



A Bioeconomy for Europe

Using resources from land and sea
for a post-petroleum economy

Thomas Arnold
DG RTD-F

**THINKFOREST FORUM ON
"BUILDING THE BIOECONOMY:
INSIGHTS FROM EUROPEAN STRATEGIES"**
Helsinki, 07/06/2016



EU Forests





EU Forests

- ✓ Forest and other wooded land: 42% of total EU land
- ✓ Forest-based industries provide 3.5 million jobs
- ✓ A lot of diversity across Europe

Welcome to the forest!



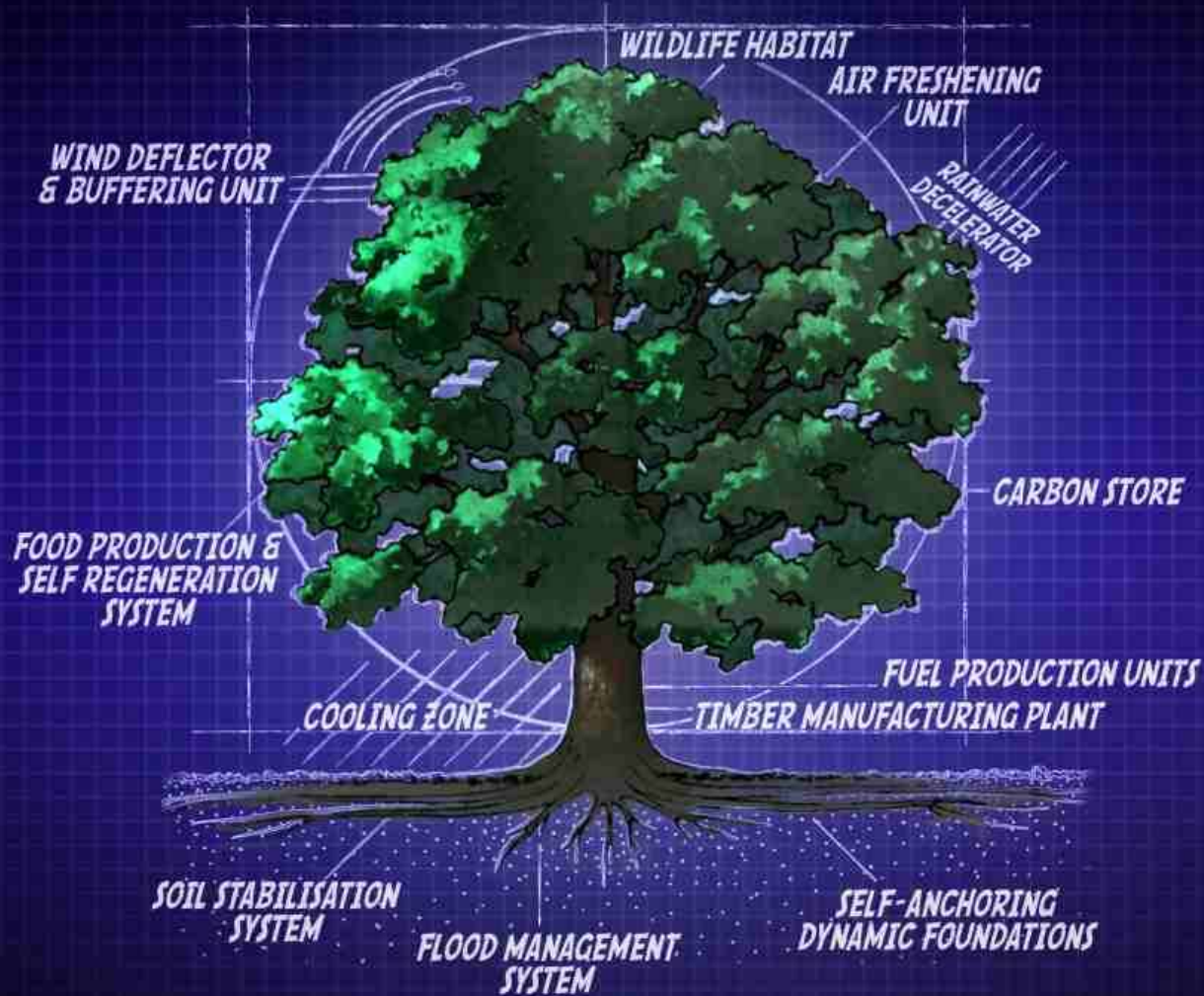
What do you see in the picture?



- Place for recreation?
- Biodiversity?
- Carbon sequestration?
- Carbon storage?
- Protection of soil and water?
- Wildlife?
- Wood for buildings, furniture or energy?
- Air quality?
- Quality of life?
- Mushrooms?
- Bear's garlic?

All of the above?

**We have demands,
they have solutions...**





Beyond Wood

The multiple services provided by Europe's forests

Policy conference

Brussels, European Commission, 23 May 2016

Looking
#BeyondWood

<http://ec.europa.eu/environment/forests/conference.htm>



“Wood remains the main source of financial revenue from forests and forest biomass represents the most important source of renewable energy in the EU. However, forests also provide a large range of other products, such as cork, resins, mushrooms, nuts, game or berries as well as ecosystem services whose value is increasingly recognised on the market.

***Taken altogether, the value of these forest ecosystem services is a multiple of the value of wood production alone,** and their contribution to employment, wealth and well-being is significant.*

*So far, the **only 'negative emissions' process that works at scale** and can be manipulated by humans is the carbon sink of land. “*

Vice-President Katainen



Recreation, tourism, hunting

*“Finland is a good example: timber and forestry are more important than for any other European country, given the extent of the country's forests. **But this does not mean that Finnish forests are to be treated as wood production facilities only.** The country's summer house culture and public access rights of forests have fostered in the Finnish people a close relationship with nature, its values and its processes. The start of the berry picking season around July is something most Finnish families are looking forward to.”*

Vice-President Katainen



New innovative products

*“So-called bio-based products, i.e. those from bio-refineries in which wood (or other) biomass is refined instead of fossil fuels, can replace many of their fossil-based counterparts. This applies not **only to low-value bio-fuels but moreover to higher-value bio-plastics, bio-textiles, bio-medicines, bio-cosmetics**”*

Vice-President Katainen



Sustainability

*“The Commission’s revision of the Renewable Energy Directive should not only ensure that wood and other biomass used for bio-energy be from sustainable sources but also that they be used sustainably, i.e. efficiently, so that less be needed overall. This fits with the principles of the **Circular Economy, which also seeks to encourage the cascading use of wood, i.e. use, then re-use or recycling before energetic use.**”*

Vice-President Katainen

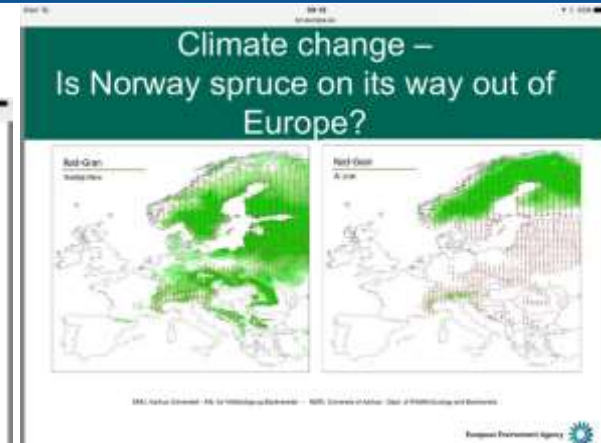


Sustainable management and use of forests

*“In the forest-based sector, a **vast range of specialised SMEs are currently providing key services** on e.g. forest mapping and management planning; eco-tourism; nature and landscape conservation and management studies; forest health and risk management services; development of forestry infrastructure; harvesting, processing and marketing of forest-based products; etc. Their role is essential in advancing the forest-based bioeconomy, which is an essential part of rural economies in Europe. Innovative solutions applicable throughout the forest-based value chains are specifically expected from their side.”*

Vice-President Katainen

Beyond wood – some conference flashlights



Why are forests important?

Forest ecosystem services

Provisioning services
Timber/fibres
Fuelwood
Food
Clean water
Medicines
Genetic resources

Regulating services
Climate regulation
Water regulation
Noise regulation
Clean air
Pollination

Cultural services
Recreation
Ecotourism
Aesthetic
Inspirational
Educational
Heritage
Spiritual and religious

Supporting services /forest ecosystem functions

Nutrient cycling

Spatial structure

Soil formation

Primary production

European Environment Agency

Major pressures of forest ecosystem changes

Habitat changes	Climate change	Invasive alien species	Land use	Pollution and nutrient enrichment
Over-exploitation of timber and non-wood products, recreation and tourism, game overgrazing	Changes in temperature and precipitation, extremes events, drought, frost, floods, storms, forest fires	Increased number of invasive alien species	Conversion to agriculture, urbanisation, fragmentation, land take	Nitrogen enrichment, acidification, air pollution, contamination heavy metals, critical levels of ozone

(EU, 2013)

Beyond wood – some conference flashlights

08:10
ec.europa.eu

Different perspectives on forests in the context of addressing climate change

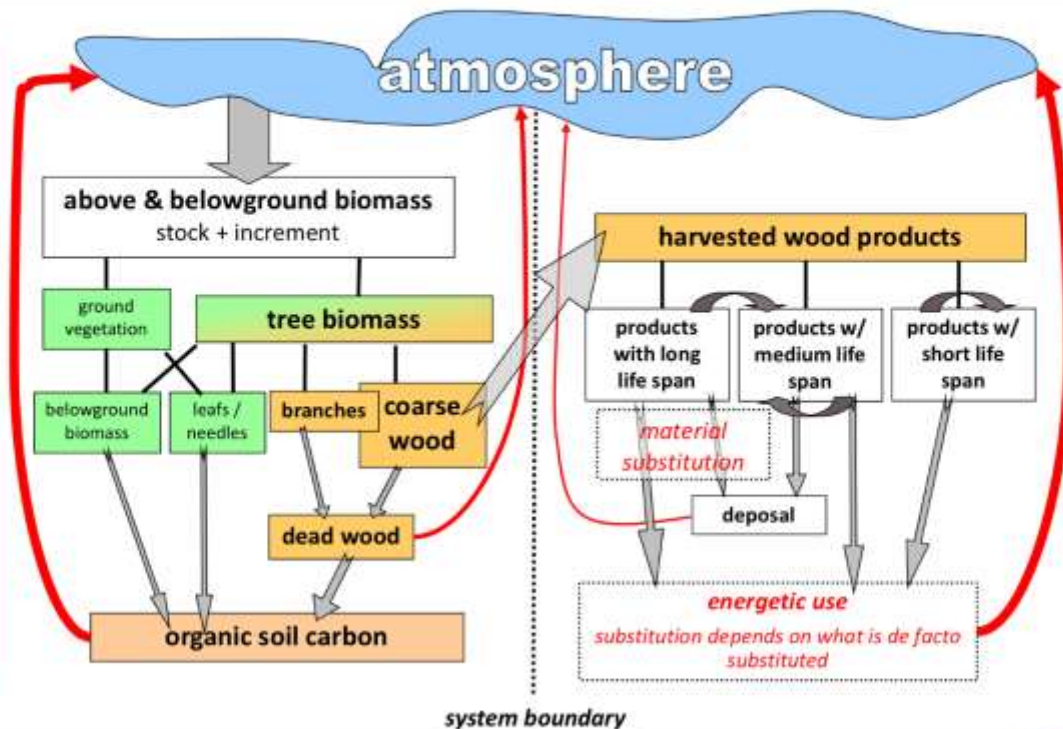
beyond wood – the multiple services provided by Europe's forests

Brussels, 23.5.2016

Dr. Till Pistorius



2.1 Carbon balance (forests & HWPs)



Beyond wood – some conference flashlights



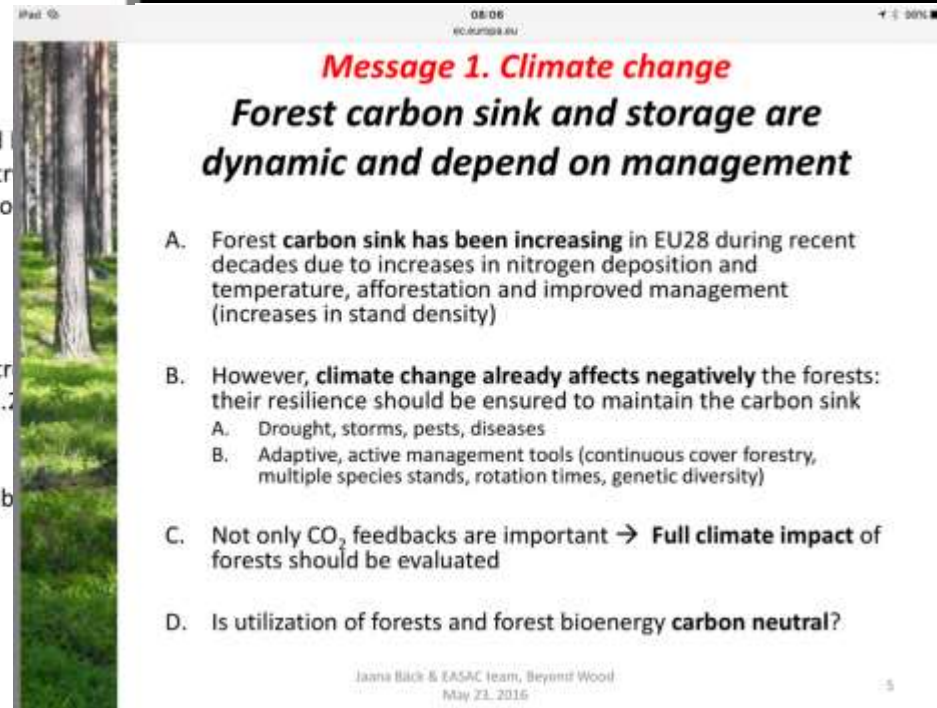
Is bioenergy from forests carbon neutral?

The carbon neutrality argument:

Burning of forest biomass causes CO₂ emissions but they are eliminated by the growth of new trees implying that in the long run sustainable forestry is carbon neutral and excellent source of renewable energy compared to fossil fuels

Problems in carbon neutrality argument:

1. It may take 20-300 years before the released CO₂ is stored in new trees
2. CO₂ emissions per produced energy unit from forest biomass are 1.2 times higher compared to natural gas and coal
3. In the long run comparisons with fossil fuels may be misleading because of new low carbon energy technology may become available
4. The possibilities to actively increase carbon storage in forests are neglected



Message 1. Climate change

Forest carbon sink and storage are dynamic and depend on management

- A. Forest **carbon sink has been increasing** in EU28 during recent decades due to increases in nitrogen deposition and temperature, afforestation and improved management (increases in stand density)
- B. However, **climate change already affects negatively** the forests: their resilience should be ensured to maintain the carbon sink
 - A. Drought, storms, pests, diseases
 - B. Adaptive, active management tools (continuous cover forestry, multiple species stands, rotation times, genetic diversity)
- C. Not only CO₂ feedbacks are important → **Full climate impact of forests should be evaluated**
- D. Is utilization of forests and forest bioenergy **carbon neutral**?

Jaana Böck & EASAC team, Beyond Wood
May 23, 2016

Negative emission technologies

06:54
theguardian.com

Advertisement

EXPATS, MAKE YOUR LIFE IN BELGIUM EASIER. FREE PREMIUM PACK:
• 3 multi-currency accounts
• up to 7 limit credit cards
• many more advantages!
Apply now >
*Subject to approval of your application

BNP PARIBAS
FORTIS

theguardian

home environment climate change wildlife energy pollution UK world all

COP 21: UN climate change conference | Paris

EU says 1.5C global warming target depends on 'negative emissions' technology

EU climate chief says that aspirational 1.5C target was put into Paris climate deal at insistence of 'most exposed countries' and will require new strategies



📷 The slogan '1.5 degrees' is projected on the Eiffel Tower during the Paris climate summit. Photograph: Francois Mori/AP

Arthur Neslen
Monday 14 December 2015 15:57 GMT

06:47
theguardian.com

Advertisement

Q
Suprême Cheese

theguardian

home environment climate change wildlife energy pollution UK world all

Carbon capture and storage (CCS)

Climate expert calls for decarbonisation tech to help meet Paris targets

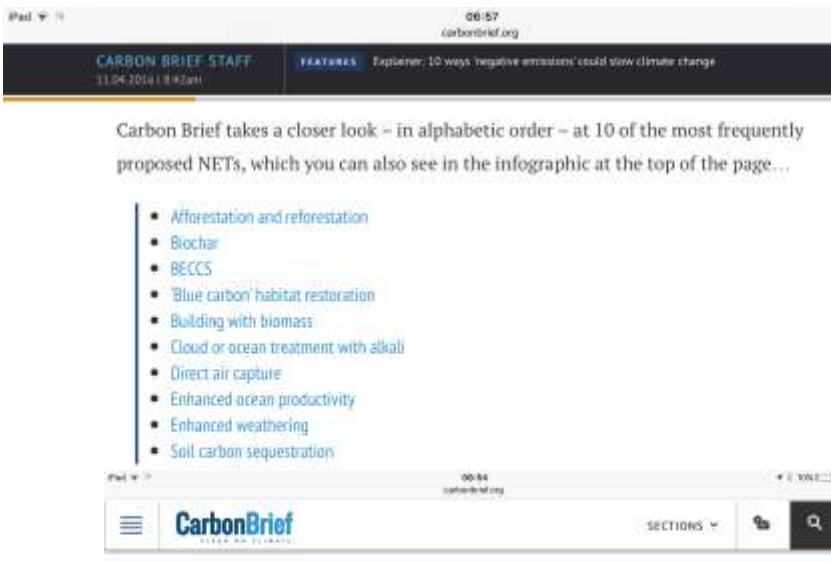
Hans Joachim Schellnhuber pushes for afforestation and advances to carbon capture and storage projects to limit global warming



📷 Schellnhuber thinks removing carbon from the atmosphere is crucial to limiting global warming. Photograph: Patrick Plaut/Cortez

Suzanne Goldenberg
@suzyl
Monday 14 December 2015 06:00 GMT

Negative emission technologies



Carbon Brief takes a closer look – in alphabetic order – at 10 of the most frequently proposed NETs, which you can also see in the infographic at the top of the page...

- [Afforestation and reforestation](#)
- [Biochar](#)
- [BECCS](#)
- ['Blue carbon' habitat restoration](#)
- [Building with biomass](#)
- [Cloud or ocean treatment with alkali](#)
- [Direct air capture](#)
- [Enhanced ocean productivity](#)
- [Enhanced weathering](#)
- [Soil carbon sequestration](#)

FEATURES | April 11, 2016 | 8:42

Explainer: 10 ways 'negative emissions' could slow climate change



The [Paris Agreement](#), adopted at the COP21 climate talks in December, sets out a global aim to limit average global surface temperatures to "well below 2C" above pre-



Afforestation and reforestation

Afforestation means planting trees where there were previously none.

Reforestation means restoring areas where the trees have been cut down or degraded. Because trees take up CO₂ from the atmosphere as they grow, planting more trees means boosting how much CO₂ forests absorb and store. As a method of removing CO₂ from the atmosphere, this is one of the most feasible options, although it still has drawbacks and uncertainties.

Reforestation is almost universally desirable in its own right, particularly if it means re-planting native trees, and is already widely recognised and used to tackle climate change. Many countries are already practising it, such as Brazil, which has [pledged](#) to restore 12m hectares of forest. The UN's [Clean Development Mechanism](#) provides a financial incentive for countries to increase their forest stocks.

[Estimates](#) suggest that afforestation and reforestation can sequester CO₂ at a rate of 3.7 tonnes per hectare per year, and comes with an associated cost of \$20-100 per tonne.

One potential obstacle to afforestation is land availability and suitability. This depends on a range of factors, including global population, diet, the efficiency and intensity of agriculture, and rising competition from bioenergy. Planting vast areas of forests could also cause complex changes in cloud cover, reflectivity, and the soil-water balance. All of these could also have an impact on the Earth's climate.



EU Forests

- ✓ Nature-based solutions
- ✓ Eco-system services
- ✓ Non-wood forest products (NWFP)
- ✓ Innovative wood value chains
(nanocellulose, Tree-Shirts, biobased construction)
- ✓ Forest-based industries in BBI
- ✓ Bioenergy



Overview

1. *Conclusions*
2. *What is bioeconomy*
3. *EU bioeconomy facts and figures*
4. *Why EU Bioeconomy strategy?*
5. *What is EU Bioeconomy policy?*
6. *Bioeconomy and Horizon 2020*
7. *Investments, markets and regulatory environment*
8. *EU Bioeconomy strategy review*
9. *EU regions are key players for the bioeconomy*
10. *The food pillar of the bioeconomy*
11. *Looking forward: Rising interfaces and new complexities*
12. *Flashlights: Bioeconomy today, or maybe tomorrow?*



Key takeaways

Bioeconomy concept is getting stronger in Europe and globally due to expected environmental, economic and social impacts, such as on jobs, climate change and food security.

In Europe, it is part of important **EU Policies** such as circular economy, industrial renaissance and renewable energy and resource policies, also increasingly on **national level**, with research and innovation supported under...

...priorities of EU **Horizon 2020 programme** (2014-2020) – Societal Challenge 2 and in separate but **complementary** industry-led programme **BBI JTI**

We need to take into account **framework conditions** (e.g. standards, national policies and priorities, access to finance) in order to deliver fully on the expectations of the Bioeconomy concept.



Key takeaways (2)

Forests cover over 40% of EU land area. EU forest-based sector accounts for up to four million jobs, mostly in rural areas. Forest-based products represent ca. 8% EU manufacturing added value, with further potential

Beyond high value of wood and non-wood products, forests are crucial **ecosystems**, supplying key services for society: climate change mitigation, soil and water protection, biodiversity, clean air, leisure and recreation.

Sustainable management of forests and provision of ecosystem services are shared challenges and political objectives at European level, including for research and innovation policy. There is a significant portfolio of research projects under FP7 and Horizon 2020.

EU **Bioeconomy Strategy** is currently under review. MS input in this process will be much appreciated. The Strategy will be updated, if deemed necessary, to better encompass decarbonisation and circularity while also promoting industrial renaissance, dynamic regional economies and the renewal of key sectors (agri-food, forestry, waste, marine, chemical, construction).



Conclusions (1)

- **Bioeconomy is gaining momentum**, with several EU Member States currently developing national bioeconomy strategies (following the good examples set by Finland and Sweden), and with a variety of research and innovation funding opportunities available at EU level via Horizon 2020, the Structural Funds (ESIF) and also via the Juncker Fund for strategic investments (EFSI).

