective tissue, thanks to the unique natural complex of natural Bulgarian rose oil, Rose absolute and 100% snail extract.	Bulgaria	https://www.damascena.net/produkt/dneven-krem-za-lice-s-ekstrakt-ot-ohlivi/
Fresh algae	Spirulina	Algae Bulgaria	Spirulina is a microscopic blue-green algae with millions of years of history. Spirulina is naturally rich in protein, vitamins, unique antioxidants, minerals and all other essential amino acids that can only occur in food. It is known that there are various forms - spiral tablets, spirulina capsules and spirulina powder. The company offers another form, namely fresh spirulina.	Bulgaria	https://spirulina.bg/
Food supplement for diabetes and obesity prevention	Klinovital: extract of a Clinopodium vulgare ("cat step") plant,	InoBioTech	It contains an innovative standardized extract of a Clinopodium vulgare ("cat step") plant, and retains its bioactive components, as well as concentrated juices from the special grape Mavrud and aronia, with preserved biological activity.	Bulgaria	https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/InterReg/TO-P-bio-zasnovani-izdelki-v-Podonavju.pdf
Rose oil	Roses	Phytocode Ltd, Burgas	Cosmetic line based on Bulgarian Rose Oil	Bulgaria	https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/InterReg/TO-P-bio-zasnovani-izdelki-v-Podonavju.pdf

Healthy drink Ho-Fi	sodium chlorophyllin	biolat	<i>Coniferous sodium chlorophyllin is a concentrate of chlorophyll derivatives obtained from coniferous (mainly SPRUCE) extracts. It contains water-soluble chlorophyll derivatives (chlorines, feophitins, feoforbides), coniferous paraffinic acids and fatty acids sodium salts and other compounds. Sodium chlorophyll stimulates the body's overall immunity. Studies have shown anti-oxidant, anti-inflammatory and antiviral effects.</i>	Latvia	
Table game	Willow wood	EcoMark	Tic Tac Toe is an old and simple game, which requires strategic thinking. It is made from willow wood	Latvia	http://ecomark.lv/en/tic-tac-toe.html
Board game	Willow wood	EcoMark	Checkers made of willow wood	Latvia	http://ecomark.lv/en/checkers.html
Composite material from natural fibre	Vegetable fibre (hemp, jute, coconut, willow fibre, etc.) and thermoplastic fibre	SC Taparo SA	The composite material is based on two types of fibre: vegetable fibre (hemp, jute, coconut, willow fibre, etc.) as well as thermoplastic fibre that binds the vegetable fibre and provides the finished product with resistance. The main advantages of this composite material are:- Recyclability and a very good mechanical strength, which can be enlarged and reshaped, it can be thermofixed in the final form of a structure (material + work-manship in one phase, generating a lower cost of the resistance structure compared to classical materials);- It reduces the wood usage by using the perennial plant fibres (wood 80-100 years, increase 3 tons / year, annual fibre 6-10 tons per year);- The superior capitalization of agricultural or less fertile land;- Reducing the transport price of the raw material because the weight per square meter of the composite is lower than the classical structure;- Reducing pollution by reducing transport;- By using other consolidation methods, it significantly reduces the amount of plastic used and implicitly the consumption of hydrocarbons.	Romania	https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/InterReg/TO-P-bio-zasnovani-izdelki-v-Podonavju.pdf