Forest-based sector is, and remains, important for the development of EU policies in general, including for research and innovation policy. There is a significant portfolio of research and innovation projects, and coordination activities, under FP7 and under Horizon 2020, through a number of instruments launched under the annual work programmes, including the Joint Undertaking Bio-Based Industries (BBI).

Supporting the role of the forest-based sector in the Bioeconomy is instrumental in reaching a number of EU's goals, including the strengthening of Europe's competitiveness and the stimulation of investment for job creation (Item 1 in Juncker's Agenda for Jobs, Growth, Fairness and Democratic Change).



Conclusions (2)

Finnish and Swedish support to the bioeconomy is important and appreciated, with national and supra-regional bioeconomy strategies and initiatives building on the initiatives already undertaken at EU level, in particular the European Bioeconomy Strategy.

European Bioeconomy Strategy is currently under review, also to assess its contribution to the circular economy. It will update the strategy in 2017, if necessary, in order to better encompass decarbonisation and circularity while also promoting industrial renaissance, dynamic regional economies and the renewal of key sectors (agri-food, forestry, waste, marine, chemical, construction, ...)

Very complex challenges require a high level of policy coordination across a range of policies that are key to the bioeconomy. Defining a coherent bioeconomy policy needs to be considered within the context of climate, energy, and agriculture objectives (addressing food security, natural resource scarcity, fossil resource dependence, etc.), while achieving sustainable economic growth.



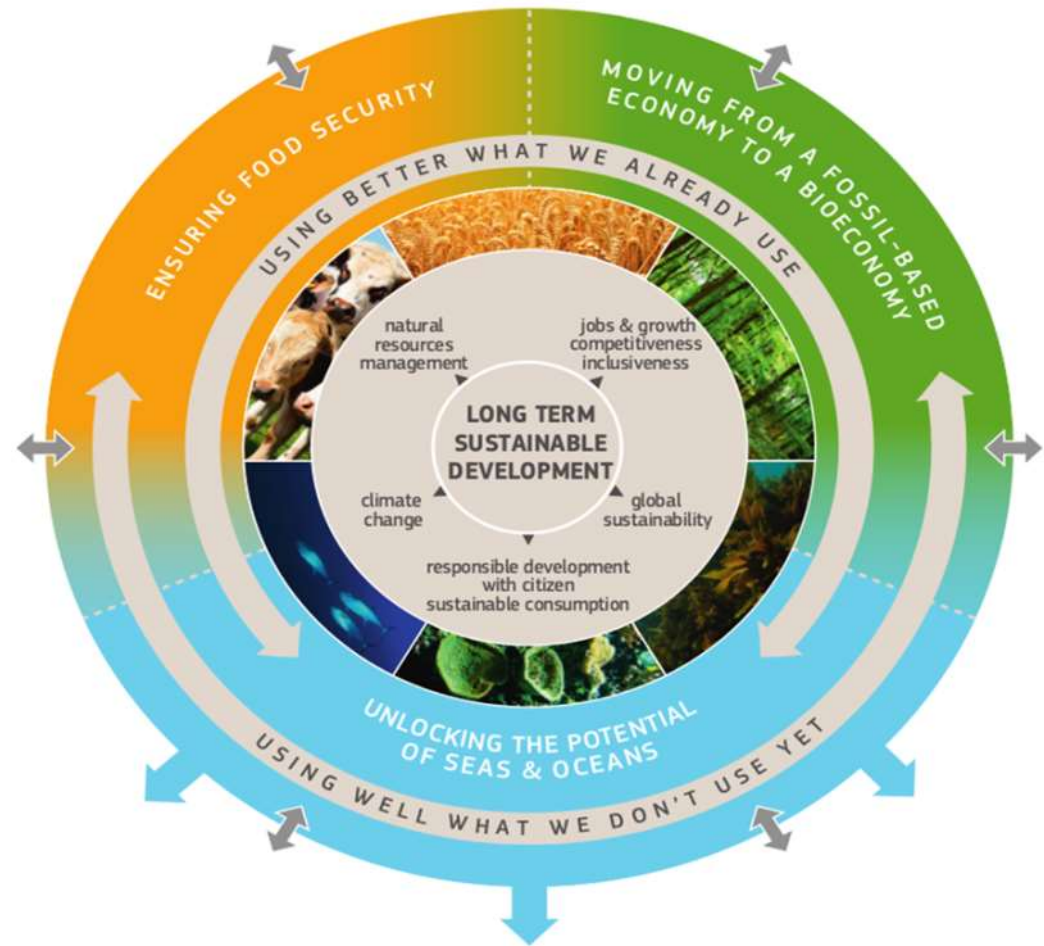
Conclusions (3)

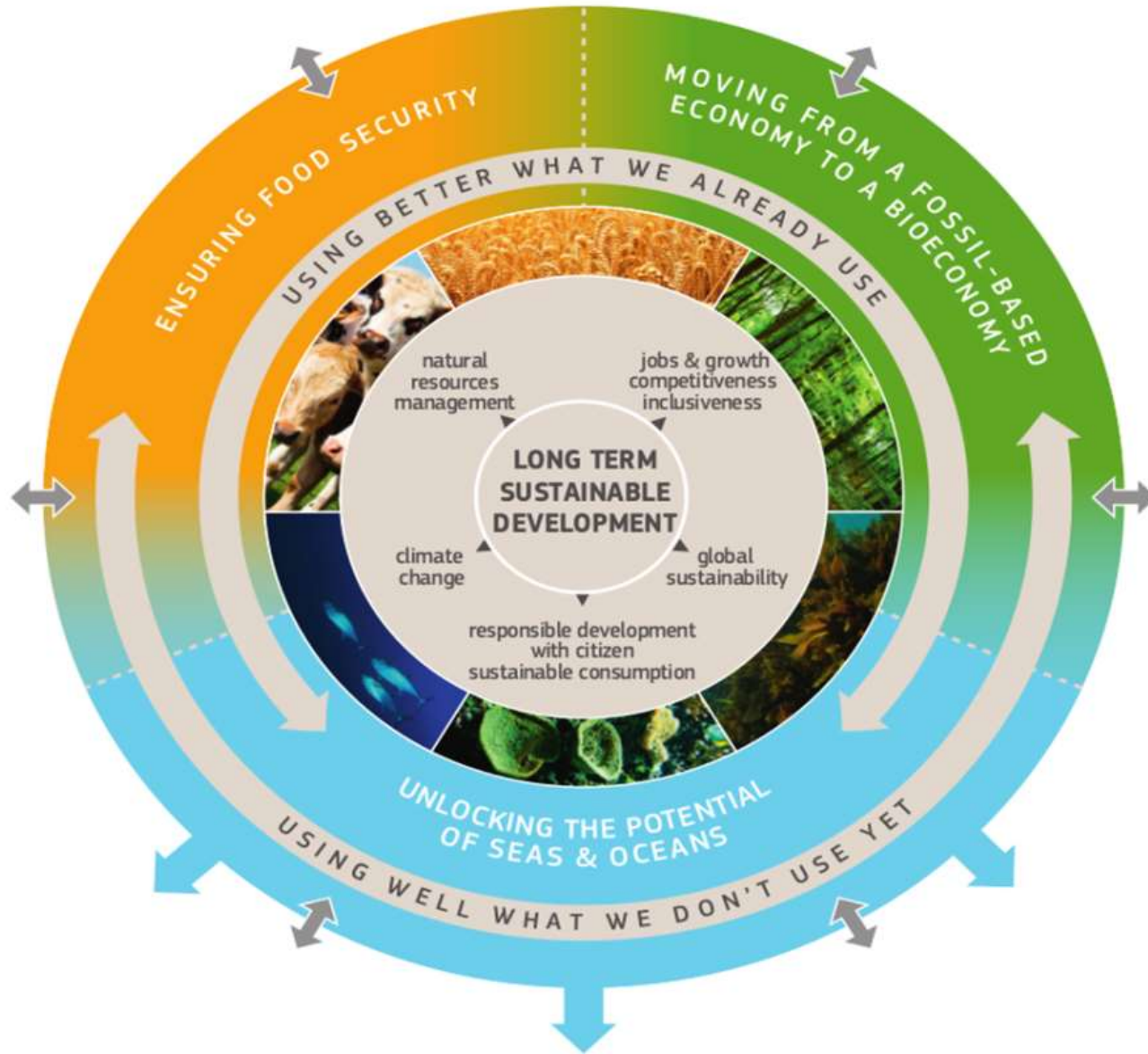
- **Role of forests in 'de/re-carbonisation' of Europe is important in context of EU energy and climate objectives.** Forests have capacity to sequester carbon in living biomass and soils, but also play a key role in substitution of fossil fuels by both wood products (e.g. wood constructions) and bioenergy. Based on the on-going work on this, the Commission will come up with a legislative proposal for the sector Land use, land use change and forestry (LULUCF) before the summer, and for the bioenergy next year
- **EFI plays an important role in conveying to its members key messages on forest research and innovation at the pan-European level,** and also in helping shape EU policy development, through involvement in various projects, stakeholder engagement activities and publications such as "ThinkForest" forums.
- **Your views on the future of the bioeconomy and on what we can do further at EU level are welcome.** Furthermore, do you see specific aspects related to the Bioeconomy (notably for forestry) that are limitedly treated the Circular Economy package so far and would be relevant to be taken up in the context of the EU Bioeconomy Strategy review?

2. WHAT IS BIOECONOMY

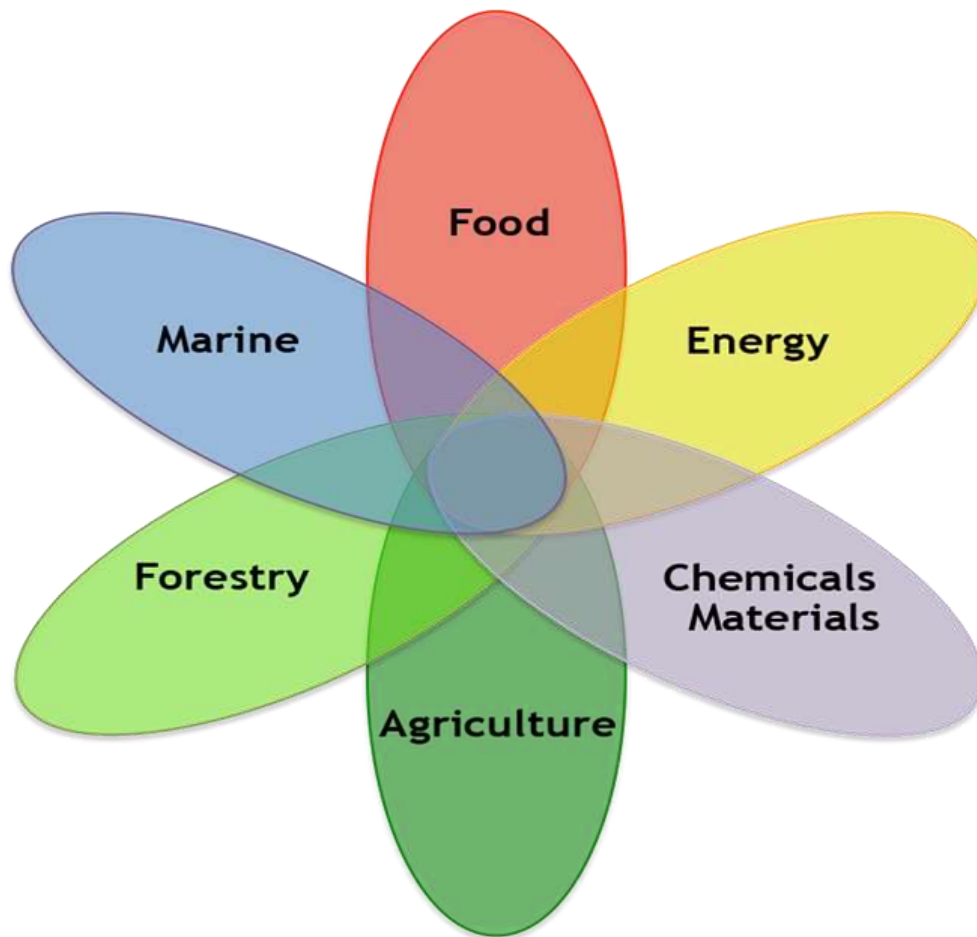
" The Bioeconomy encompasses those parts of the economy that use **renewable biological resources** from land and sea to produce food, bio-materials, bio-energy and bio-products."

EU Bioeconomy Strategy, 2012

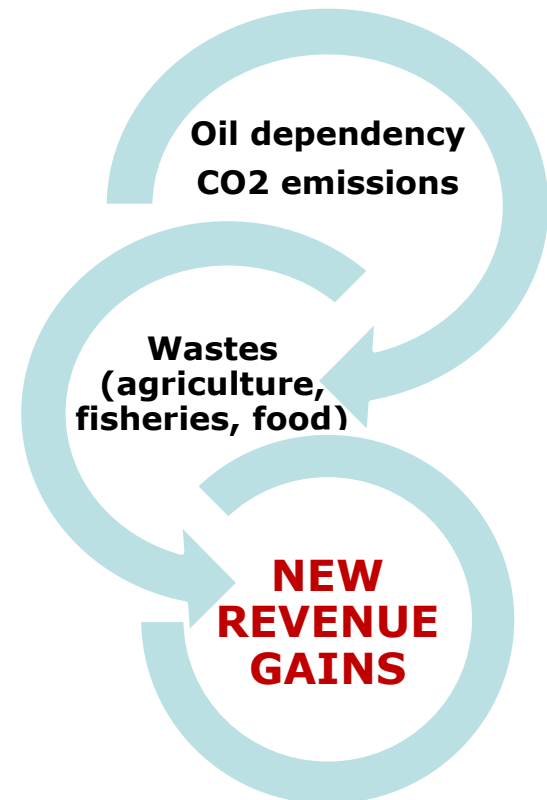




Bioeconomy .



Using biological
resources to
produce
**"more and better,
from less"**



Research and innovation enable the creation of new **bio-based** value chains

Primary production

Waste



Sugar beets



Algae



Wood residues



Biological waste



Fish waste

INTO



Cosmetics



Plastic bottles
Natural colourants
for candy



Dashboards



Bio-based plastics



Pharmaceuticals



PRINCIPLE

1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
ReSOLVE levers: regenerate, virtualise, exchange

Bioeconomy

Renewables



Finite materials

Regenerate

Substitute materials

Virtualise

Restore

Renewables flow management

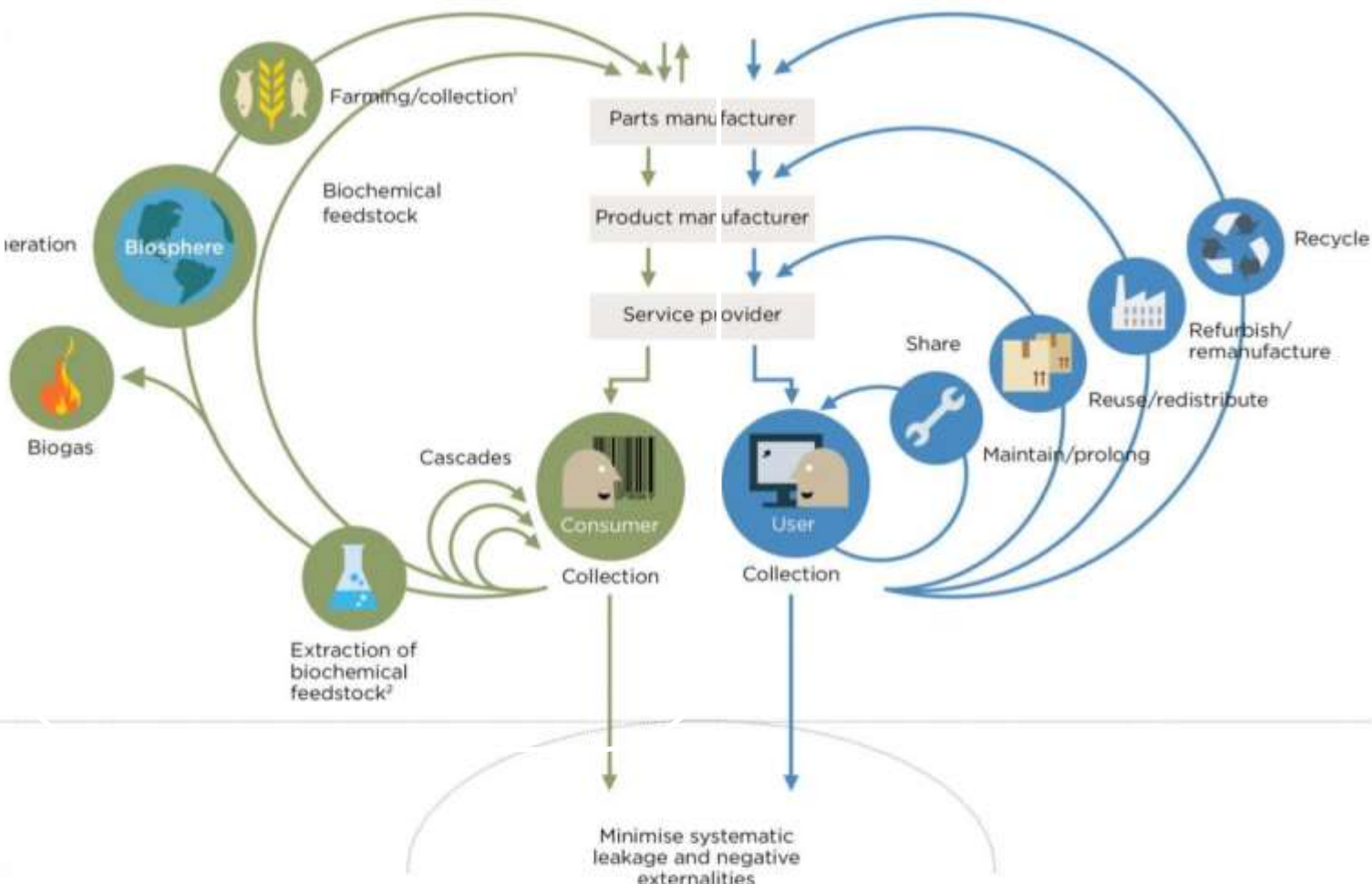
Stock management

PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
ReSOLVE levers: regenerate, share, optimise, loop

Regeneration



PRINCIPLE

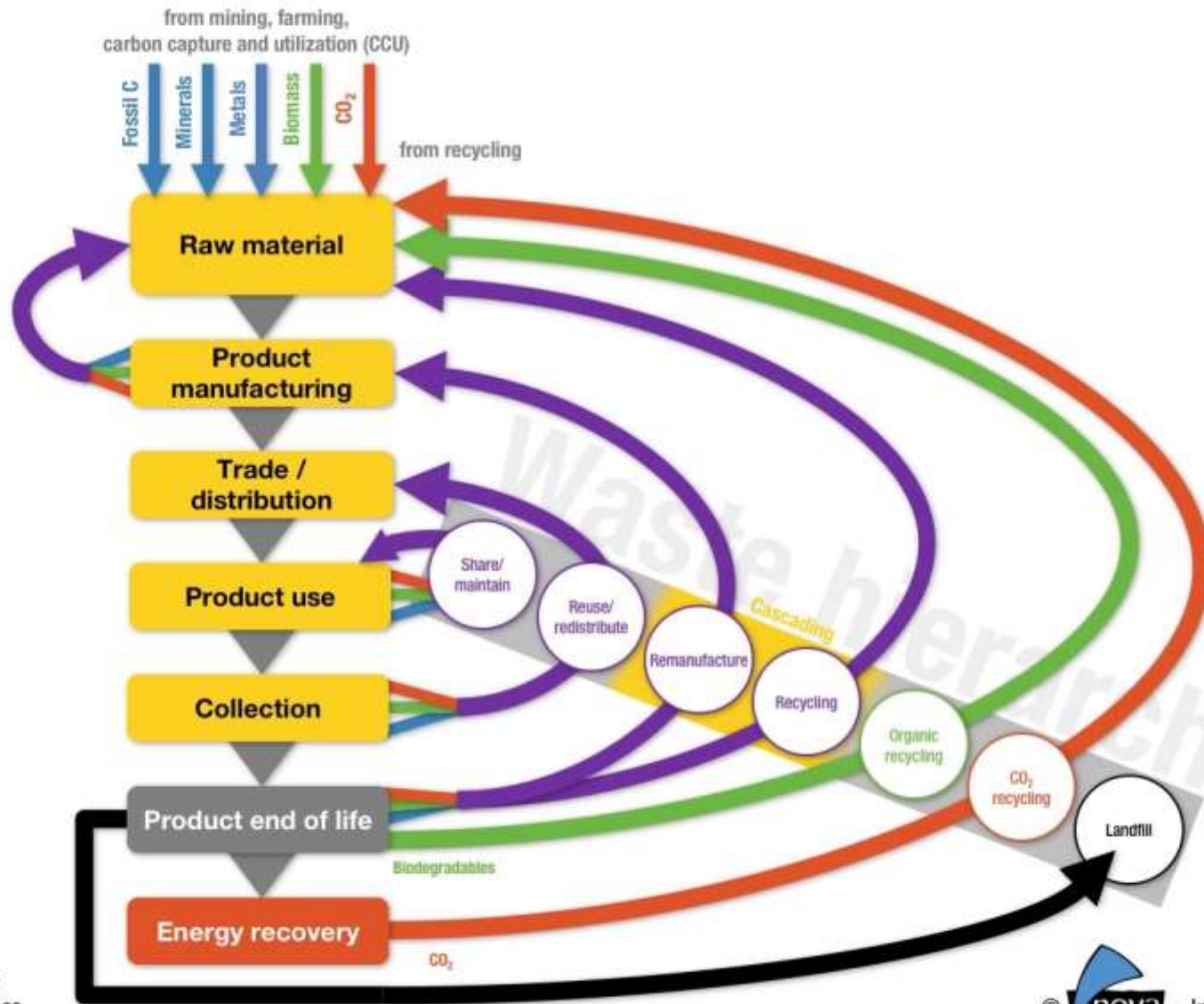
3

Foster system effectiveness by revealing and designing out negative externalities
All ReSOLVE levers

1. Hunting and fishing

2. Can take both post-harvest and post-consumer waste as an input

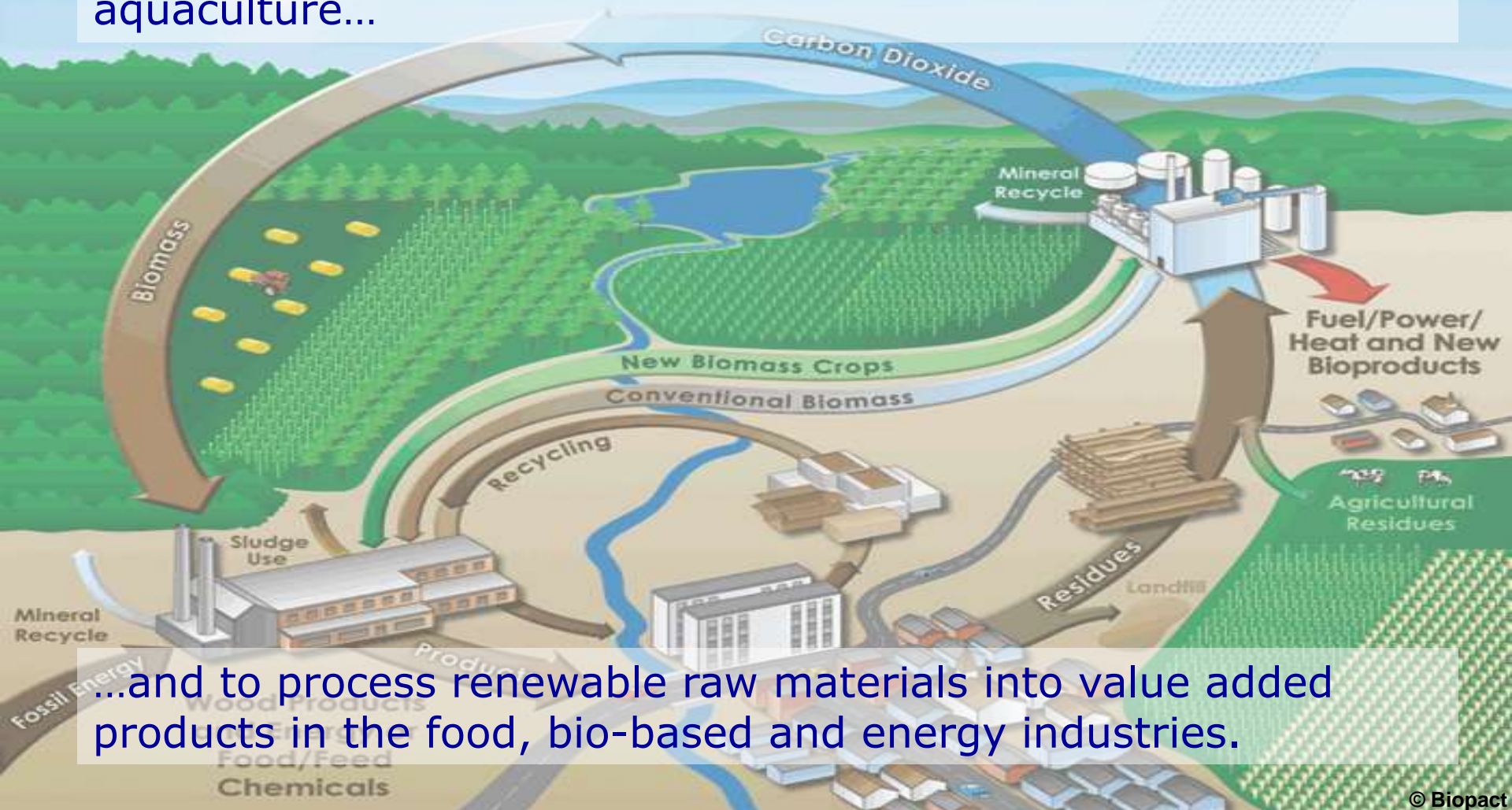
Comprehensive Concept of Circular Economy



The Bioeconomy for sustainable competitiveness



Using research and innovation to produce renewable raw materials sustainably in agriculture, forestry, fisheries and aquaculture...



...and to process renewable raw materials into value added products in the food, bio-based and energy industries.

Feedstocks, processes and products in a bioeconomy

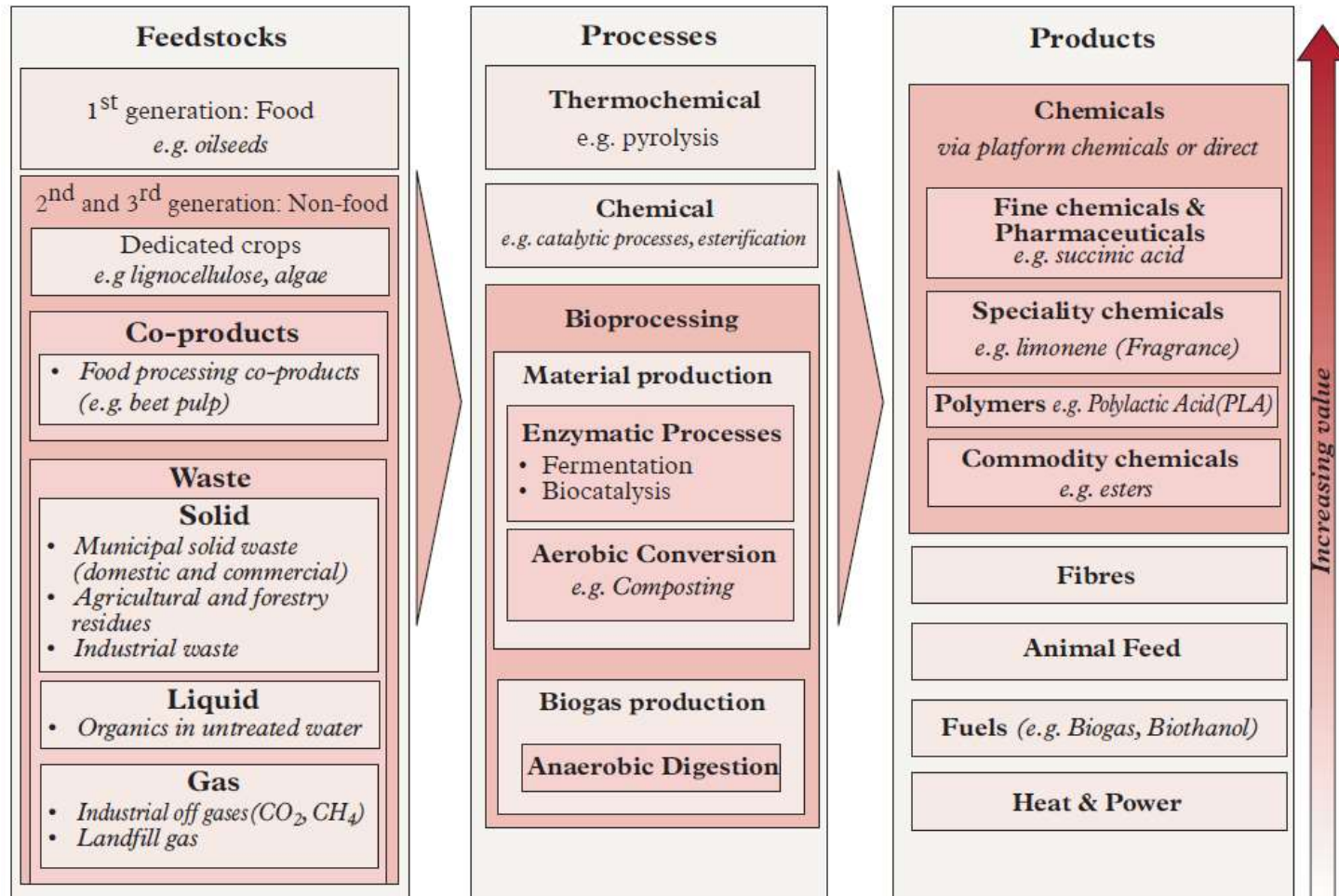


Figure II.6: Bio-based feedstocks, processes and end products sorted by value-added creation (House of Lords 2014)

3. EU BIOECONOMY FACTS AND FIGURES



The Bioeconomy in the European Union in numbers

Facts and figures on biomass, turnover and employment (IPTS 2015)



Bioeconomy Factsheet

Facts and figures on biomass, turnover and employment. The bioeconomy is the production of biomass and the conversion of biomass into value added products, such as food, feed, bio-based products and bioenergy.

"The bioeconomy is the production of biomass and the conversion of biomass into value added products, such as food, feed, bio-based products and bioenergy. It includes the sectors of agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. The definition used in this document includes also manufacturing of bio-based textiles. It is important to note that these figures do not take account of the full potential of the marine bioeconomy and figures provide only a partial picture of its value."

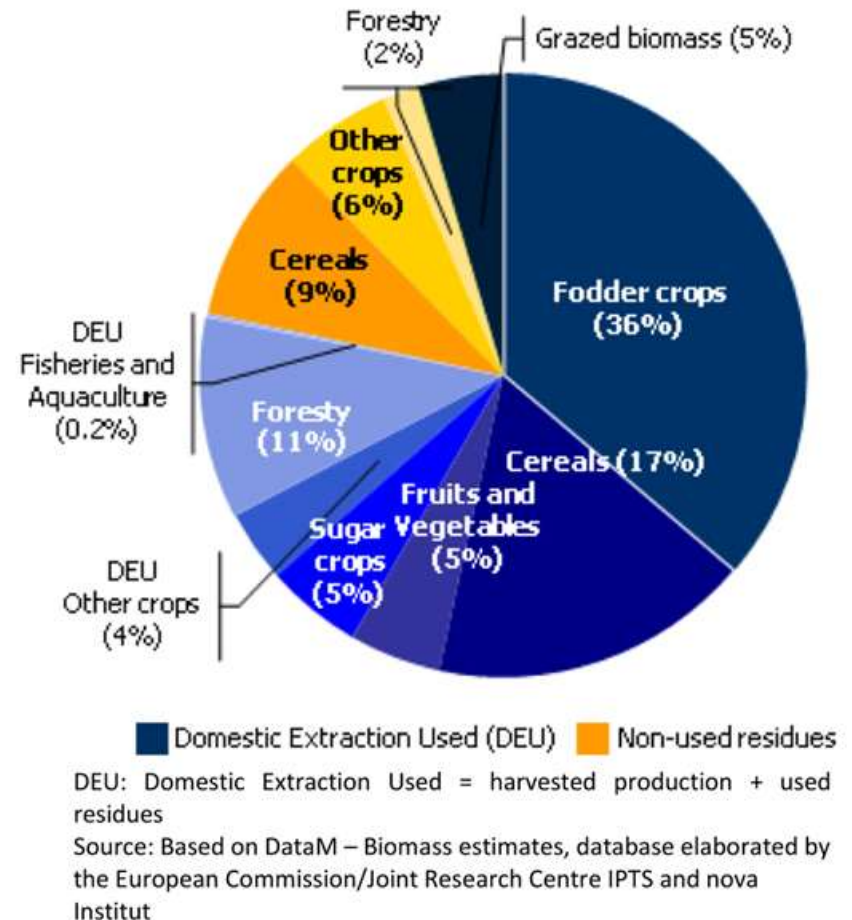
Documenting the bioeconomy is a challenge for science and research because official statistics only report on traditional sectors with no distinction between synthetic and bio-based production (e.g. manufacture of synthetic textile vs bio-based textile). Therefore, indicators for the bioeconomy are estimated based on a combination of multiple sources."

Domestic extraction of biomass in the European Union

The bioeconomy in the EU,

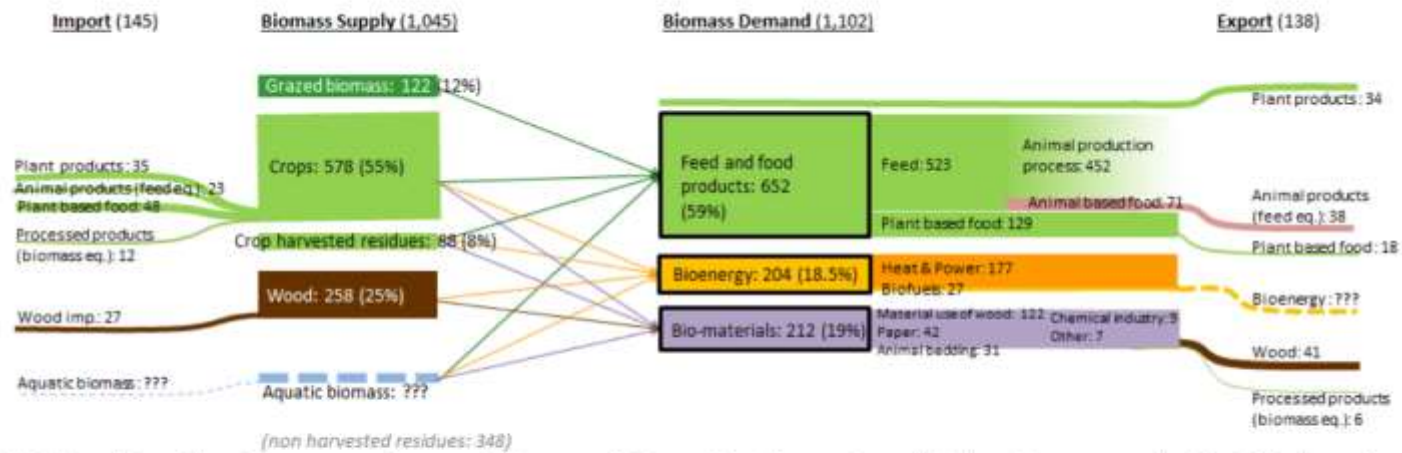
- uses 1600 to 2200 million tonnes of biomass produced within Europe yearly ... while 450 to 680 million tonnes of biomass produced remain unused.
 - One part of it needs to remain unused to maintain soil fertility. The conditions needed to take advantage of the rest remains a key question to be addressed.
- uses **agricultural biomass as the first source of supply.**
- imports approximately 15% of all biomass consumed, including processed products.
- and exports almost the same amount of biomass.

Figure 1. Estimation of domestic extraction of biomass in the European Union (% of total volume of dry matter, 2013)



Preliminary biomass balance in the European Union

Figure 2. Preliminary biomass balance in the European Union (million tonnes of dry matter, EU-28, 2013)



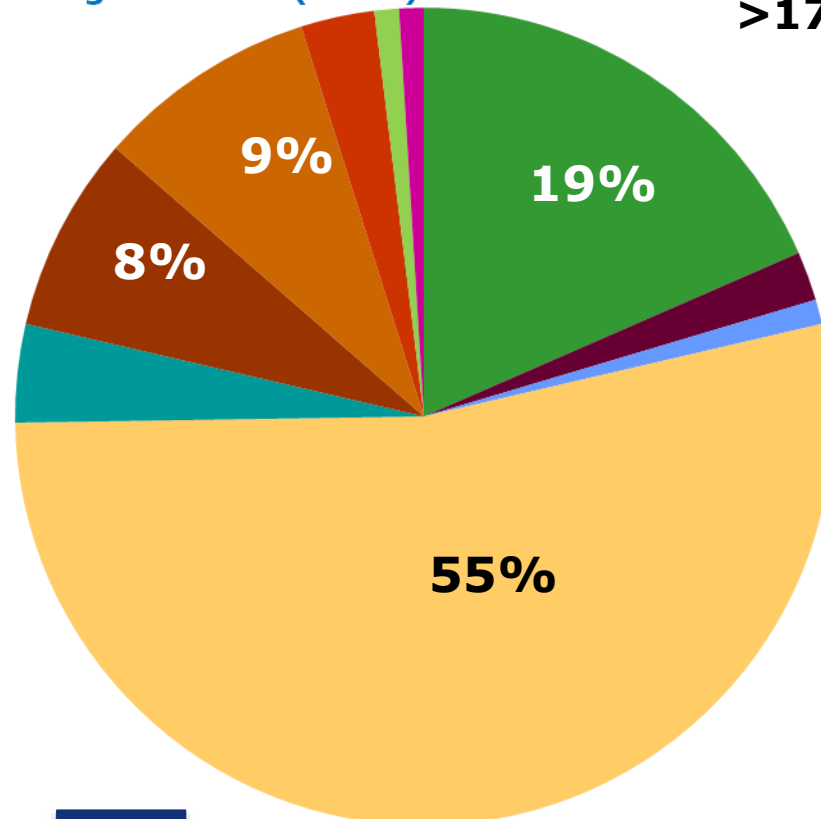
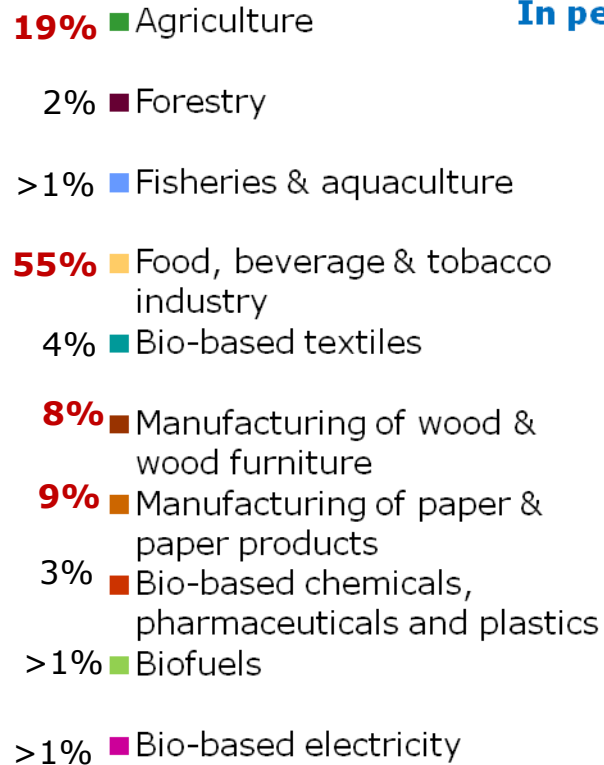
*In the European Union the biomass is mainly consumed for **food and animal feed purposes, which represents 61% of the whole biomass consumption.** Animal feed use alone represents 48% of the total use of biomass. The sectors of bioenergy and biomaterials are similar in terms of the quantity of biomass they consume. Each of them consumes around 18% of the whole biomass. Within bioenergy, biofuels represents around 2% of the biomass consumed in the European Union.*

Bioeconomy is key for Europe

**2 trillion euro
turnover**

**Employs
>17m people**

**Turnover in the EU-28 by the bioeconomy sector
In percentage of value (2013)**





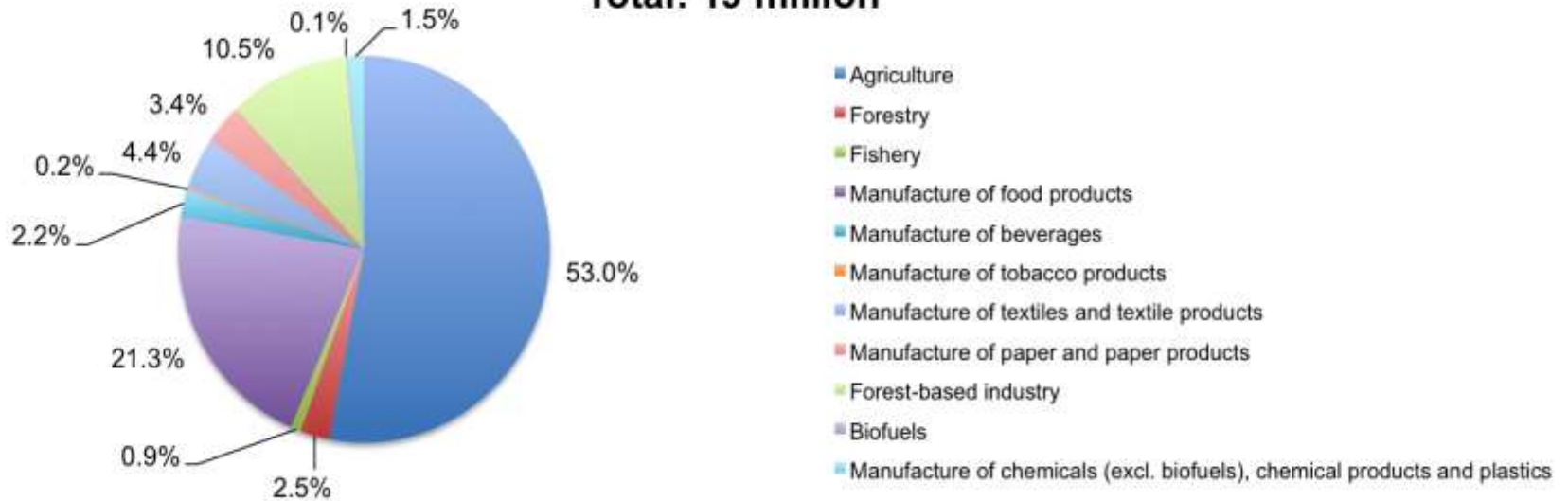
The European bioeconomy generates a turnover estimated at around 2 trillion euros and employs more than 17 million of persons

The **agricultural and the "food, beverage and tobacco" sectors** are leading the European bioeconomy in terms of turnover and employment, followed by the **wood and paper industry**.

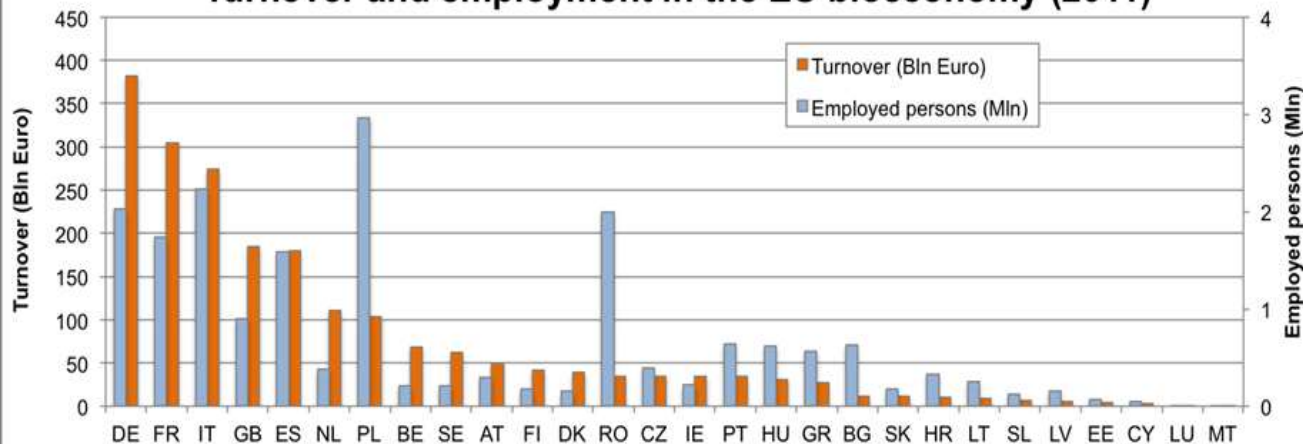
Slightly **more than a half of the European bioeconomy turnover comes from the "food, beverage and tobacco" sector, 19% comes from agriculture**, followed by the "manufacturing of wood and wood furniture" and the "manufacturing of paper" with 9% and 8% respectively.