Edible packaging films for food packaging	Beeswax, coconut oil and sunflower oil	?	The lipid nucleus coating extends the shelf life of strawberries. The research is done by 13 daily monitoring of strawberries. For the experiment three types of strawberries have been used: regular strawberries, strawberries with PVC film and strawberries with lipid shell. Lipid edible shell is made of beeswax, coconut oil and sunflower oil. Researchers were tracking the change of color, mass, and vitamin C concentration in each group of strawberries. Strawberries coated with lipid edible packaging film showed better results than PVC film strawberries and regular strawberries. Lipid sheath in fact by retaining moisture in the strawberries and preserving vitamin C contributes to the extension of the shelf life of strawberries. This kind of packaging is better choice for storing food than PVC films, because they are biodegradable and do not affect the growth of packaging waste.	North Macedonia	http://www.fzhn.ukim.edu.mk/jafes/VOL%2065_2015/Trudovi_PDF/053%20Dijana_Milosavieva_19_27.pdf
Wild chestnut laundry detergent	Wild chestnut	Dobrazemja	The leaf and the fruit of the wild chestnut contain saponins which make them suitable for replacing chemical washing detergents. Once the chestnuts are blended (or soaked in water), a bowl is filled with water, chestnuts are added and left overnight (or if watered, chestnuts can be used after 30 minutes). Then the liquid from the jar is drained and ready to be used. The same liquid can also be used as a natural hair shampoo. Essential oil can be added for better odor.	North Macedonia	http://dobrazemja.org/mk/sredstvo-za-alishta-od-div-kosten/
Reed briquettes	Reed	Apla	The project "Less Waste 2" will be implement in the next two years through the IPA Cross-Border Cooperation Program between the Municipality of Resen and three Greek municipalities. The project deals with management and treatment of organic waste, composting and sustainable use of the reed in the Nature Park "Ezerani", from which briquettes will be produced. The project will carry out researches on food waste in households and catering facilities, waste collection methods and bio-waste public awareness. An action plan and study for sustainable use of reeds in Ezerani will also be developed, followed by procurement of reed and grass water harvesting machinery, organic waste collection containers and briquette production equipment.	North Macedonia	https://apla.mk/index.php/denes/item/2282-resen-i-ushte-tri-grchki-opshtinikje-proizveduvaat-briketi-od-trska

Soaps from: cold pressed flaxseed/pumpkin/sesame/black cumin chia seeds oil	Flax, pumpkin, sesame, black cumin, chia seeds	Filla	These soaps are all natural, handmade, vegan friendly, made from various cold pressed oils. Cold pressed oil is a type of fresh juice squeezed from the seeds of particular plants, containing their natural nutrients. It is an unrefined and lacks heat treatment rich in essential fatty acids, vitamins soluble in oil, lecithin, phytosterols and minerals valuable for people's health. The seeds are processed by using a technology for cold seed pressing which means that the oil is mechanically pressed on a low temperature. As a result of the essential fatty acids present in flaxseed oil, the flaxseed soap will provide better skin care, regenerate and soothe.	North Macedonia	http://filla.com.mk/en/sapuni/
Packaging	sugar, corn starch, cooking oil	crafting plastics! Studio	Using the patented Nonoil® technology, NUATAN is made of 100% plant-based biopolymers Polylactic acid (PLA) and Polyhydroxybutyrate (PHB) produced out of plant-based resources such as corn starch, potato starch, used cooking among others. NUATAN is one of the first fully biobased and biodegradable materials that can be considered as a competitor to oil-based plastics in terms of properties and processability.	Slovenia	https://www.craftingplastics.com/nuatan
Plant pot	protein-rich discarded foods, e.g. beans, rice husk	Evegreen, Eva Štraser s.p.	With our sustainable plants pots you don't need to worry about contaminating your soil with plastic. In fact, you don't even need to worry about adding too much fertilizer because Evegreen rice husk pots break down as organic fertilizer.	Slovenia	http://www.bioplasticpot.com/
Material Cutlery and Container	Bioplastic containers for packaging of vitamin products, drugs, cosmetics, etc	KM-SYSTÉM, s.r.o.	Currently, the company is working together with the Slovak University of Technology in Bratislava, with the Faculty of Chemical and Food Technology as testing partner for their newly developed Bio-based PLA material for injection moulding technology.	Slovakia	https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/InterReg/TOP-bio-zasnovani-izdelki-v-Podonavju.pdf