The overview is different when looking at the employment indicators compared to the turnover indicators. **The agricultural sector employs slightly more than half of the people employed in the European bioeconomy, a quarter is employed in the "food, beverage and tobacco" sector and another quarter in the "manufacturing of wood and wood furniture" and the "manufacturing of paper".**

Employment in the EU bioeconomy (EU28, 2011), Total: 19 million



Turnover and employment in the EU bioeconomy (2011)





Bioeconomy of the 28 EU Member States is reflecting national historical, territorial and economic specificities (1)

1. Bioeconomy dominated by *Agricultural employment*

- In Romania, Greece, Poland, Slovenia, Ireland, Portugal and Croatia, agriculture employs more than 60% of the total people employed in the bioeconomy.

2. Bioeconomy geared toward the *Agro-Food industry and Bio-based chemical industries*

- The turnover generated by the “food, beverage and tobacco” sector in the Netherlands, Belgium, France, Denmark, Germany, Italy, the United Kingdom, Spain, Luxembourg and Ireland is above the European Union average.
- Additionally, these countries demonstrate a turnover per person employed in biochemical industries higher than 260 thousand euros per person. The term “Biochemical industries” comprises here of bio-based chemistry, biobased pharmaceuticals and bio-based plastics.



Bioeconomy of the 28 EU Member States is reflecting national historical, territorial and economic specificities (2)

3. Turnover of the bioeconomy primarily generated by Forestry and downstream industries

- Finland, Sweden, Latvia and Estonia generates more than 40% of their bioeconomy turnover in forestry, the manufacturing of wood and wood furniture and pulp and paper sectors. Sweden and Finland also show an orientation towards the bio-based chemical industry as described in group 2.

4. Non-specialised bioeconomies

- Bulgaria, the Czech republic, Hungary, Lithuania, Malta and Slovakia show a more mixed bioeconomy with no strong orientation as described for the other member states. Despite Austria showing an orientation towards biochemical industries, it was not classified in group 2 because of a clear absence of orientation towards the agri-food sector, and inversely for Cyprus.

4. WHY EU BIOECONOMY STRATEGY?



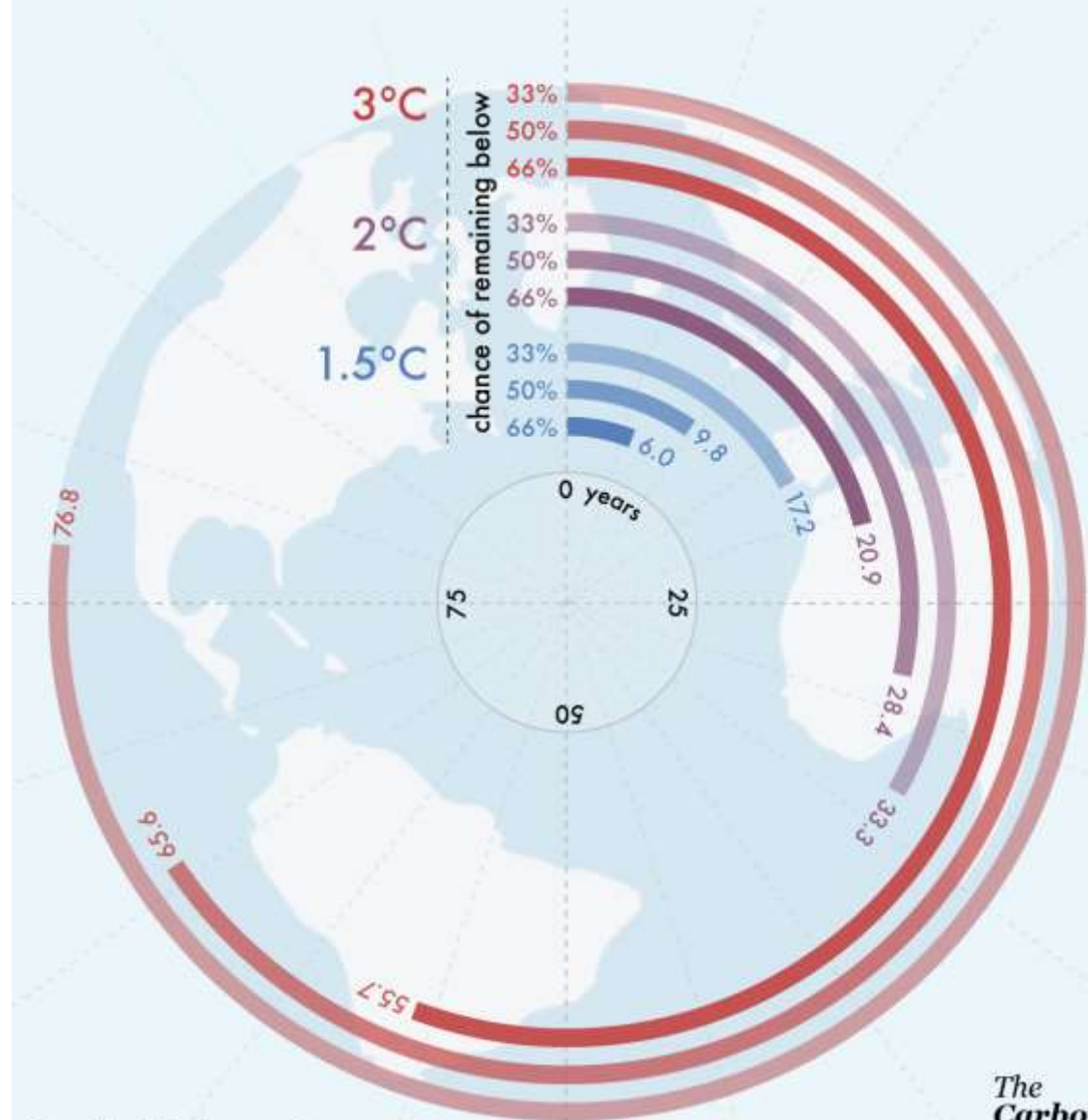
Why a European bioeconomy strategy?

*In order to cope with an **increasing global population, rapid depletion of many resources, increasing environmental pressures and climate change**, Europe needs to radically change its approach to production, consumption, processing, storage, recycling and disposal of biological resources. The Europe 2020 Strategy calls for a **bioeconomy as a key element for smart and green growth in Europe**. Advancements in bioeconomy research and innovation uptake will allow Europe to improve the management of its renewable biological resources and to open new and diversified markets in food and bio-based products. Establishing a bioeconomy in Europe holds a great potential: it can **maintain and create economic growth and jobs in rural, coastal and industrial areas, reduce fossil fuel dependence and improve the economic and environmental sustainability of primary production and processing industries**. The bioeconomy thus contributes significantly to the objectives of the Europe 2020 flagship initiatives "Innovation Union" and "A Resource Efficient Europe".*

Carbon Countdown

How many years of current emissions would use up the IPCC's carbon budgets for different levels of warming?

- **Six years left to remain confidently (66%) below 1,5°C with current emission levels**
- **21 years to remain below 2°C**
- **3°C warmer in 2070**



<http://bit.ly/carboncountdown>

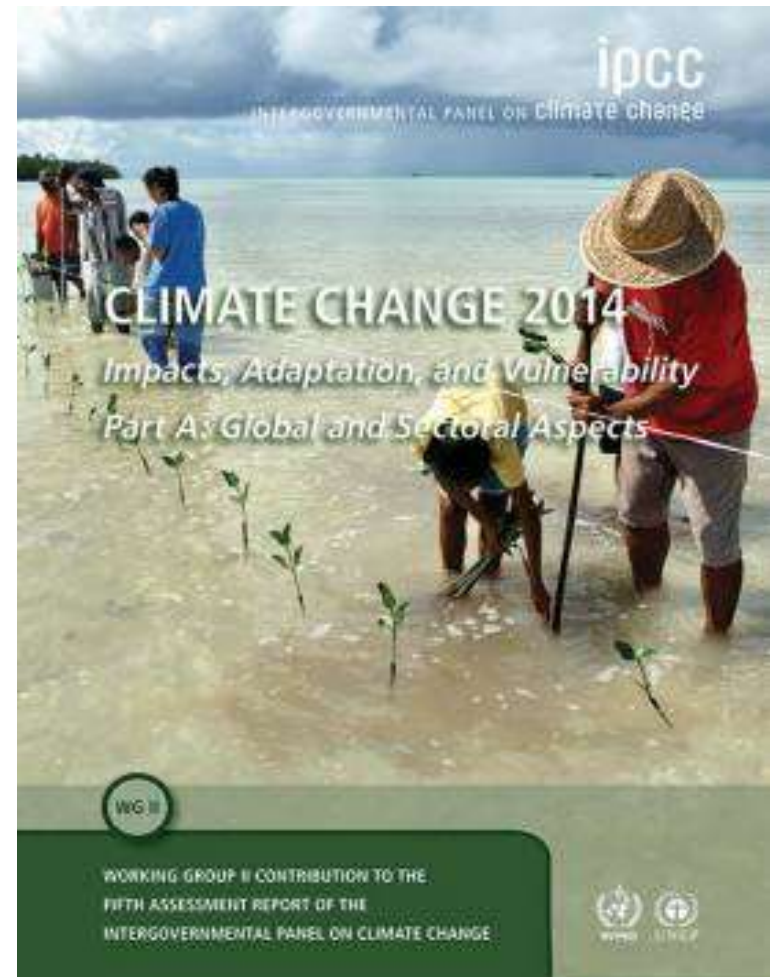
The
Carbon
Brief

<http://www.carbonbrief.org/the-ipccs-priorities-for-the-next-six-years-1-5c-oceans-cities-and-food-security>

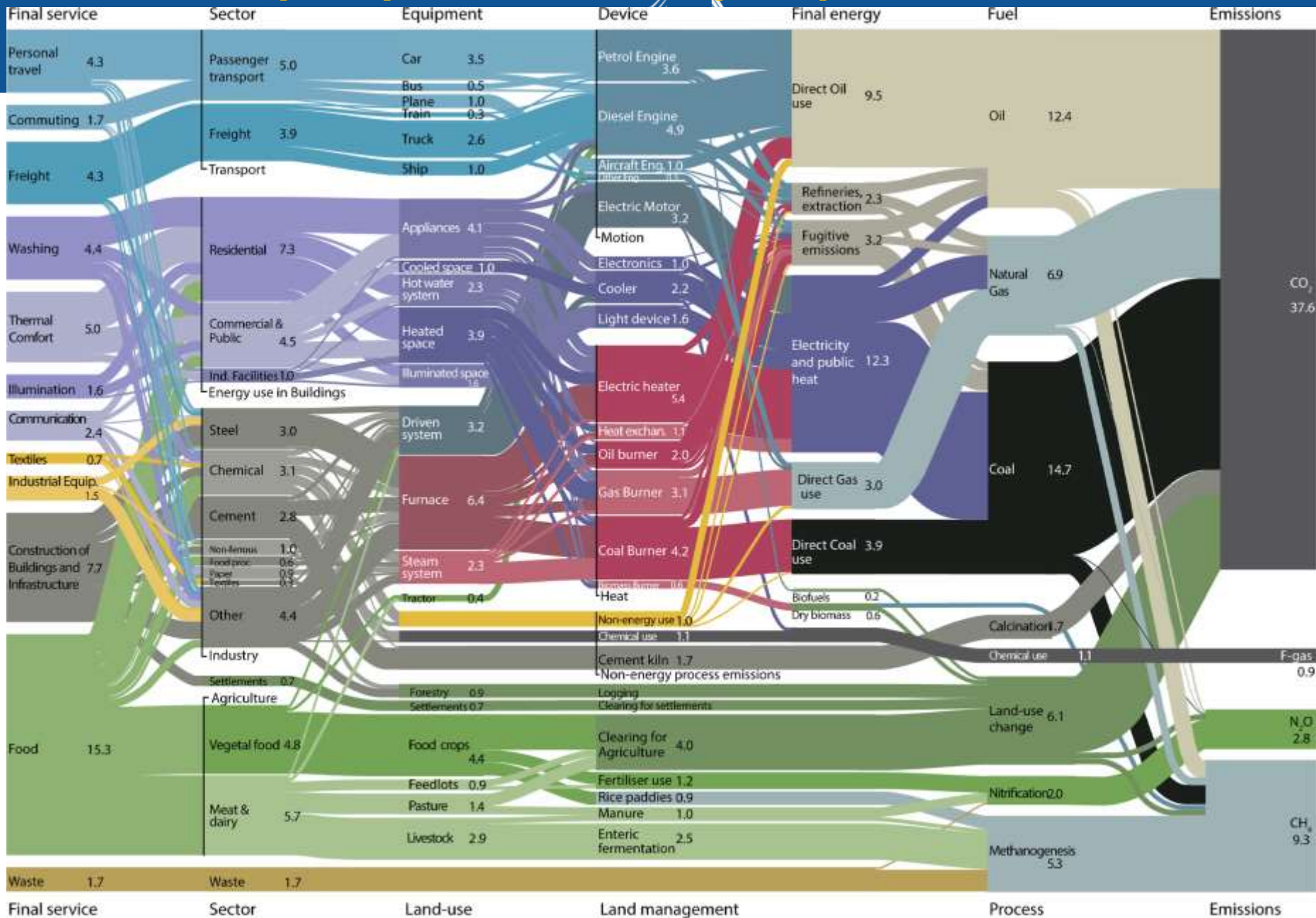
Food is first to be hit by climate change, possibly badly

“Increasing magnitudes of warming increase the likelihood of severe, pervasive, and irreversible impacts.[...] Global climate change risks are high to very high with global mean temperature increase of **4°C** or more above preindustrial levels in all reasons for concern (Assessment Box SPM.1), and include **severe and widespread impacts on unique and threatened systems, substantial species extinction, large risks to global and regional food security**, and the combination of high temperature and humidity **compromising normal human activities, including growing food or working outdoors in some areas for parts of the year (high confidence).**”

IPCC, Climate Change 2014: Summary for policymakers.



Food (30%) + Construction (15%) = 45% GHG



Total GHG emissions (2010): 50.6 Pg (Gt) CO₂e

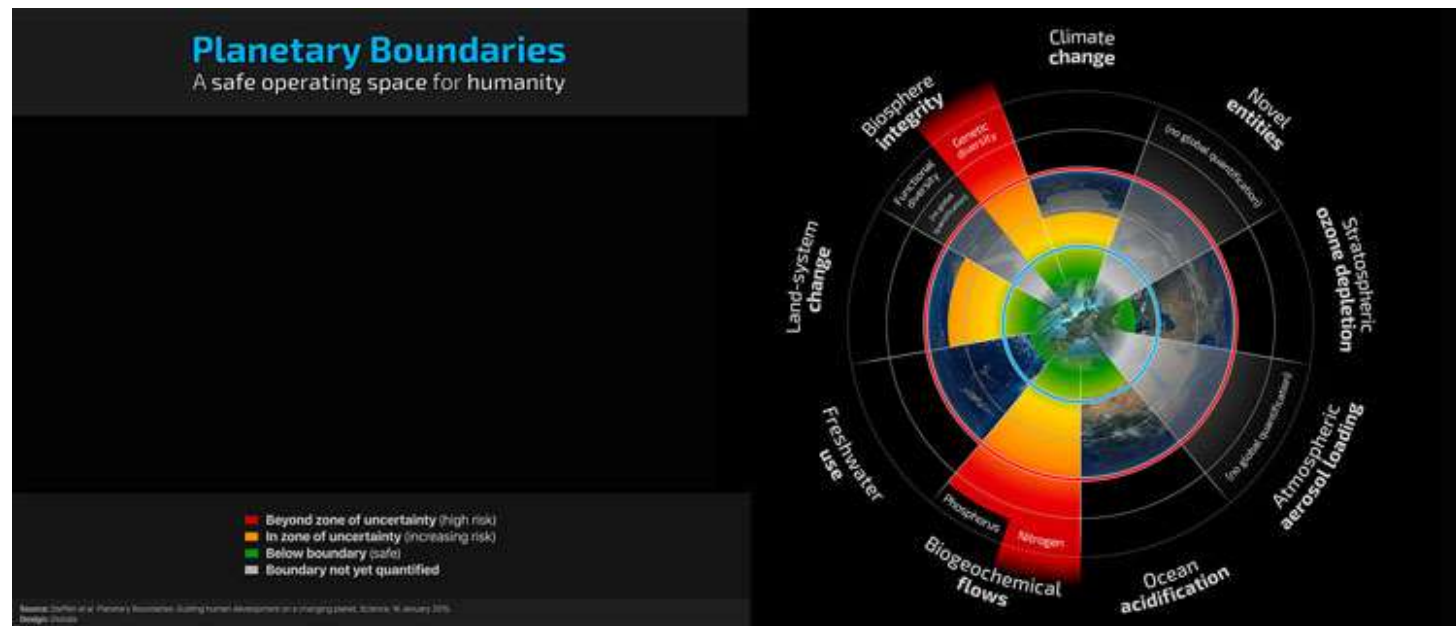
Source: Bajželj et al

(2013), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3797518/pdf/es400399h.pdf>

Planetary Boundaries 2.0 - All crossed boundaries relate to bioeconomy and FNS

"As Science publishes the updated research, four of nine planetary boundaries have been crossed

Four of nine planetary boundaries have now been crossed as a result of human activity, says an international team of 18 researchers in the journal Science (16 January 2015). **The four are: climate change, loss of biosphere integrity, land-system change, altered biogeochemical cycles (phosphorus and nitrogen)."**
Stockholm Resilience Centre



**Today globally
more obese than
undernourished
(Lancet 2016)**

**With current
trends zero
chance to meet
obesity targets**

THE LANCET

Online First · Current Issue · All Issues · Special Issues · Multimedia · Information for Authors

Volume 387, No. 10026, p1377-1396, 2 April 2016

Articles

Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19·2 million participants

NCD Risk Factor Collaboration (NCD-RisC)[†]

[†] NCD Risk Factor Collaboration members are listed at the end of the paper

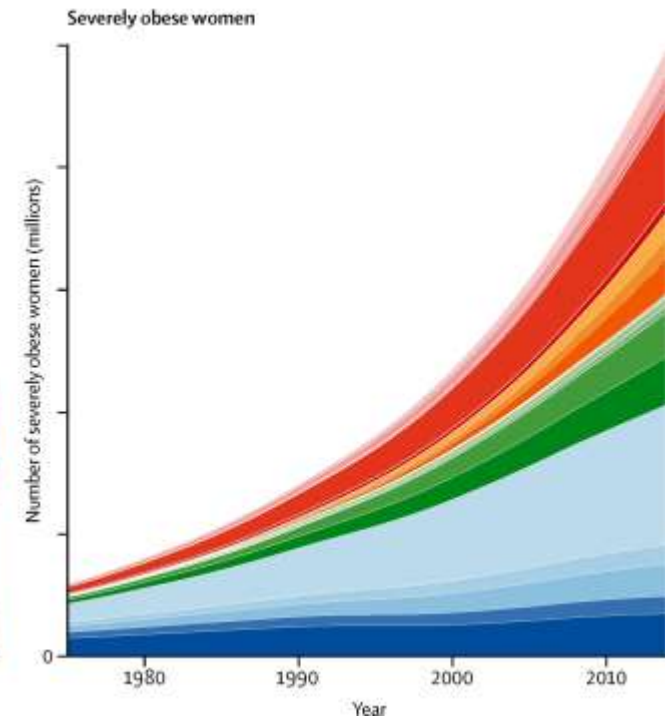
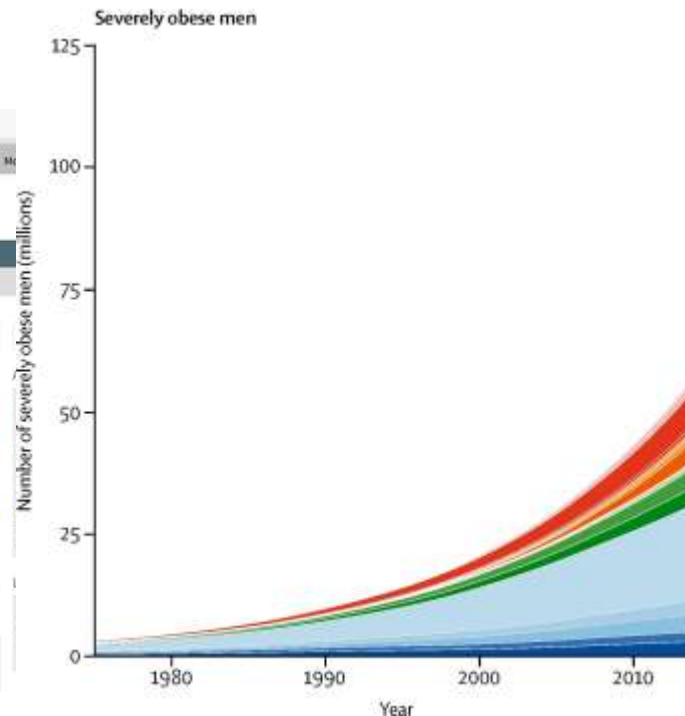
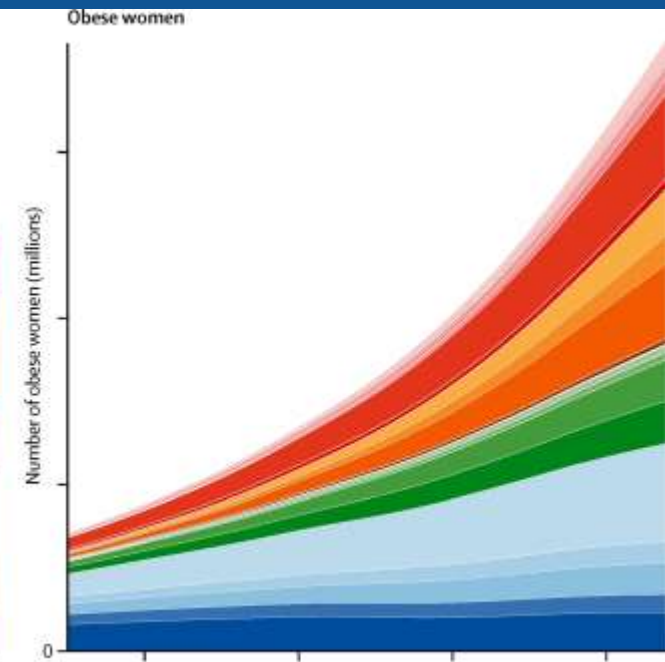
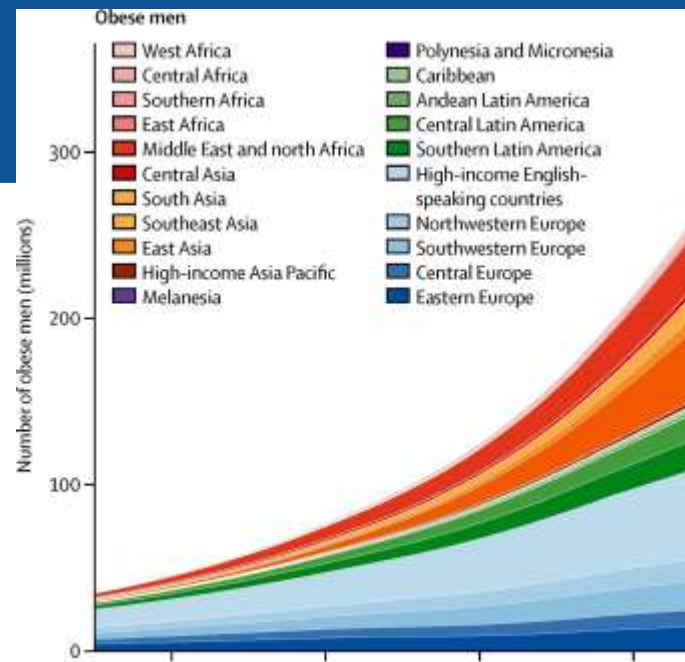
Open Access | [Articles](#) | [Lancet](#)

DOI: [http://dx.doi.org/10.1016/S0140-6736\(16\)0054-X](http://dx.doi.org/10.1016/S0140-6736(16)0054-X) | [CrossMark](#)

Article Info

Summary · Full Text · Tables and Figures · References · Supplementary Material

Summary



HOW LONG UNTIL IT'S GONE?

Estimated decomposition rates of common marine debris items



Estimated individual item timelines depend on product composition and environmental conditions.

Source: NOAA (National Oceanic and Atmospheric Administration), US / Woods Hole Sea Grant, US
Graphics: Oliver Loh / Museum für Gestaltung Zürich, ZHdK

SDGs – All directly or indirectly relevant to bioeconomy or FNS



IN EUROPE:

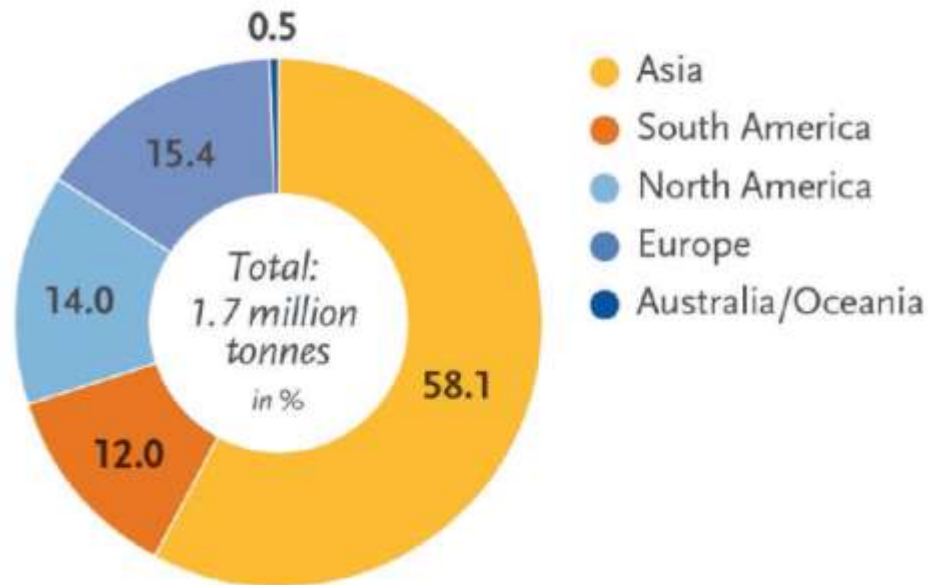
Several MS have adopted **national Bioeconomy Strategies**.



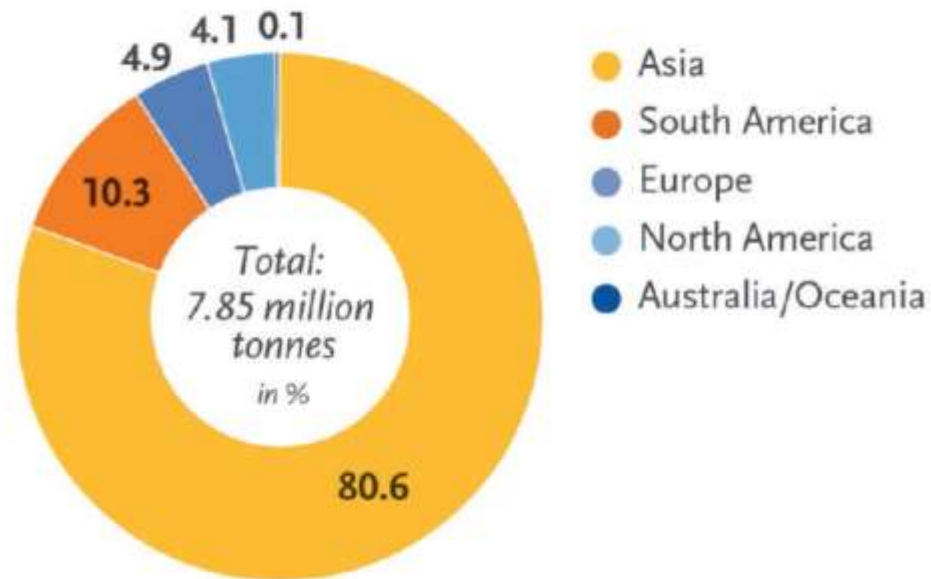
**More than 10 Regions
are investing in
Research on
Bioeconomy (ESIF)**

Finland and Poland
the most involved countries
(Source: eye@RIS3)

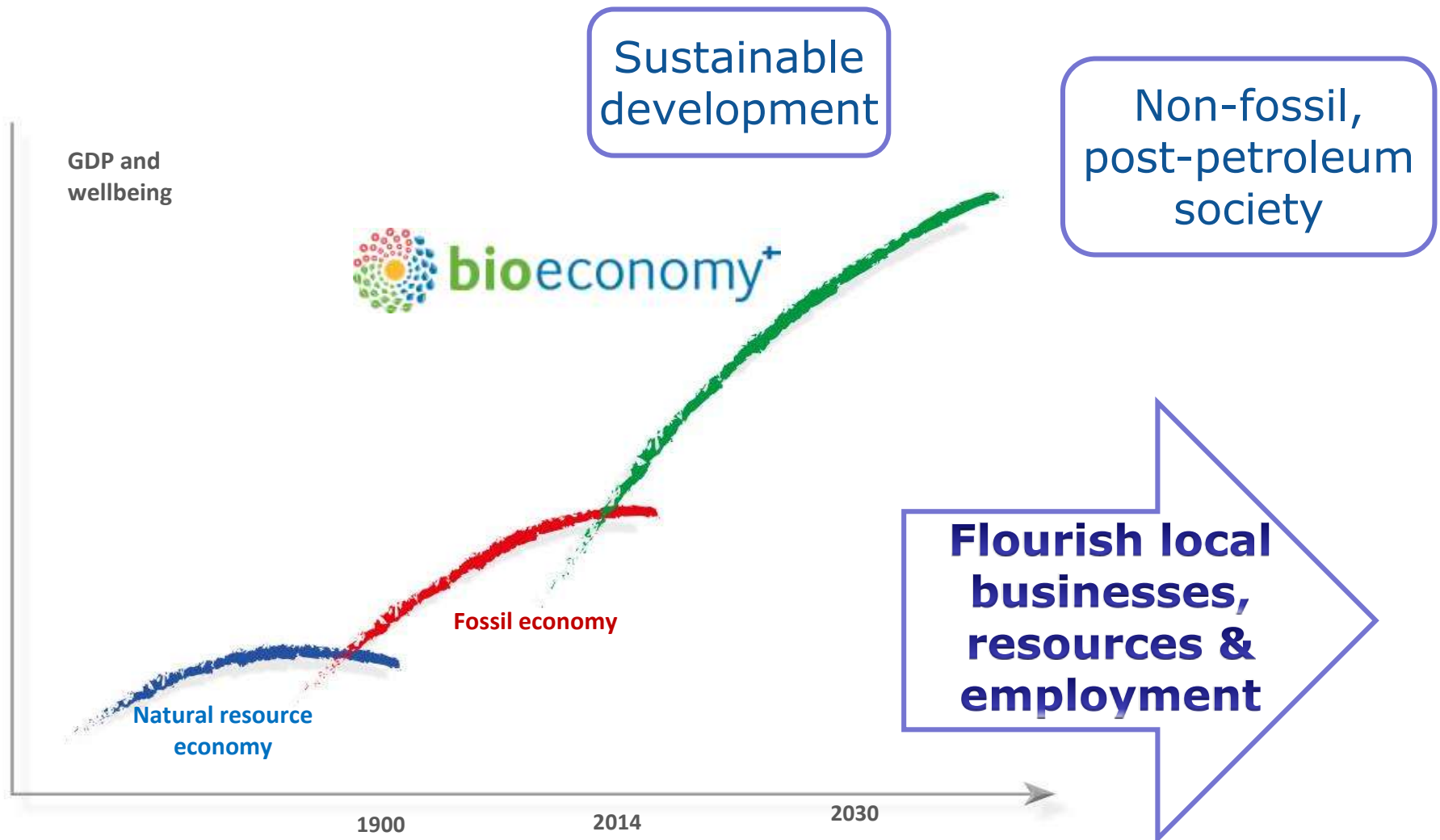
Global production capacities of bioplastics in 2014 (by region)



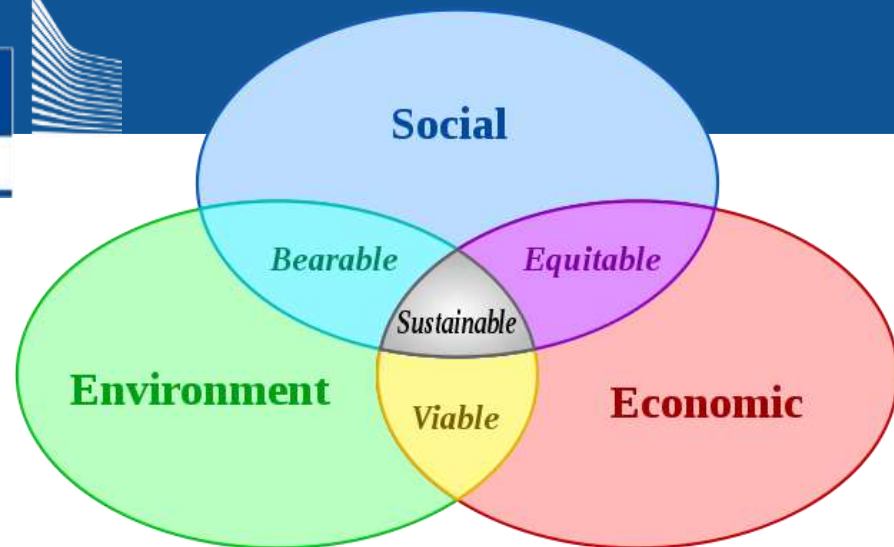
Global production capacities of bioplastics in 2019 (by region)



Europe needs to **act to remain competitive
for industrial production and attract
investment in the bioeconomy**



Source: Finnish Bioeconomy Strategy, 2014



Sustainability - *conditio sine qua non* for a robust and resilient economy in the Anthropocene

"In practice, sustainability refers to efforts to align economic development with environmental protection and human well-being. Sustainability is commonly characterized in terms of the interdependence among three broad dimensions—environment, economy, and society—while considering both present and future generations. The diagram to the right represents these dimensions as nested, with a resilient and robust economy existing within a healthy society dependent on an intact and functional environment."

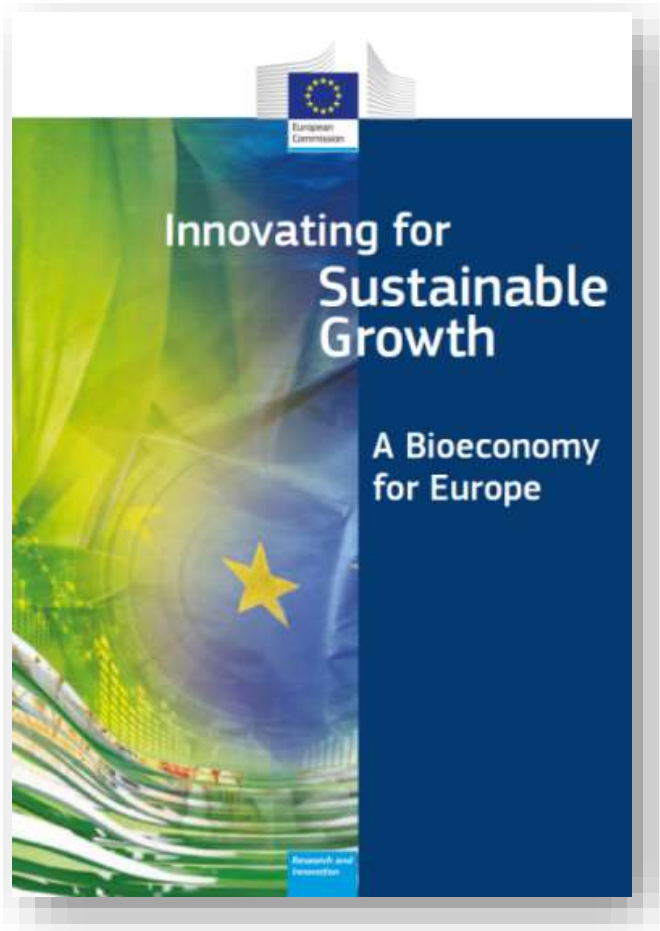
Economy, Society, Environment: A Nested Relationship



5. WHAT IS EU BIOECONOMY POLICY?

EU Bioeconomy Policies





EU Bioeconomy Strategy introduced in 2012



European Bioeconomy Strategy - Aims

*The **Bioeconomy Strategy and its Action Plan** aim to pave the way to a more innovative, resource efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection. They will **inform research and innovation agendas** in bioeconomy sectors and **contribute to a more coherent policy environment, better interrelations between national, EU and global bioeconomy policies** and a **more engaged public dialogue**. They will seek synergies and respect complementarities with other policy areas, instruments and funding sources, which share and address the same objectives, such as the Common Agricultural and Fisheries Policies (CAP and CFP), the Integrated Maritime Policy (IMP), environmental, industrial, employment, energy and health policies.*

Social, environmental and economic impact

- Replacing fossil sources and reducing GHG emissions
 - Enhancing energy security.
 - Potential for new, innovative & green products
 - Huge potential for growth and jobs
 - Important part of a circular economy
- ...but difficulties times (low oil prices, access to financing, competition between energy/material use of biomass)



EU Bioeconomy Strategy & Action Plan

Investment in R&I and skills



- **Horizon 2020 (€3,8b SC2)**
- Increase multi-disciplinary & cross-sectoral R&I
- ESIF - Smart Specialisation
- EFSI

Policy interaction & stakeholder engagement



- EU Policy coherence
- Development of regional and national bioeconomy strategies
- Bioeconomy Panel
- Bioeconomy Observatory
- International cooperation

Enhancement of markets & competitiveness in bioeconomy



- Sustainable intensification of primary production
- Expansion of new markets
- Increase EU competitiveness
- **BBI JU**

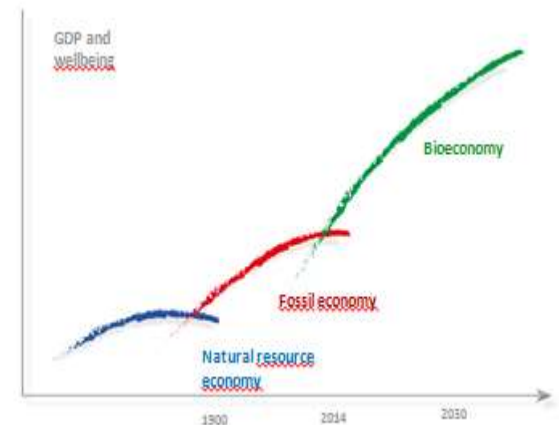


From Bio-economy to bio-industry

- "Bio-economy" is not an established sector, but at the cross-road between many different sectors involving a wide range of diverse actors
- Boundaries between biomass and waste are fluid, as "bio-based" products may be defined in different ways
- Where to start from: from premium products or from low hanging fruits?

Bio-based industries: the new wave of industrialisation

- The bio-based industries sector in the EU is currently of about 57 billion € in annual turnover with 300,000 direct and indirect jobs.
- Bio-based industries increase EU competitiveness through re-industrialisation and sustainable growth and strengthen rural economies.
- Worldwide, the race is on! Almost 1800 biorefineries to be commissioned globally until 2022*. \$1.4 billion of public funding was allocated to the development of advanced biofuels in the US in 2011.





Bioeconomy Strategy – Enhancement of New markets in Bioeconomy Sectors (2012)

- **Establish a Public Private Partnership (PPP) on bio-based industries;** Promote the setting up of networks for integrated and diversified biorefineries;
- Sustainable intensification of primary production; improve understanding of biomass/biowaste availability and demand; develop **sustainability criteria/indicators and assessment approaches;**
- Support expansion of new markets, e.g. by developing **standards and labels for bio-based products; facilitate procurement for bio-based products;**
- Develop science-based approaches to inform consumers about product properties; **encourage informed lifestyle choices.**

Bioeconomy Observatory

A 3-year project for setting-up of the Bioeconomy Observatory was launched in February 2013.

The Observatory is a source of data and information about bioeconomy, including:

- **Statistics on research investments**
- **Policy mapping**
- **Bioeconomy country profiles**
- **Data visualisation**
- **Analytical reports**

biobs.jrc.ec.europa.eu



Bioeconomy Panel

30 members representing:

- Business and producers
- Policy-makers and public administrations
- Scientists and researchers
- Civil society organisations

2 Thematic Working Groups on:

- Biomass Supply
- Development of markets in the bioeconomy

➤ 1 contact group with the **Bioeconomy Observatory**



ec.europa.eu/research/bioeconomy/policy/panel_en.htm



For a European Industrial Renaissance

COM(2014) 14 final

- Recognises the **central importance of industry** for creating jobs and growth, and of mainstreaming industry-related competitiveness concerns across all policy areas.
- **Bio-based products:** granting access to sustainable raw materials at world market prices for the production of bio-based products. This will require the application of the **cascade principle** in the use of biomass and eliminating any possible distortions in the allocation of biomass for alternative uses that might result from aid and other mechanisms that favour the use of biomass for other purposes (e.g. energy)



- 1. A new boost for jobs, growth and investment**
2. A connected digital single market
- 3. A resilient Energy Union with a forward looking climate change policy**
- 4. A deeper and fairer internal market with a strengthened industrial base**
5. A deeper and fairer EMU
6. A reasonable and balance free-trade agreement with the U.S.
7. An area of justice and fundamental rights based on mutual trust
- 8. Towards a new policy of migration**
9. A stronger global actor
10. A Union of democratic change

Agenda for Jobs, Growth, Fairness and Democratic Change (2014)





A new start for Europe

President Juncker's Agenda for Jobs, Growth, Fairness and Democratic Change (2014)

A new boost for jobs, growth and investment

- To mobilise up to € 300 billion in additional public and private investment in the real economy over the next three years.

A resilient Energy Union with a forward-looking climate change policy

- We need to diversify our energy sources, and reduce the high energy dependency of several of our Member States.

A deeper and fairer Internal Market with a strengthened industrial base

- We need to bring back industry's weight in the EU's GDP back to 20% by 2020 from less than 16% today.

A stronger global actor

- To combine national and European tools, and all the tools available to the Commission, in a more effective way than in the past.

A Union of democratic change

- Making the European Union as a whole more democratic.

Next steps for the EU Bioeconomy policy: ..with the support of MS and EU Regions

PRIORITIES

ACTIONS

Boost investments

- Financial Instruments - **EIB/InnovFin**
- Synergies with **ESIF** (*SoE, Widening participation*)
- Link with other programmes (**EFSI**, COSME...)

Favorable policy environment

- Identify and address **regulatory & financial or other** barriers /gaps/needs

Address Knowledge gaps

- **Study** to map EU regions BE Plans – RIS3 (2016)
- **Bioeconomy Knowledge Centre**

Increase stakeholders engagement

- **KEP-Knowledge Exchange Platform**
- Bioeconomy Stakeholder Panel
- Smart Specialisation Platforms, Networks (*ERRIN, ERIAFF*)

6. BIOECONOMY AND HORIZON 2020



The EU Framework Programme
for Research and Innovation

HORIZON 2020



*Excellent Science
Competitive Industries
Better Society*

Research and
Innovation



What is Horizon 2020?

- ***An €80 billion research and innovation funding programme (2014-2020);***
- ***A core part of Europe 2020, Innovation Union & European Research Area:***
 - *Responding to the economic crisis to invest in future jobs and growth*
 - *Addressing people's concerns about their livelihoods, safety and environment*
 - *Strengthening the EU's global position in research, innovation and technology*

What is Horizon 2020?