Cream	Hemp	Balcann Ointmen	Organic Balcann hemp ointment, with a high content of Omega 3-6 unsaturated fatty acids and a unique combi-nation of botanicals, effectively nourishes and soothes the skin.	Czech Republic	https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/InterReg/TO P-bio-zasnovani-izdelki-v-Podonavju.pdf
Ceramic	Industrial metal waste for colour pigments	Ignorance is bliss - Agne Kucerenkaite	ceramic tiles, which are colored using 100% pigment derived from industrial metal waste.	Estonia	https://www.agne-k.com/sl
Tomato-peel based bio-lacquer for metal cans	By-product of industrial tomato processing (mainly skins)	TomaPaint srl	If in an initial phase of production, at least 4 000 tonnes/year of standard lacquer can be replaced with lacquer derived from tomato, this will enable a reduction of CO2 eq emissions of 2 tonnes/year. Considering that 650 000 tonnes of metal packaging are used in Italy every year, the emissions reduction could be impressive, i.e. some 1 million kg of CO2 eq/year.	Italy	
Toilet paper	Bacteria	Sofidel	The cleaning power of natural bacteria that live on the skin can be used in domestic toilets: they can break down the most diverse organic matter. The Italian company Sofidel has launched a bioactive toilet paper that uses this technology. When it comes into contact with water, the spores germinate, multiply and clean deposits from the sewage pipes. Sofidel's bio-active toilet paper is coated with spores from the bacterial species Bacillus subtilis. The bacteria are sprayed onto the inner sides of adjacent layers of paper and only release their special cleaning effect in the sewage pipes when the toilet paper comes into contact with water. Because the pulp structures are loosened from the paper, the bioactive toilet paper protects the sewage system at the same time.	Italy	
Boards	Gras	Biowert	In our worldwide unique biorefinery we process meadow grass into green electricity and innovative materials. We produce plastics, insulating materials and fertilizers in a resource-conserving recycling economy - urgently needed, environmentally friendly alternatives to conventional products.	Germany	https://biowert.com/

<i>Sneaker</i>	<i>red pepper, mushrooms, coffee, roses, grass/hay, milk, moss, leaves, stone and wood</i>	<i>nat-2</i>	<i>nat-2™ is using highly innovative natural resource materials such as real certified sustainable wood, real stone, real hayfield, real natural rubber, veggie-tanned leathers, real grass for its products as well as recycling materials such as real corn, coffee grounds, beans and plants, milk, PET bottles, glass, wine corks, leather leftovers, eco-cotton, pineapple fibers, etc.</i>	Germany	https://coilex.com/
handbags	Residues from apple industry	NUUWAÏ UG	Our basic material APPLESKIN consists of 50% remnants of the apple industry, which are dried and then ground to a fine apple powder. The powder is then mixed to 50% with PU (polyurethane) and applied to a tear-resistant roll with cotton fabric. The rolls are then heated for their weather resistance and resistance and finally marked with our surface structure. This shows our APPLESKIN is made from 50% apple remnants through an upcycling process. In addition, our APPLESKIN Oeko-Tex Standard 100 is certified.	Germany	
Clothes	Algae	GREY Fashion Berlin	Vitadylan™ is made in the same innovative and environmentally friendly way as lyocell. Our raw material supplier's nature-based production method virtually goes full circle, meeting the highest standards in terms of sustainability and quality. Our secret and patented procedure is used to weave the algae and the zinc directly into the cellulose fiber. So you feel the benefit of the fabric, even after several washes. The algae used in GREY's patented Vitadylan™ material come exclusively from the unique ecosystem of the fjords of Iceland. The algae are harvested in an environmentally friendly and sustainable selection process in which only the part above the algae's regenerative region is cropped, to promote regrowth. The algae are left fully untreated to preserve their biological value.	Germany	
Leather	fish skin	nanai	Sells fish leather to designers – potentially suitable for "make your own bioeconomy product"?	Germany	https://www.salmo-leather.de/de/impressum/

Coffee Cup	Old coffee residues	Kaffeeform	Kaffeeform is an innovative and sustainable material from used coffee grounds and renewable resources. As a coffee cup it comes into its own to perfection - currently our range includes cups in different sizes for espresso, cappuccino and latte coffee as well as the award-winning WEDUCER take-away cup. The cups are very durable, light, and have a mild smell of coffee.	Germany	
Tiles from rubble	Rubble	Shards	The tiles are new materials from old materials - more precisely from bricks and waste glass from building rubble. Depending on the type of brick, the proportion of glass and the temperature curve, tiles of different colours, haptics and properties can be obtained.	Germany	https://www.goethe.de/re/sources/files/pdf152/de_dokumentation-recycling-deutsch.pdf
Spoon for icecream	Fasern der Kakaoschale	Spoontainable	Fasern der Kakaoschale, die als Reststoff in der Lebensmittelverarbeitung zurück bleiben, bilden die Basis unseres Löffels	Germany	https://spoontainable.com/
Gras paper	Gras	Apomore	Graspaper	Germany	
Food / drink	Algae/sea things	pureraw	Food with different ingredients	Germany	https://www.pureraw.de/Algen-Meeresgemuese
Chocolate	Algae	Algenheld	Algae chocolate	Germany	https://www.algenheld.de/
Burger	Insects	Bugfoundation	Burger made from insects	Germany	https://www.bugfoundation.com/locations.html
Burger	Plants	Incredible Burger		Germany	REWE
Bag	Olive leaves	Ackermann	Tanning agents based on heavy metal salts such as chromium (III) sulphate are usually used in the industrial production of leather. Olive leaves are a natural and environmentally friendly alternative. They contain secondary compounds which the plants use as a pest defence. This forms the basis for a biodegradable tanning agent. It not only protects the environment but also makes the leather extremely skin-friendly.	Germany	