Largest research and innovation programme globally - The European Union programme for research and innovation for 2014-2020

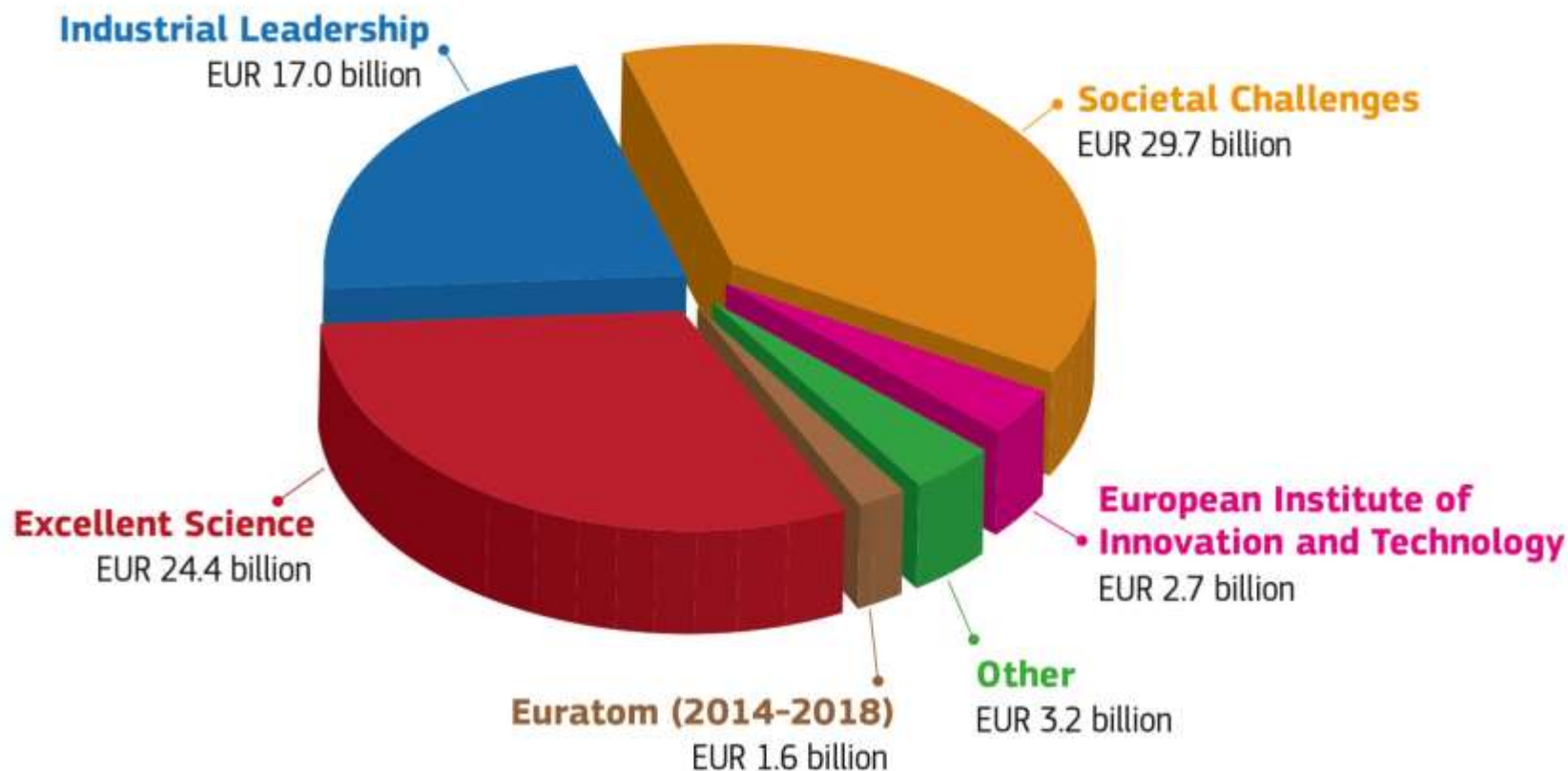
- **An integrated programme coupling research to innovation**
- **Challenge based**
- **Strong focus on SMEs**
- **Major simplification**
- **Open to the world (new priority of Commissioner Moedas)**



€ 79 billion from 2014 to 2020



HORIZON 2020 BUDGET (in current prices)



THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

Coupling R&I

Challenge based

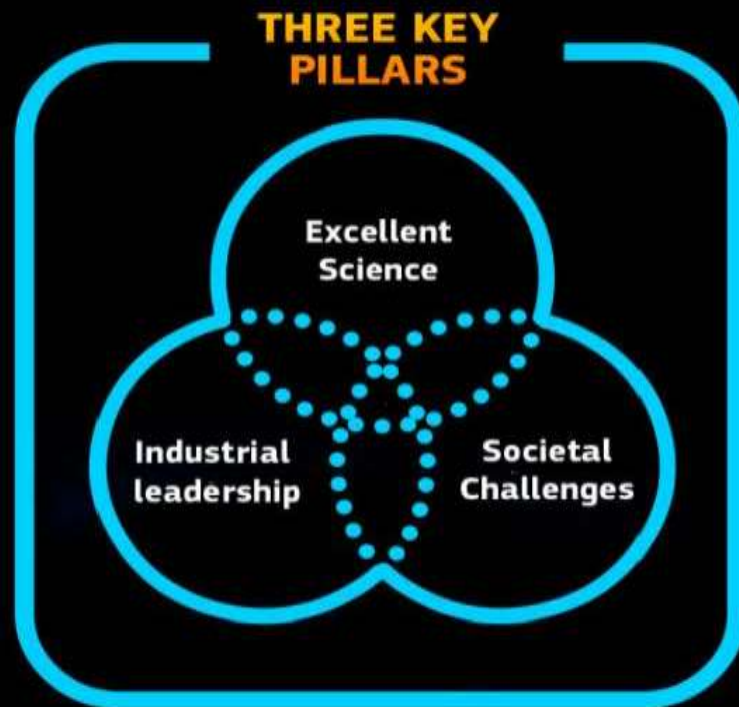
A simpler programme

**Horizon 2020 is designed to help
bring more ideas to the market**

Research and
Innovation

THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020



Research and
Innovation

Priority 3.

Societal challenges



1. Health, demographic change and wellbeing

2. Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy

3. Secure, clean and efficient energy

4. Smart, green and integrated transport

5. Climate action, resource efficiency and raw materials

6. Inclusive, innovative and reflective societies

7. Secure societies



Societal Challenge 2: Food Security, Sustainable Agriculture and Forestry, Marine and Maritime and Inland Water Research and the Bioeconomy

Objectives:

- Sufficient supplies of safe, healthy and high quality food and bio-based products,
- productive and resource-efficient primary production systems,
- competitive and low carbon supply chains.

**Making the best from our biological resources
accelerating the transition to a sustainable European bioeconomy**

EU Bioeconomy Strategy

Societal Challenge 2: Food Security, Sustainable Agriculture and Forestry, Marine and Maritime and Inland Water Research and the Bioeconomy

Activities:



**Agriculture
and
forestry**

**Agri-food
sector for a
safe and
healthy diet**

**Aquatic
living
resources**

**Bio-based
industries
and
bioeconomy**

**Marine
and
maritime
research**





Horizon 2020 – Societal challenge 2: Food Security, Sustainable Agriculture and Forestry, Marine and Maritime and Inland Water Research and the Bioeconomy

2.4. Biobased industries and bioeconomy

Feedstock

- 2.4.1. Fostering a sustainable biomass supply and building new value chains

Biorefineries*

- 2.4.2 Optimising efficient processing through R&D and upscaling in large-scale demo/flagship biorefineries

Supporting market development

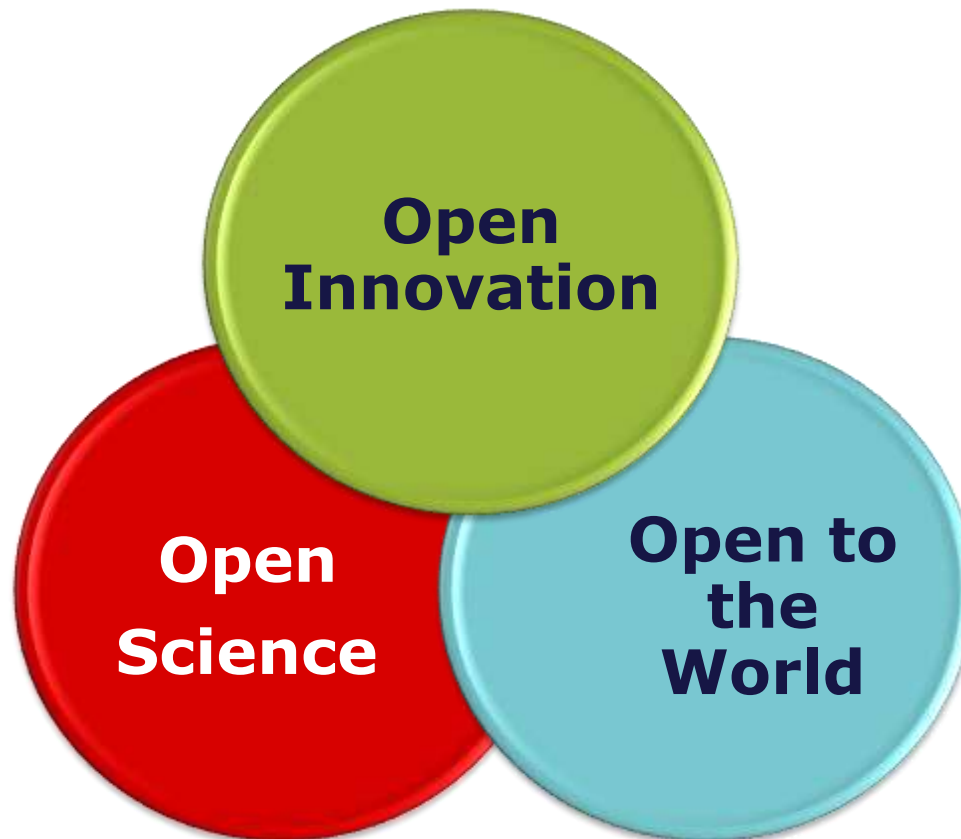
- 2.4.3 Developing markets for bio-based products and optimising policy frameworks

* Mainly implemented through the **BBI-JU**

Forestry in Societal Challenge 2

*The Specific programme implementing Horizon 2020 makes specific reference to the forestry sector under SC2 - Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy, **sub-activity 2.1.4 – Sustainable forestry**. There, specific reference is made to multifunctional forest production systems, tree health, ecosystem services, sustainable supply of biomass with due consideration to economical, ecological and social aspects of forestry, including owners' needs and regional differences.*

Commissioner Moedas - three priorities





Priorities of Commissioner Carlos Moedas for Research and Innovation

- *Open Innovation:*
 - to capitalise on the results of research and create a vibrant innovation ecosystem, involving far more actors in the innovation process, from researchers, to entrepreneurs, to users, to governments and civil society
- *Open Science:*
 - increase the excellence of European science through policies that reinforce openness and integrity of science
- *Open to the World:*
 - a more active engagement through science diplomacy and global scientific collaboration

Moedas' Priorities TO DO List



Open Innovation

Boost Private Investment:

- European Fund of Funds
- Maximise use of EFSI

Maximise Impact:

- Seal of Excellence
- European Innovation Council
- Merge digital into thematic priorities (health, energy, food, water)
- 2nd wave of simplification

Regulatory reforms:

- Scientific Advice Mechanism
- Tech Refit/ Beta Regulation
- Policy Support Facility

Open Science

Openness:

- European Science Cloud
- Open Access/
Open Data

Research Integrity

- New Standards
- Ombudsman/
enforcement

Open to the World

- **Global Research Areas** (Latin America/Asia)

Specific initiatives:

- PRIMA
- SESAME
- South Atlantic

OPEN INNOVATION



Removing barriers
and investing in
Bioeconomy to unlock
its full potential

DELIVERABLES

**"Revise Bioeconomy Strategy"
as "Key Circular Economy"
action**

- EU Bioeconomy Strategy & Action Plan revised 2017
- Joint Research Agri Council – Bioeconomy + FNS + Research in Agri(Q4 2016)

Food & Nutrition R&I Strategy

- Partnership Food Industry – Personalised Nutrition & Diet, Low Waste/Resources;
- World Food Day 2016 FNS Innovation Summit
- Food Research Area: 4 Priorities & Partnership Data Governance Investment Alignment

Building Bioeconomy Regions

- Seal of Excellence bioeconomy funded by ESIF
- Future Danube bioregion initiative?

**New Biobased Industrial
flagships**

- BioBased Industries joint undertaking annual call for proposals 3,7 bn
- 5 Demonstrator biorefineries + KPIs

Blue Growth & Innovation

- Blue Med Initiative 2015-17
- BONUS Renewal 2016 -17
- Demonstrators Algae & Aquaculture, multipurpose offshore platforms, technologies

Access to Finance Bioeconomy

- New EIB-EIF risk financing instruments for blue bioeconomy agriculture and food investment (2016+)

OPEN SCIENCE



**Opening Bioeconomy to
build a societal consensus
on Bioeconomy**

DELIVERABLES

Open Access to Science - Bioeconomy Data

- Pilot "Food Commons" Open Science
- Open Access to Data in SC2 Work programme 2016/2017

Science Open to Citizens

- EU wide citizen dialogue public engagement project on SC2

Engaging Citizens in Science

- Ocean Literacy
- Clean oceans campaign, yearly prize
- G7 - Ocean Litter engagement

Building stakeholders consensus on Bioeconomy

- Bioeconomy Stakeholders Panel Event – April 2016 (NL)
- Bioeconomy Manifesto for Europe (end 2016)

Science for Security of Citizens

- Food Safety "One Health" Animal/Human Health EJP 2016

OPEN TO THE WORLD



**Building a Global
framework for the
Bioeconomy**

DELIVERABLES

**EU – Africa Partnership on Food and Nutrition
Security FNS and Sustainable Agriculture**

- Roadmap EU/AU Addis Abeba event 2016
- Thematic focus: Sustainable Production, Nutrition & Health, Food Safety & Trade

**PRIMA – Mediterranean partnership for food
security and water availability**

- PRIMA CSA 2016: Water & agriculture

Towards an All Atlantic Ocean Research Alliance

- EU-Brazil MoU on Marine Cooperation on 17 Nov 2015
- EU-US-Can Transatlantic Ocean Research Alliance
- Arctic Cooperation

**EU-China Flagship Initiative on Food, Agriculture
and Biotechnologies and EU-Asean on aquaculture**

- EU-China flagship 2015
- EU-Asean 2016

Global Bioeconomy Forum

- Global Bioeconomy Summit 2015
- International Bioeconomy Forum 2017

7. INVESTMENTS, MARKETS AND REGULATORY ENVIRONMENT



Investment, markets and regulatory environment

- Bioeconomy and Structural Funds (ESIF)
- Access to finance (InnovFin - EU Finance for Innovators)*
- Market conditions and regulatory environment

* incl. ongoing study on addressing funding gaps in bio-based industries & blue economies (Dec 2015)



- Major opportunities for new economic growth and job creation;
- Cross-cutting approaches, engaging a wide range of stakeholders.

http://ec.europa.eu/regional_policy/sources/docgener/presentation/green_growth/greengrowth.pdf



Access to finance

- **Guidelines on BBI-ESIF synergies** developed by BIC

- WHAT can be co-funded in a given project
- HOW to approach these synergies

http://bbi-europe.eu/sites/default/files/documents/Guidelines_BBI_H2020.pdf

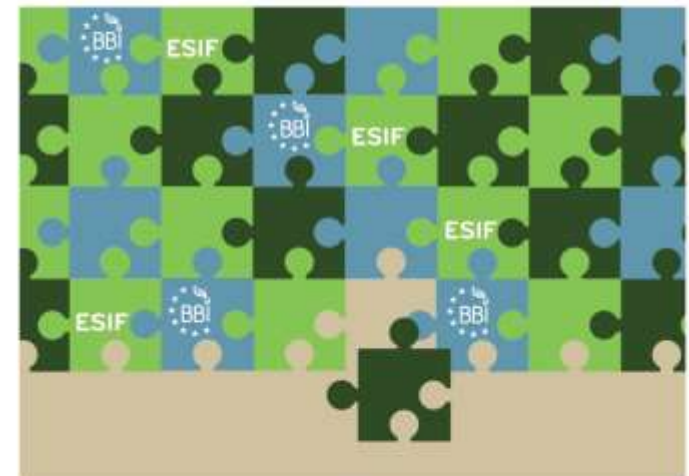
- **"Bioeconomy Investment Summit" in Brussels** on 9-10 November 2015 organized by the European Commission

Registration is free - will open by summer's end


http://ec.europa.eu/research/bioeconomy/news-events/news/20151109-programme_en.htm

Combining BBI (H2020) and European Structural and Investment Funds (ESIF) to deploy the European bioeconomy

- *Guiding principles* -



A PUBLIC-PRIVATE PARTNERSHIP
ON BIO-BASED INDUSTRIES

 **Bio-based Industries
Consortium**



InnovFin

EU Finance for Innovators

The new generation of Horizon 2020 financial instruments



Horizon 2020 Access to Risk Finance - Basics

1) What support will be on offer?

- Risk-sharing (loans and guarantees); risk finance (equity)

2) For who or what?

- *RDI-driven/ innovative SMEs & small midcaps*
- Ambitious RDI projects (by companies, stand-alone projects, etc.)

3) To serve which purpose?



- Stimulate investment in R&D&I, notably by the private sector
- No market distortion: intervention only to address financing gaps (notably due to high risk), and as such help translate R&D results to the market

4) Key figures (2014-2020)

- 3bn€ from EU + 3 bn€ from EIB group as risk buffers
- ➔ will result in total debt financing of > 24bn€ (of which >5.5bn€ for SMEs)
- ➔ expected overall economic impact incl. private investment = 48bn€

InnovFin Product Overview

SMEs	Mid-Caps	Large Caps	Advisory
InnovFin SME Guarantee (Guar.: 25K€ to 7.5 mio€)	InnovFin MidCap Guarantee (Guar.: 7.5 to 50 mio€)	InnovFin Large Projects (Loan: 25 to 300 mio€)	InnovFin Advisory
InnovFin SME Venture Capital	InnovFin MidCap Growth Finance (Loan: 7.5 to 25 mio€)		

- 
direct products - EIB group is directly issuing a loan to a borrowing project (loan covers up to 50% of total project's costs)
- 
indirect products - EIB group is offering (counter-)guarantees to an intermediary partner bank which then issues loans to borrowing projects ((counter-)guarantees cover up to 50% projects' costs)



Horizontal aspects related to bioproduct markets

Standards

- What does term the bio-based product cover? How it is being used? Helping to clear uncertainties for companies, governments and consumers. European Standards as essential elements in aggregating demand of existing and new bio-based products.
- E.g. bio-based polymers, bio-lubricants, bio-solvents and bio-surfactants, Sustainability aspects (Final EN 16751 expected mid-2016), Life Cycle Assessment (Final EN 16760 expected mid-2016).
- EC-mandated work of CEN Technical Committee 411 'bio-based products'.

Labelling

- Voluntary scheme EU Eco-label of environmental excellence provided that products fulfil the criteria on environmental performance.
- E.g. bio-lubricants, taking into account quantitative levels of bio-based contents.

Public procurement

- Green Public Procurement (e.g. biopolymers for packaging & other bio-based products, especially bio-based cutlery for large events), Public Procurement of Innovation (PPI) with Bio-Based Products and Services (BBPS).



Regulatory environment

Initiative InnovREFIT (Regulatory Fitness and Performance Programme)

- Favorable regulatory environment (EU and Member States)
- Access to and sustainability of biomass
- Market-pull measures
- Citizens and consumers expectations

8. EU BIOECONOMY STRATEGY REVIEW



ROADMAP

1st SEMESTER 2016:

- Jan:** Stakeholder interviews (NL Presidency)
- Mar:** Member States workshop
- Apr:** Stakeholders Panel, Utrecht Conference
Competitiveness Council
- May:** Agri- Council
- Jun:** Stakeholders Panel
New Bioeconomy Observatory web-site



2nd SEMESTER 2016:

- Sept:** Expert Group BioE Review
- Nov:** MANIFESTO
Workshop OECD/FAO
Competitiveness + Agri
Council
- Dec:** Expert Group Final Report



1st SEMESTER 2017:

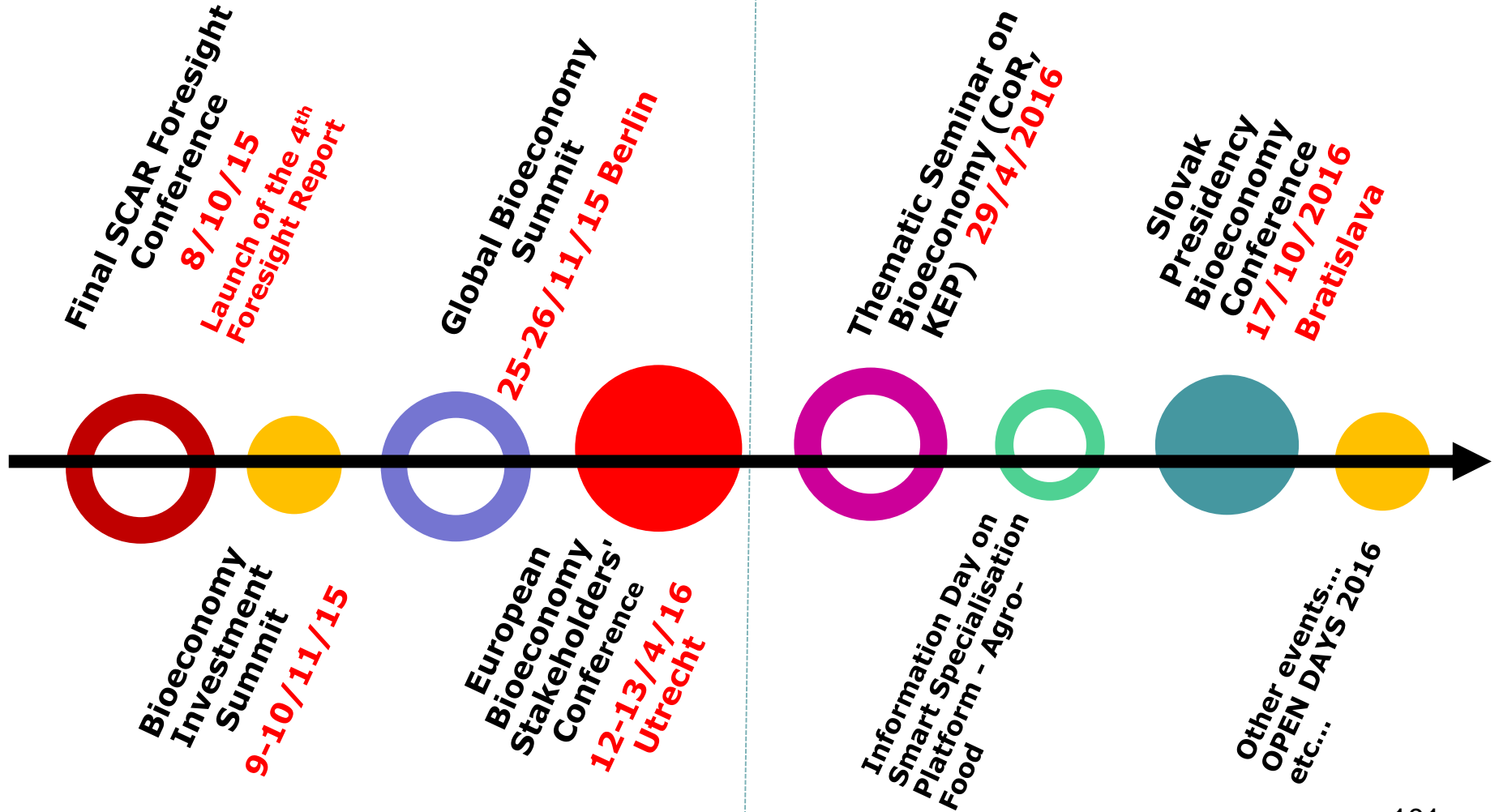
- Mar:** BioE ACTION PLAN – Draft
WORKSHOP OECD/FAO/EUROSTAT/JRC
- Apr:** Member States Workshop
- Jun:** BioE ACTION PLAN – Final draft



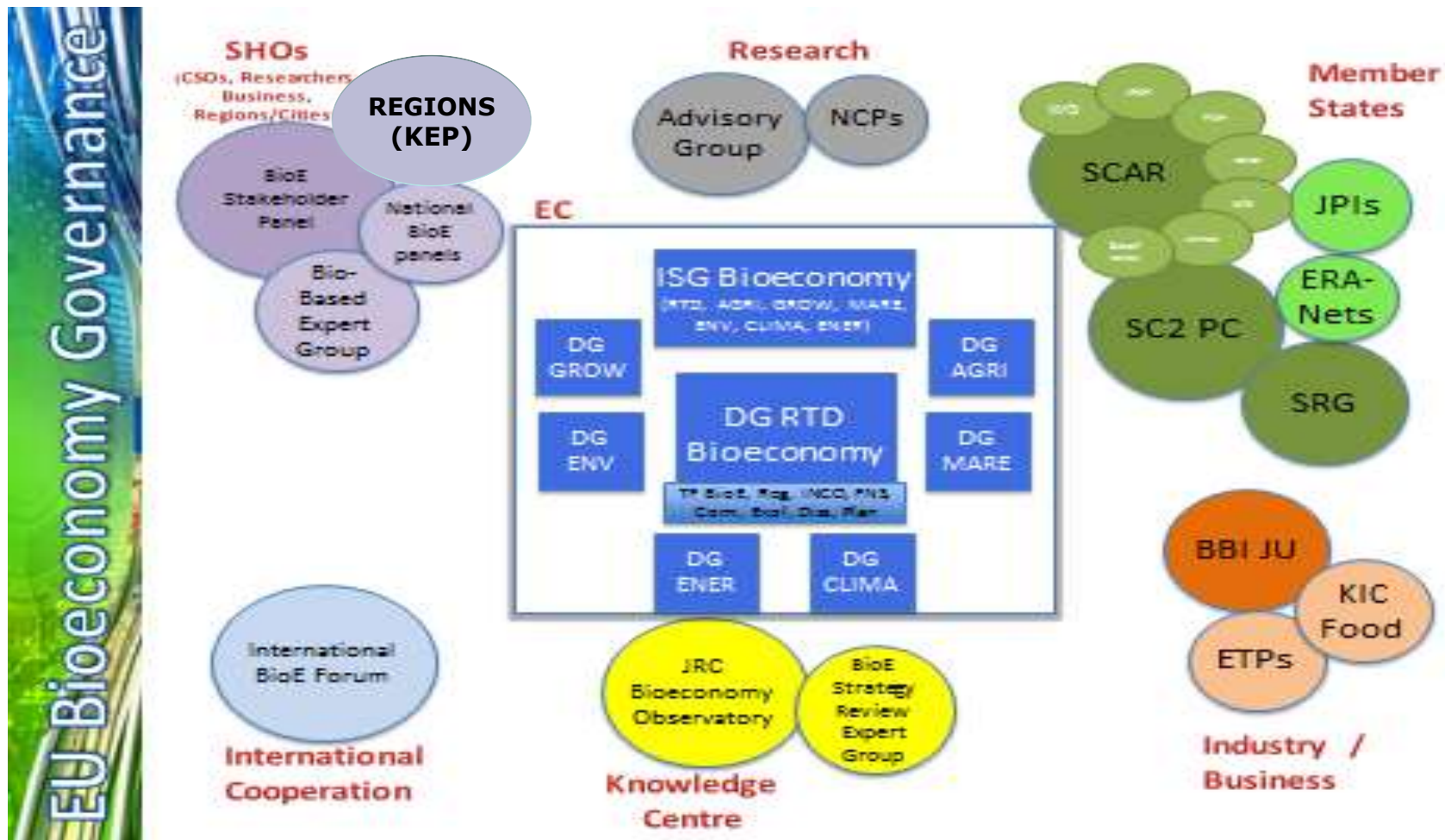
2nd SEMESTER 2017:

- Sep:** BioE CONFERENCE (?)
COUNCIL CONCLUSIONS

Calendar - events



We count on MS and EU regions for the review of the Bioeconomy Strategy





EUROPEAN BIOECONOMY STAKEHOLDERS MANIFESTO

BIOECONOMY UTRECHT 2016



CHALLENGES & OPPORTUNITIES FOR EU REGIONS: (POINT 8)

- Need to revitalise **rural and coastal areas**.
- **Bioeconomy** for high-value production in the regions,
- New opportunities & jobs for farming, forestry and aquaculture.
- The **marine environment potential** as part of the circular bioeconomy.

GUIDING PRINCIPLES: (POINTS 16 & 17)

- Europe's **cities & regions** should play a key role for the BioE.
- We should fully **utilise the available biomass** and **better valorise the use of agricultural land...**
- **Marine production and aquaculture** offer new possibilities.

ACTIONS: (POINT 22)

- **Mutual learning** within & between regions, **peer-to-peer exchanges** at the EU
- **Link** between **regional bioeconomy strategies** and **smart specialisation**
- Creation of **new value chains, stairways of excellence, jobs and growth**
- **Redesign current agricultural-, energy and waste policies**



Stakeholders Manifesto

2. The **bioeconomy** comprises those parts of the economy that **use renewable biological resources** (biomass) from land and sea – such as crops, **forests**, fish, animals and microorganisms, as well as biological residues and waste – to produce **food, animal feed, materials, chemicals, fuels, and energy** in a sustainable way. Our vision has been built upon a solid historical basis.

8. Europe needs to revitalise rural and coastal areas. A European bioeconomy will offer a **new perspective on high-value production in the regions**, as well as creating **new opportunities and jobs** for farming, **forestry** and aquaculture

16. A European bioeconomy will **diversify the revenues of the agricultural and forestry sectors** and develop a competitive, knowledge-intensive economy in rural Europe

18. **Flagships** for a European Bioeconomy with potential for 'Public-Private Partnerships' are: biorefinery, biomaterials, new food systems (proteins from aquaculture, insects, plants), **building with innovative wood products**, biochemicals, artificial photosynthesis, marine biomass production and new molecular functionalities

European Bioeconomy Stakeholders Manifesto

Building blocks

This manifesto was developed by stakeholders from large and small companies, NGOs, associations, national and regional governments from 30 countries throughout Europe at the 4th Bioeconomy Stakeholder Conference in Utrecht, 12-13 April 2016.

9. EU REGIONS ARE KEY PLAYERS FOR THE BIOECONOMY

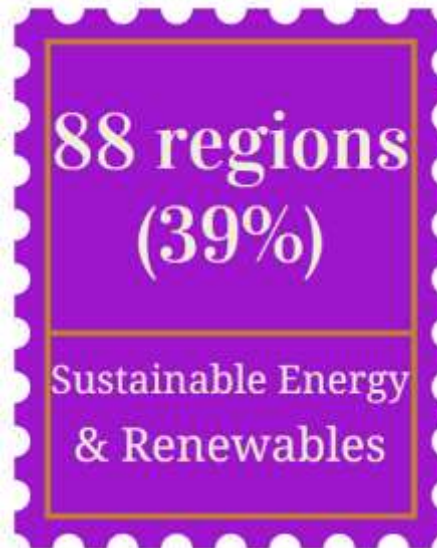
What areas are EU regions going to invest in? (*RIS3*)



Food Security & Safety
34 regions (15%)

Sustainable Agriculture

24 regions (11%)

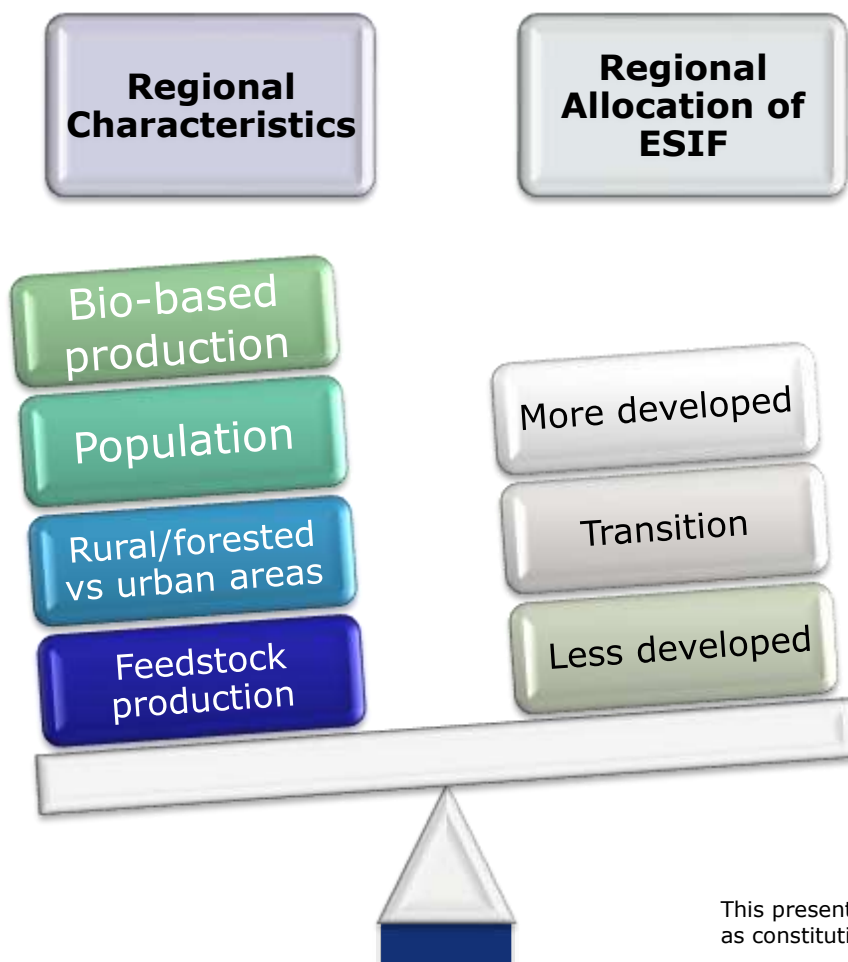


Aquaculture: 7 regions (3%)

Blue Renewable Energy: 9 regions (4%)

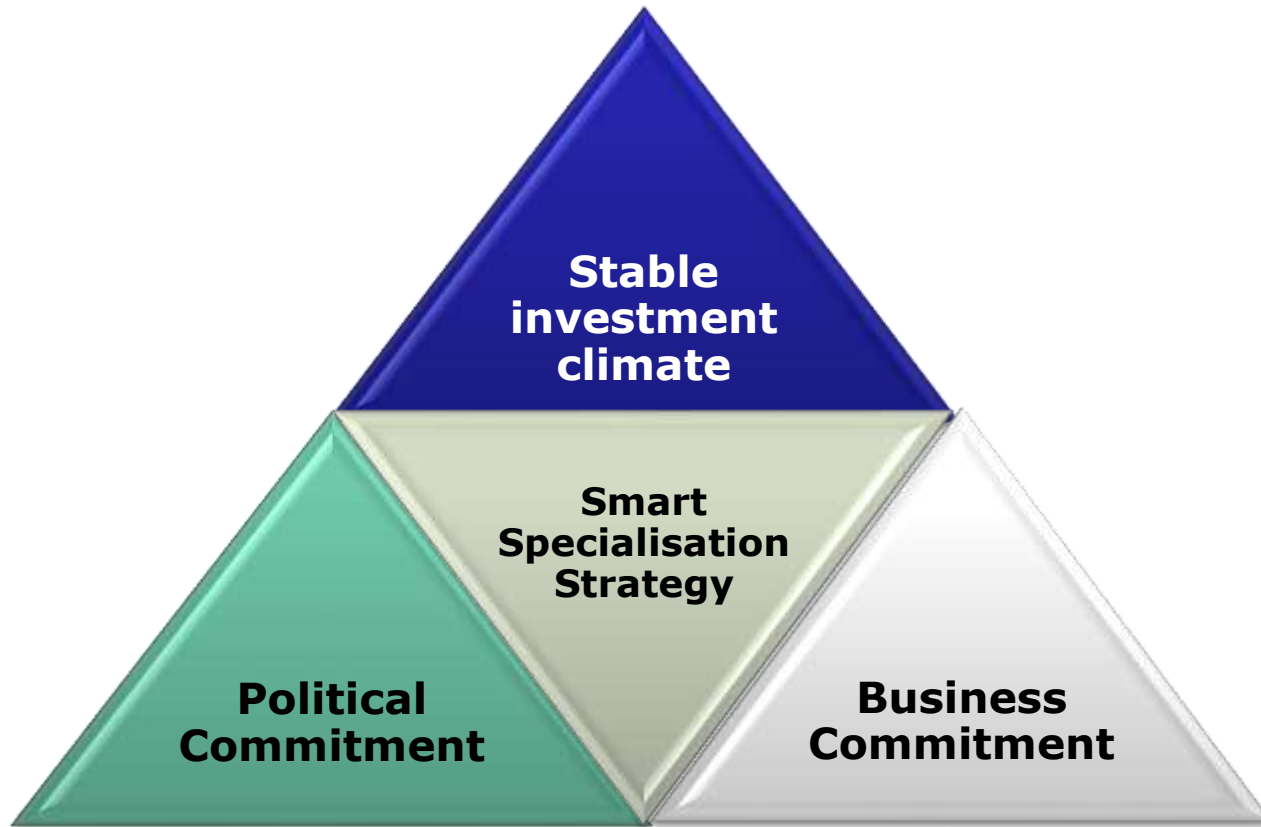
Marine Biotechnology: 2 regions (1%)

EU Regions' diversity is their advantage!



Regional Bioeconomy Strategy Development

4 fundamental ingredients



SUGGESTED ACTIONS ON THE GROUND FOR EU REGIONS:

→ Provide market **Supply** by **exploiting biomass**



→ Create market **Demand** by investing in **new value chains**

**EU & regions needs to act fast
to remain competitive & attract investments**



Regional Bioeconomy Strategy Development

7 Tips to remember!

- 1. Learn from Best Practices!** *(various EC Guides, web-sites)*
- 2. Link/create networks, clusters** *(Clusters Observatory)*
- 3. Involve in existing initiatives** *(BBI JU, Vanguard)*
- 4. Use available tools** *(eye@RIS3, Bioeconomy Observatory)*
- 5. Look for inter-regional + macro-regional opportunities**
Baltic, Danube
- 6. Use public-procurement** for new bio-based innovative solutions
- 7. Seek help!** *(Bio-NCPs, EIP-AGRI)*

Bioeconomy EU successful projects – **For regions' inspiration!**



Source photo: metsaboard.com



**EFSI
Aanekoski –
FINLAND:**
Next
generation
bio-product
mill for
boxboards
and white
linerboards

**FIRST 2
RUN
PROJECT:**
(17m€,
Sardinia)
An
abandoned
oil refinery
transformed
into a
biorefinery

**MIRACLE
S
PROJECT**
(12m€)

New
technologies
that uses
algae for
specialties
useful in

**CHIMIO
PROJEC
T:**

Facial
cream &
bioplastic
s made
from crab
shell

**AQUARIS
- Brussels:**

Bioplastic
production
from
municipal
wastewater

Useful for you..



TRY BIOECONOMY



Bio-Based Industries Joint Undertaking (BBI-JU)

<http://www.bbi-europe.eu/>

SYNERGIES & SEAL OF EXCELLENCE (**new website!**)

<http://ec.europa.eu/research/regions/>

AGRI-FOOD SMART SPECIALISATION PLATFORM

<http://s3platform.jrc.ec.europa.eu/agri-food> (**new initiative!**)

VANGUARD INITIATIVE/ Bioeconomy Pilot Project

<http://www.s3vanguardinitiative.eu/cooperations/bioeconomy-interregional-cooperation-innovative-use-non-food-biomass>

GUIDES ON ESIF-H2020 SYNERGIES

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/other/index.html>

http://www.bbi-europe.eu/sites/default/files/documents/Guidelines_BBI-ESIF-Final.pdf

S3 KNOWLEDGE REPOSITORY

<http://s3platform.jrc.ec.europa.eu/knowledge-repository>

More info: **Christina Nanou (DG RTD)**
christina.nanou@ec.europa.eu

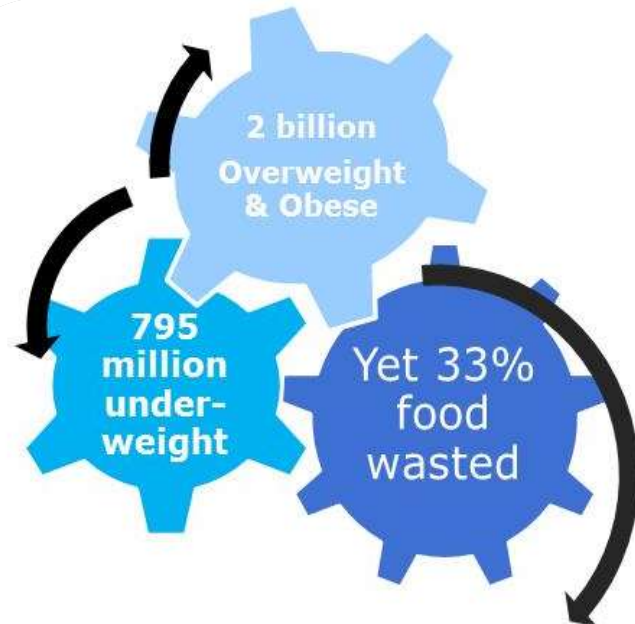
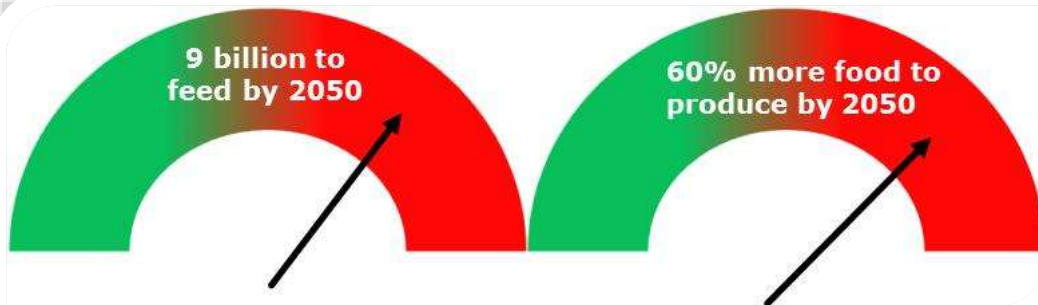
10. THE FOOD PILLAR OF THE BIOECONOMY

FOOD 2030



**Research and Innovation for
Future-proofing our Nutrition and Food Systems**

The Perfect Storm





Food Systems
Healthy & Sustainable
Diets
Land & Sea

Food & Nutrition Security

Responsible
Resilient
Competitive
Sustainable
Diverse
Performant

Food includes edible products deriving from land or sea (including inland waters) destined for human consumption or animal feed.

Food is far **more than just biomass** for life support: it has important historical, social, cultural, environmental and economic dimensions.

'**Food systems**' include the entire 'value chain' from inputs, to primary production (agriculture, aquaculture & fisheries), harvesting, storage, processing, packaging, distribution, waste streams, to consumer intake – *and back!*



They go beyond the production of sufficient food for all, but also respond to the need to provide safe and nutritious food for **healthy** and **sustainable diets**

Today vs tomorrow: ***how to future-proof our food systems (2030+)?***



So what's the problem?