Clothing	Milk protein	Calida/Qmilk	Milk is a popular food product, but not all milk proteins are actually used. Every year, millions of tonnes of milk are accrued, which cannot be used for consumption. Two companies have started to use the milk protein Casein for the production of textile fibres and clothing such as dresses or underwear. These are silky to the touch, naturally antibacterial and can be easily dyed. It has long been known that Casein can be spun into fibres.	Germany	
Pencil	Pasture	Biowert	You wouldn't expect it when looking at the delicate stalks, but meadow grass contains a number of nutrients and is held upright by its robust fibres. A Hessian company uses these features for an innovative production cycle. The procedure is that of a 'green biorefinery', in which wet, fibrous biomass is separated into a liquid phase and a solid phase. Subsequently, the fibres are mixed with bio or recycled plastic at a ratio of 3 to 1.	Germany	
Coffee Cup	Coffee grounds	Kaffeeform	According to the European Coffee Federation, Europeans consume 2.5 million tonnes of coffee per year in around 725 million cups of coffee. Coffee is a luxury product and has a high value, but in the end only little of it is used. Nearly 80% of the coffee bean is left behind as residue.	Germany	
Detergent	Enzymes	Ecover/Persil	Manufacturers of cleaning products such as detergents have been using the power of enzymes for many years. The biocatalysts accelerate biological processes and are active even at low temperatures. There are several classes of enzymes. Some remove dirt particles, while others work by preventing the fabrics from pilling. The use of enzymes means that less detergent and energy are required. Industrial enzymes for cleaning products and detergents have the biggest market share.	Germany	
Wall plugs	Ricinus communis	Fischer/Hellerman nTyton	Wall plugs and cable ties are made from highly robust and resistant plastics such as nylon. A German construction company relies on a polymer that is partly based on castor oil as a raw material. The oil is extracted from the seeds of the castor oil plant <i>Ricinus communis</i> , which belongs to the spurge plant genus.	Germany	

Rust remover	Bacteria	ASA Spezialenzyme	In nature, there is a mechanism to eliminate rust. Rust is simply atoms of iron which have reacted with oxygen. And then there are some microorganisms, such as bacteria, that eat iron. In order to obtain this important element, the bacteria produce siderophores, protein molecules that can trap iron atoms and incorporate them into their structure. Which is why siderophores are used as biodegradable rust removers. In order to use siderophores to remove rust, a company has developed a procedure that uses the bacteria of the species <i>Streptomyces olivaceus</i> .	Germany	
Brick	Bacteria	BioMASON	What about saving CO2 emissions by 'growing' a brick instead of firing it! After all, more than a trillion bricks are produced worldwide every year – releasing 800 million tonnes of CO2 into the atmosphere annually. bioMASON employs bacteria to 'grow' a durable cement. At the start of the procedure, sand is packed into rectangular moulds. Afterwards, bacteria (<i>Sporosarcina pasteurii</i>) are added, which wrap themselves around the grains of sand. Calcium carbonate crystals begin to form around the grains while an irrigation system feeds nutrient-rich water. The crystals grow larger and after three to five days, they are ready for use. This process was inspired by corals, which grow in all kind of formations and can withstand water and erosion.	Germany	
Straw	Apple residues	Wisefood	Straw, 100% compostable	Germany	
Nail polisher	algae	Ocean pharma	durch den enthaltenen Mikroalgenwirkstoff Spiralin® ist skinicer® oxyperm zusätzlich antimikrobiell schützend und pflegend, die Nägel werden nebenbei intensiv geschützt und regeneriert.		

Clothes	chestnuts, fungi and algae, nettles, brassicas	VIN+OMI	We are focussing on organic plants and naturally occurring components to make a range of plant based leathers and fabrics. We are working and experimenting with a wide range of raw materials including: Chestnuts, Fungi and Algae, Nettles, Brassicas and byproducts of the food industry. The raw material is readily available in the UK, has minimal impact on the environment, is sustainable, organically produced and has a low carbon footprint from source to production of finished textile and garment / accessories.	UK	http://www.vinandomi.com/eco-innovation/4594289755
Leather	By-product of pineapple harvest	Ananas Anam	Piñatex® is an innovative natural textile made from pineapple leaf fibre. The leaves are the byproduct of existing agriculture, and their use creates an additional income stream for farming communities. Piñatex® is a natural, sustainably-sourced, cruelty free material.	UK	https://www.ananas-anam.com/about-us/
Shoes	Algae	Quoc (made from bloom algae)		UK	https://quoc.cc/collections/weekend/products/week-end-olive
"Bottle", capsule	Seaweed	Skipping Rocks Lab Ltd.	Ooho is a flexible packaging for beverages and sauces. It's made from Notpla, our material combining seaweed and plants. Ooho biodegrades in 4-6 weeks, or you can just eat it, making it ideal for on the go consumption.	UK	https://www.notpla.com/products/
Teabags without plastic	plant-based	PG Tips	Most manufacturers currently use polypropylene to seal teabags - they say it strengthens them and stops them disintegrating in a cup. Unilever said the move to plant-based sealants was based on "cutting edge science and technology".	UK	
	cell-based meat	Higher Steaks	Cell-based meat has the potential to reduce CO2 emission and land and water usage	UK	
School uniform	Microorganisms	Marks & Spencers, Novozymes	Kids can be rough on their clothes, especially when they wear the same school uniform day in and day out. A British and a Danish company have developed schoolwear that is produced with a special enzyme technology that keeps the kids' uniforms looking like new longer. At the same time, the production process is more sustainable. The enzymes are produced by industrial microorganisms. As the enzymes are added during the textile bleaching and dying process, the whole industrial process saves water and reduces energy. The enzymes work as biocatalysts and help the fibres strengthen from the inside out, helping to eliminate fibre ends that can stick out from the surface	UK	

vegan salad cream	Aquafaba	Rubies in the rubble	Smooth and creamy mayo made with aquafaba as a substitute for eggs so that vegans can enjoy it too! Aquafaba is the protein-rich water left over from cooking chickpeas which would normally be thrown away.	UK	
Packaging	Mushrooms	Espresso Mushroom Company	Growing mushrooms on coffee compound	UK	
Shoes	Algae	Vivobarefoot: Ultra 3 Bloom		UK	
Edible straws	sugar, water, maize starch and gelatin; flour and water	EcoStraws Ltd	<p>Firstly, a specialist team in Spain developed the Sorbos edible straws. We have produced them using sugar, water, maize starch and gelatin. Each straw contains just 23 calories, and currently there are 5 flavours available. On developing the Sorbos edible straws, we placed emphasis on the correct rigidity, durability and stability, without either the colour or flavouring of the straws tainting the drink. The result is an EcoStraw which does not dissolve in the drink and stays in its original form for up to 50 minutes. The straw acts like a sponge and absorbs the taste of the drink. Once our clients finish the drink, they can then eat the straw, enjoying the taste.</p> <p>Our second edible range of straws is the Pasta Straw. It holds its strength and shape in cold drinks plus it will decompose virtually overnight after being discarded.</p>	Ireland	
Leather	fish skin	Atlantic Leather	Atlantic Leather is an Icelandic tannery leading in manufacturing exotic leather from fishskin. The fishleather is produced from four different species of fish; Salmon, perch, wolffish and cod – each with its own unique characteristics - in a diverse range of colours, textures and finishes. The development of the fish leather has been in process since 1994, but the idea itself is rooted in tradition whereas centuries ago Icelanders wore shoes made of wolffish skin. Atlantic Leather is the only company in the world that makes wolffish leather, and it is also the only tannery in the world that has successfully developed a way to make washable salmon leather. Being stronger than regular leather due to the alignment of fibers within the leather, it can serve purpose in everything from jewelry to handbag to panels.	Iceland	http://www.atlanticleather.is/thestory

Bags	Nylon from abandoned fishing nets	ECONYL®	Abandoned fishing nets, cast-off carpet, and other bits of discarded nylon are all grist for Aquafil's "magic box," which transforms waste on one end into ECONYL® fiber at the other. Besides creating healthier seas, Aquafil says that the production of every 10,000 tons of ECONYL® saves 70,000 barrels of crude oil and the equivalent of 62,900 tons of carbon dioxide. Even better, the fiber can be recycled almost infinitely without any decline or degradation in quality.	Italy	https://www.ssense.com/en-us/editorial/fashion/fabric-innovations-giving-us-hope
Dress	Orange residues, Tencel® Lyocell	H&M/Orange fiber	Orange Fiber in H&M conscious collection - buy soon already reduced!!	Italy	https://www2.hm.com/de_de/productpage.0754498001.html
Bag	100% Naturfaser-Filz aus MilCHFaser, Viscose	Waldegg-Taschen	The sustainable main material is absolutely innovative: a 100% natural fibre felt made of milk fibre, viscose & virgin wool provides a silk fibre feel. The material is dirt-repellent, antibacterial and therefore ideally suited for people who live with allergies. The Milky Study Bag is lined with a natural cotton-linen mixture.	Austria	office@waldegg-taschen.at
meat substitute	king oyster mushrooms	Neuburger Fleischlos GmbH	The basis for Hermann products are fresh king oyster mushrooms of our own breed. These are picked by hand, washed and cut into small pieces. Then they are prepared with rice, vegetable oil and a little protein from organic chicken eggs and seasoned. Everything else is expendable. Hermann dispenses with any additives, preservatives or aromas.	Austria	
Ice cream	Lupines	Vegavita	Plant based ice-cream with lupine proteins! Lupines are green multi-talents. As nitrogen fixers they are great fertilisers for German soil. In addition, their seeds are rich in protein, which is why they have come to the attention of food manufacturers as an alternative source of protein. Lupine seeds are usually very bitter-tasting due to their high alkaloid content, which is why blue sweet lupines came into play. In contrast to other types of lupine, they have a low content of bitter-tasting alkaloids. First, the lupine seeds are peeled and processed into paper-thin flakes. The flakes are then de-oiled and unwanted aromas are extracted. Only then do the experts isolate the proteins. The dairy-free product contains neither lactose nor gluten and is suitable for allergy sufferers.	Austria	
Textiles	Cellulose, waste streams	Spinnova	Spinnova represents a disruptive, ecological innovation that turns cellulose and waste streams into textile fibre simply, without dissolving or any harmful chemicals. Spinnova develops the most sustainable fibre in the world.	Finland	info@spinnova.fi

Straw	s100% biodegradable and microplastic-free.	Sulapac	We are introducing the marine biodegradable Sulapac straw made from non-toxic and sustainably sourced materials. The straw's renewable material content is maximized, and the straw is 100% biodegradable and microplastic-free. Sulapac straw complies with the European food contact material legislation. The material is a drop-in solution for plastic straw manufacturers and has been tested successfully with multiple production lines.	Finland	https://www.sulapac.com/sulapac-straw/
Bags	natural banana fibres: Bananatex®	QWSTION	Over the past three years we've developed Bananatex®, a sleek, waterproof fabric made from 100% natural Banana fibres. At once super strong and durable, yet light and flexible, the natural beeswax coating gives it a smooth, water-resistant finish and a supple hand feel. Given our ultimate aim of offering a viable alternative to the synthetic fabrics that currently dominate the bag industry, we've developed Bananatex® as an open source project, and want to encourage other brands to use it.	Switzerland	https://www.qwstion.com/uk/bananatex
Jacket, if possible petri dish... Jacket 68 x60 x20 depth, 4-5 petri dishes (12 x 12cm each)	Mushroom roots	MycOTEX	custom-made clothes made from compostable mushroom roots.	The Netherlands	https://neffa.nl/
Calendar	Agricultural residues	Paperwise	Paper produced from agricultural residues	The Netherlands	https://paperwise.eu/
Washing up liquid	Rapeseed oil/no fossil fuels	Ecover	The active chemical components in washing-up liquids and household cleaners are called surfactants and tensides. Conventionally, they are produced on the basis of oil chemistry. The Belgian company Ecover, which is known for its ecologically sound cleaning products, uses several natural resources as a basis for their tensides. Among others, these are plant-based ingredients such as rapeseed oil. The company has developed a bio-based manufacturing process, in which the yeast <i>Candida bombicula</i> plays a key role as mini-factory. The fungus was once isolated from bumblebees. In combination with glucose, it produces the desired biosurfactant product from the sustainable raw materials.	Belgium	

Face cream	Microorganisms	Korres	It's been known for decades that yeast extracts aid in wound healing. Researchers observed that, as a response to stress factors such as ultraviolet light, ozone or heat, yeast cells start to produce a set of protective molecules. Some of these natural agents have skin-firming properties, making them interesting candidates as components in face and body creams. Greek cosmetics firm Korres uses yeast cells as mini-factories.	Greece	
eco mil: Hemp Drink	Hemp	Ecomil	lactose-free milk	Spain	
Bio-Based Jacket		Tierra	Tina Tape yarn is 100% vegan, it is produced without harmful chemicals and water saving. This 0.5cm flat ribbon yarn is softer than silk and cooler than linen. Only the best of everything! Tina Tape yarn is mainly made from the fibers of sustainably grown eucalyptus trees using renewable energy.	Sweden	https://tierra.com/material-and-innovation/deterra-bio-based-jacket/
Nappy	use a film out of corn, rather than plastic, to prevent rashes.	Eco by Naty	Nature Babycare, often just called Naty, are eco-friendly diapers that are free of perfumes, chlorine, plastic, and any genetically modified organisms. Naty began in Sweden with the purpose of creating natural diapers made of renewable materials. The increased breathability helps to prevent diaper rashes	Sweden	
Algae bioereaktor	Algae	n/a	Algae can serve as a low-carbon energy source, as dye substances and they contain valuable nutrients for food and cosmetic products. They grow in salt or brackish water and can easily be cultivated in a bioreactor, circulating the water efficiently. Daylight, CO2 and some nutrients ensure rapid and productive growth, regardless of season and location. Algae store the energy from light in the form of carbohydrates through photosynthesis. The mixture of algae and water can be drained from the transparent tubes and is usually separated by centrifugation.	n/a	
Moss wall	moss	n/a	to be added	n/a	
Lamp	Algae		to be added		http://www.douenias.design/
Bioethanol	Straw	n/a	to be added	n/a	

Packaging	Seaweed	Evoware	Seaweed-based packagings are good for small-format food sachets and wraps, e.g. instant noodle seasoning, cereal, single serving coffee powder and the complements, rice wrap, burger wrap, etc. It can also be used to package the non-food based contents such as toothpicks, soap bars and sanitary pads. We collaborate with local seaweed farmers to provide best quality seaweed for our material that can give you many benefits. Our seaweed-based packaging's patent has been granted and we have received halal and safety guarantee certificate.	Indonesia	http://www.evoware.id//product/ebp
Sanitary napkins	locally sourced agriwastes	Aakar Innovations	Anandi, is India's first Govt. of India Lab certified 100% compostable, high quality sanitary napkin available in the low-cost market which provides women and girls in rural villages and urban slums a more environmentally sustainable solution. The use of sterilized, disposable sanitary napkins, such as Anandi, prevents infections, illnesses, the spread of diseases such as cervical cancer, and labor complications, all of which claim thousands of lives each year.	India	
Spray so that food stays fresh longer	Organic waste residues	Apeel Sciences	Apeel Sciences, ein Start-Up aus Kalifornien, hat ein essbares Schutzspray für empfindliche Früchte und Gemüse entwickelt. Es ist geschmacksneutral, kalorienarm und wird aus Resten der Lebensmittelprodukten wie Birnenstiele, Fruchtschalen, Kernen und vielem mehr gewonnen. Hauptbestandteil des essbaren Coatings sind Glycerinphosphatide die am Aufbau von Biomembranen höherer Pflanzen beteiligt sind. Diese pflanzlichen Lipide können in flüssiger oder fester Gestalt in Form von Fetten vorkommen. Aufgrund der Molekülstruktur sind die geruchs- und geschmacksneutralen Lipide wasserunlöslich und bieten einen dauerhaften Schutz vor Feuchtigkeit und Gasen, die den Reifungsprozess der empfindlichen Ware massiv beschleunigen.	US	https://apeelsciences.com/
Paper	Elephant dung/ Cellulose	EcoMaximus/Mr ElliePooh	to be added	Sri Lanka	
Brick	Bacteria	BioMASON	The process of growing bricks is similar to hydroponics- whereby units mixed with the microorganism are fed an aqueous solution to harden the bricks to specification. Traditional bricks are formed in brick units and then fired for hardening.bioMASON's process simply eliminates the need for firing by replacing the curing/hardening process with the formation of biologically controlled structural cement.	US	