FNS is a growing challenge, and **R&I is key to finding solutions** to feeding the planet in a changing world, but the current EU FNS R&I landscape is:

- Fragmented and lacks policy coherence
- Underinvestment given the challenges lying ahead
- Suffering from an innovation gap, and low speed of market/societal/policy take-up
- Lacking cohesion & investment at industrial level to meet future needs
- Lacking a whole food system approach
- Not sufficiently capitalizing on the emerging trends and advances in how we can do better science and innovation

...all of these limit the impact of R&I for FNS...thus we propose a **new policy framework** (Food 2030) for more impactful EU R&I for FNS



FOOD 2030

Need for EU R&I Policy Framework

- An innovation facing a Food Systems approach integrating land and sea - from inputs to nutrition (and back)
- Will provide:
 1. A **policy framework** to better structure, connect and scale-up EU R&I, in a global context
 2. A **global platform** to convene stakeholders in Nutrition & Food Systems to tackle global societal challenges
 3. **Investment driver** : A mean to step-up EU investment ambition and division of labour – PPP, P2P, financial instruments, EFSI
 4. A magnet for **Market Creating Innovation**

The Political Opportunity

Juncker Priorities

10 priorities

- | | | | | | |
|----|---|--|----|---|--|
| 01 |  | A new boost for jobs, growth and investment. | 06 |  | A reasonable and balanced free trade agreement with the United States. |
| 02 |  | A connected digital single market. | 07 |  | An area of justice and fundamental rights based on mutual trust. |
| 03 |  | A resilient Energy Union with a forward-looking climate change policy. | 08 |  | Towards a new policy of migration. |
| 04 |  | A deeper and fairer internal market with a strengthened industrial base. | 09 |  | Europe as a stronger global actor. |
| 05 |  | A deeper and fairer Economic and Monetary Union (EMU). | 10 |  | A Union of democratic change. |

SDGs 2015-2030



COP21



World Food Day 2016



CAP & CFP reforms

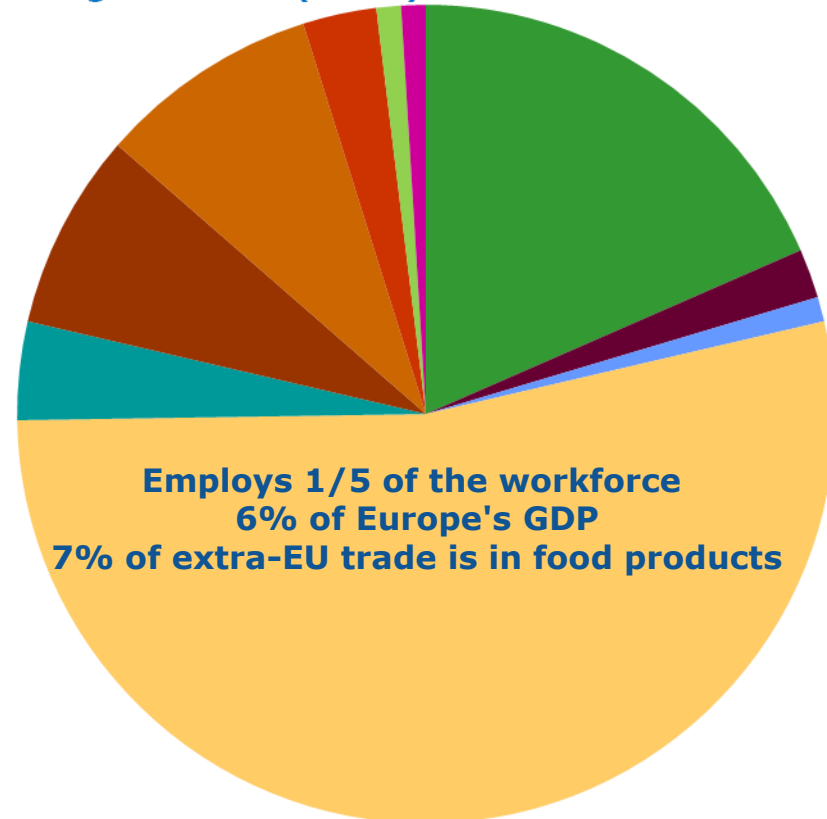
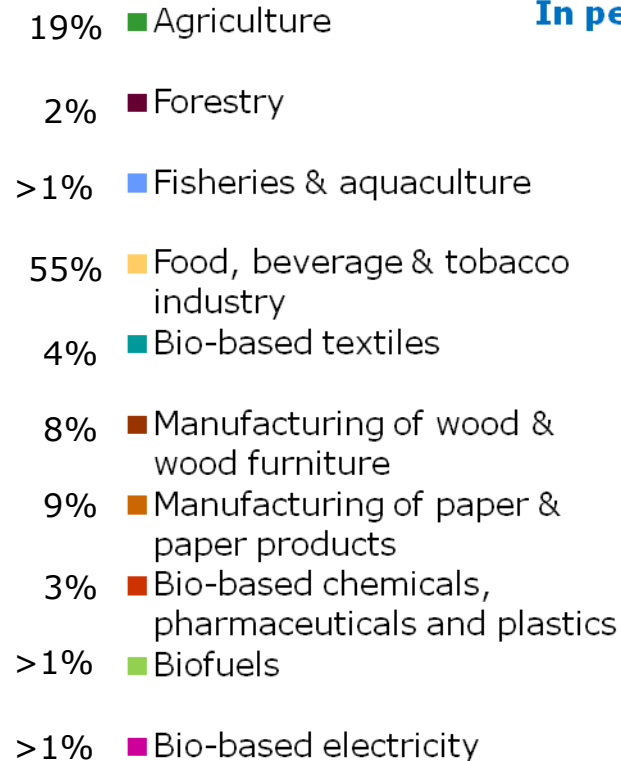
IPCC



The Economic Opportunity

Agriculture, food, fisheries & aquaculture represent 75% of the bioeconomy in Europe

**Turnover in the EU-28 by the bioeconomy sector
In percentage of value (2013)**

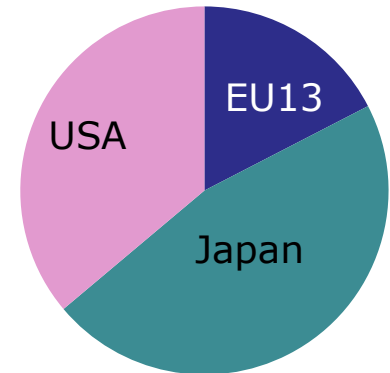




The Investment Opportunity

- Low investment in EU R&I food industry
- Historically the returns on agriculture investment have very long lag times of between 20 – 40 years.
- Return on R&I investment approx 9% in EU.
- US Venture capitalists have made more than \$1B in investments in future food and experienced a 200% year-over-year growth in 2014
- We are not reaping the potential of EFSI measures in agriculture and food sectors

Food and drink private investment in R&D as a percentage of output, 2010 (%)

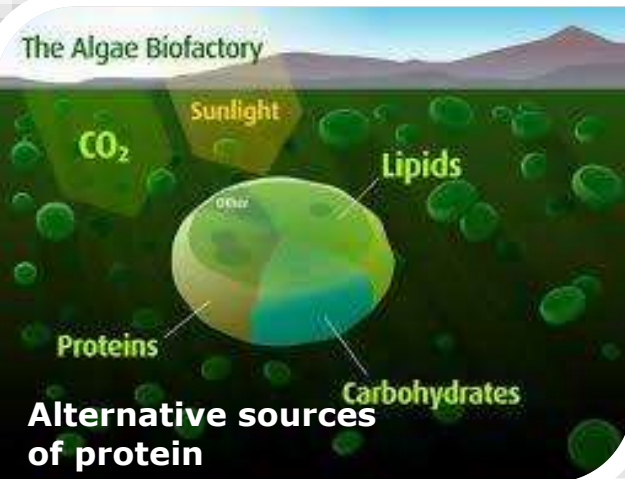


The Innovation Opportunity


Lab grown hamburger



The Algae Biofactory




FOOD 2030 Priorities



=> **Nutrition:** ↓ hunger & malnutrition, ↑ food safety & ↓ diet-related illnesses, and helping citizens adopt sustainable diets and healthy lives



=> **Climate:** Building a climate and global change-resilient food system (mitigation & adaptation)




=> **Sustainability:** Implementing sustainability & circular economy principles across the whole food system – e.g. food waste, sustainable and resource-efficient food production



=> **Innovation:** ↑ market-creating innovation & investment, while empowering communities – e.g. FOOD PPP, FOOD KIC, regions and Agri-food Smart Specialisation, food in cities, synergies between funds (H2020, EFSI, RDF, etc.)

FOOD 2030 Drivers



=> **Open Innovation:** ↑ Investment, ↑ innovation (place-based, broadbased, disruptive, market-creating, quadruple helix innovation), new business models, public/private collaboration



=> **Open Science:** Open access & data; multi-actor & public engagement; education, capacities & skills



=> **Research Breakthroughs:** ICT, food systems science & transdisciplinarity (e.g. smart personalised nutrition, consumer behaviour, multi-actor approach)



=> **Open to the world:** Global collaborations; MS R&I alignment and support (e.g. International Bioeconomy Forum, ASEAN aquaculture, EU-Africa HLPD)

What will FOOD 2030 deliver?

- R&I Policy coherence
- Investment Narrative (EFSI / EIC)
- Synergies (CAP / EFSI)
- Global cooperation platform (IBF)
- Public / Private Market Creating Innovation





FOOD 2030 - Engagement

FOOD 2030 Inter Service Task Force

- Met twice since March 2016: RTD (F,I,E,B,A), AGRI, DEVCO, MARE, CNECT, JRC, SANTE, CLIMA, ENV, GROW, SECGEN ...
- Consultation & stocktaking towards building FOOD2030

FOOD 2030 CAB-DG 12th May 2016

- Staff Working Document – adoption in time for Oct Conf



FOOD 2030 Workshops

- Food systems Innovation – May 12
- Agri-Food Smart Spec Platforms – May 12
- Smart Personalised Nutrition – June 16



FOOD 2030 HL Conference

FOOD 2030 Pre-events - 12th Oct 2016 – afternoon:

- Four pre-event participatory workshops (14:00-17:30)
- Launch "Food Village" showcasing successful R&I initiatives (18:00)
- Icebreaker cocktail with keynote (18:00-20:00)

FOOD 2030 Conference – 13th October 2016

- Participation of Moedas & Hogan confirmed
- P. Bulke (CEO Nestlé) confirmed
- Innovators, entrepreneurs, panels on nutrition for healthy and sustainable diets, climate-resilience and circularity, investments & innovation.

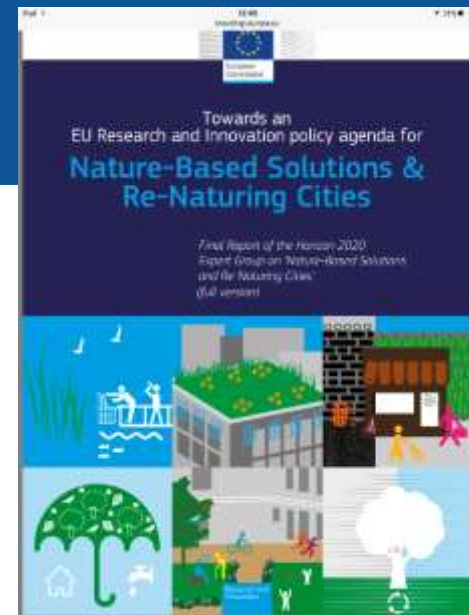
11. LOOKING FORWARD: RISING INTERFACES AND NEW COMPLEXITIES

How to interface?

Bioeconomy and new Plastics Economy

1. Create an effective **after-use plastics economy** by improving the economics and uptake of recycling, reuse and controlled biodegradation for targeted applications. This is the cornerstone of the New Plastics Economy and its first priority, and helps realize the two following ambitions.
2. Drastically **reduce leakage of plastics into natural systems** (in particular the ocean) and other negative externalities.
3. **Decouple plastics from fossil feedstocks** by – in addition to reducing cycle losses and dematerializing – exploring and adopting renewably sourced feedstocks.





How to interface?








Bioeconomy and Nature-based economy

- 1. Nature-based solutions harness the power and sophistication of nature to turn environmental, social and economic challenges into innovation opportunities.** They can address a variety of societal challenges in sustainable ways, with the potential to contribute to green growth, 'future-proofing' society, fostering citizen well-being, providing business opportunities and positioning Europe as a leader in world markets.
- 2. Nature-based solutions are actions which are inspired by, supported by or copied from nature.** They have tremendous potential to be energy and resource-efficient and resilient to change, but to be successful they must be adapted to local conditions.
- 3. Many nature-based solutions result in multiple co-benefits for health, the economy, society and the environment,** and thus they can represent more efficient and cost-effective solutions than more traditional approaches.

How to interface? Bioeconomy and Nature- based economy (2)



<https://ec.europa.eu/research/environment/index.cfm?pg=nbs>

Research & Innovation Agenda on Nature-Based Solutions and Re-Naturing Cities	
Goals	Research & Innovation Actions
Enhancing sustainable urbanisation	 Urban regeneration through nature-based solutions  Nature-based solutions for improving well-being in urban areas
Restoring degraded ecosystems	 Establishing nature-based solutions for coastal resilience  Multi-functional nature-based watershed management and ecosystem restoration
Developing climate change adaptation and mitigation	 Nature-based solutions for increasing the sustainable use of matter and energy  Nature-based solutions for enhancing the insurance value of ecosystems
Improving risk management and resilience	 Increasing carbon sequestration through nature-based solutions

How to interface?

Bioeconomy and Eco-Innovation economy

*"**Eco-industries** can be organised around three main functions:*

- **Green industries** – e.g. environmental industries, clean-up, remediation, natural resources management, renewable energy, etc.
- **Industries greening** – other industries adopting eco-innovations and reducing their environmental impacts
- **Eco-innovative solution providers** – R&D, new business models, organisational/social innovation, integrators"

<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC96826/kjna27376enn.pdf>



How to interface?

Bioeconomy and Green growth

- “So-called ‘green’ living, once promoted for the sake of environmental quality and safety, is becoming a core value in reaching for a better life as well as an economic driver in itself
- It is important to define this **‘green good life’** and **‘green growth’** in a much broader sense than is usually applied, recognising the potential for innovation in every industry and activity
- The EU is already well positioned to play a major role in the development of these new markets.
- **The current technological potential, if intelligently and appropriately supported by shifting the playing field towards favouring ‘green’ economic growth, could accelerate that path and result in the creation of a ‘European Way of Life’, a new, sustainable and profitable ideal for middle class aspirations.”**



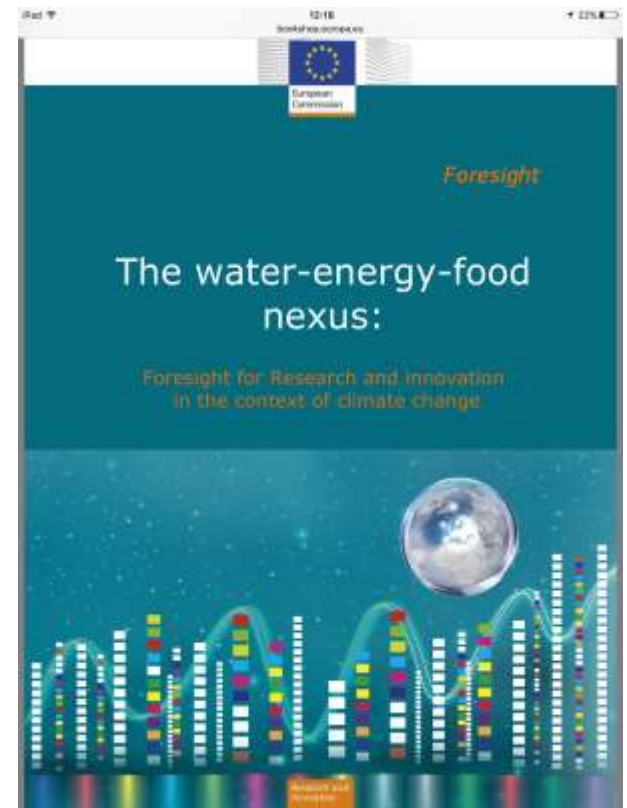
<http://bookshop.europa.eu/en/changing-gear-in-r-i-pbKI0216237/?CatalogCategoryID=7QwKABstDHwAAAEjK5EY4e5L>

How to interface?

Bioeconomy and Low carbon economy

"The water, energy and food sectors are strongly inter-connected, and actions in one sector have marked impacts on the other two. Ensuring the availability and affordability of water, food and energy is of vital strategic importance. The 'Study on water, energy and food Nexus: research and innovation in the context of climate change' points to opportunities for the EU to contribute to a resilient low carbon economy by anticipating the early signals and potential for key research and innovation. "

<http://bookshop.europa.eu/en/the-water-energy-food-nexus-pbKI0215971/?CatalogCategoryID=7QwKABstDHwAAAEjK5EY4e5L>



How to interface?

Bioeconomy – Economics of ecosystems



Back to Mail 20:07 ec.europa.eu 97%

 ENVIRONMENT

European Commission > Environment > Nature and biodiversity

Home About us Policies Funding Legal compliance News & outreach

Nature and biodiversity
Biodiversity Strategy
Nature and biodiversity law
Species protection
Natura 2000
Knowledge and data

The Economics of Ecosystems and Biodiversity

Not all that is very useful commands high value (water, for example) and not everything that has a high value is very useful (such as a diamond).
Pavan Sukhdev, The Economics of Ecosystems and Biodiversity, An Interim Report, 2008

Valuing our natural assets

We depend upon "ecosystem services" provided by nature for free. Services like freshwater, fertile soil, clean air, fisheries and timber. But population growth, changing diets, urbanisation and many other factors are damaging ecosystems and causing biodiversity to decline. While the world's poor are most at risk, this loss has an impact on us all. It affects our health, wellbeing and livelihood.

Setting a price on natural capital may appear callous. But nature and its services escape pricing and are therefore ignored or undetected by markets. In our economic system, this lack of monetary valuation is a root of the problem.

If we can **demonstrate the value of nature** in economic terms, it can help everyone, including policymakers and businesses, to reach decisions that consider the full costs and benefits of the proposed use of an ecosystem, rather than just costs that enter markets in the form of private goods.

The TEEB initiative



How to interface?

Bioeconomy – Ocean economy

"For some, the ocean is the new economic frontier. It holds the promise of immense resource wealth and great potential for boosting economic growth, employment and innovation. And it is increasingly recognised as indispensable for addressing many of the global challenges facing the planet in the decades to come, from world food security and climate change to the provision of energy, natural resources and improved medical care. While the potential of the ocean to help meet these challenges is huge, it is already under stress from over-exploitation, pollution, declining biodiversity and climate change."

The ocean economy encompasses ocean based industries (such as shipping, fishing, offshore wind, marine biotechnologies), but also the natural assets and ecosystem services that the ocean provides."

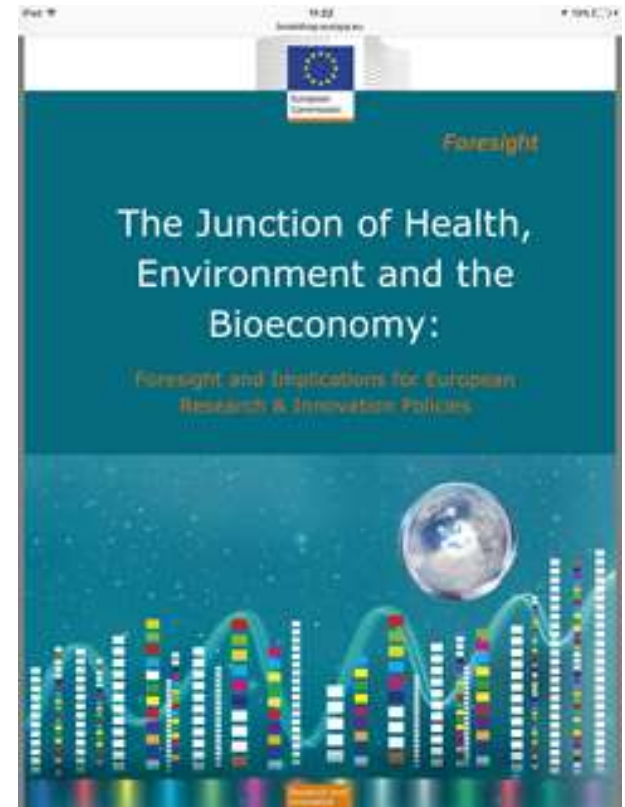


<http://oecdinsights.org/2016/04/27/the-trillion-dollar-ocean/>

How to interface?

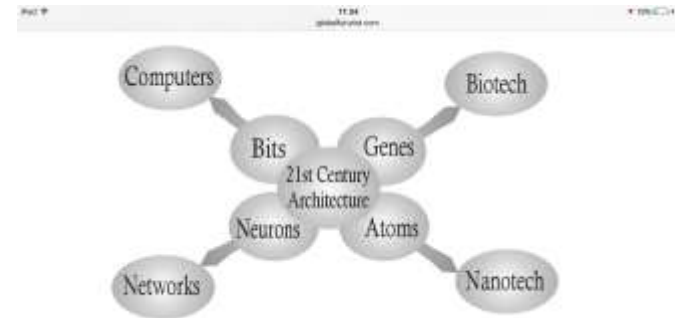
Alignment health and sustainability agendas

"Searching for '**triple-winners**', i.e. research delivering benefits across the three fields allowed to identify four areas offering the most potential: **sustainable food** **improving human diets and minimizing risks to health and environment**, **circular economy**, including the bio-economy, **cities** as testing grounds and demonstrators of triple-winners, **holistic health** (i.e. integrating life-style, environment and well-being)."

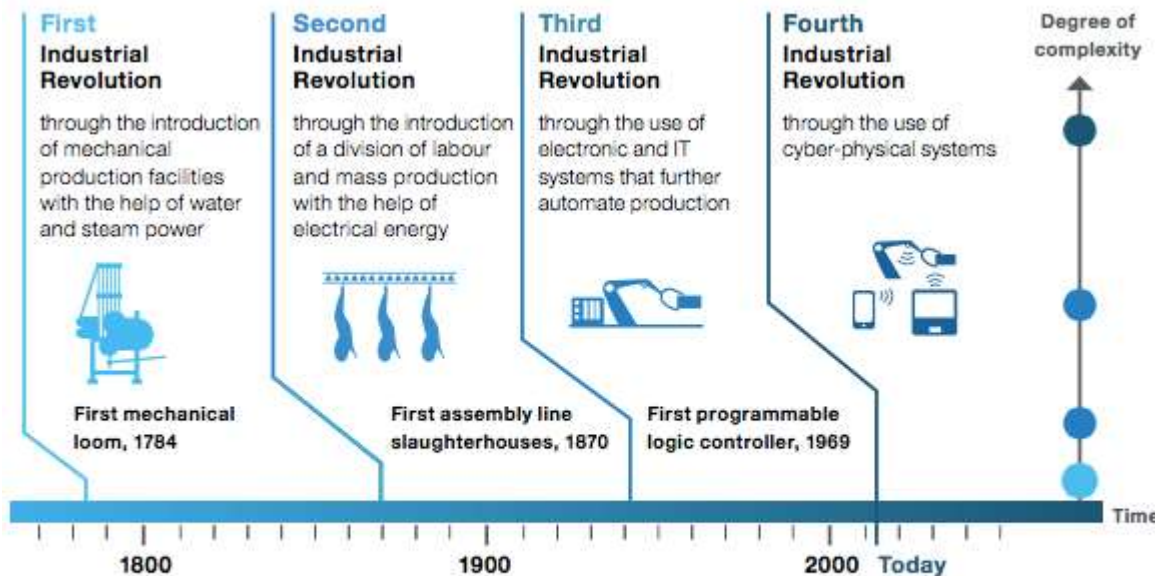




How to interface? Forth Industrial Revolution, NBIC convergence and AI



21st century architecture schematic - James Carse, *Technofutures: How Leading Edge Technologies will Transform Business in the 21st Century*



Cyber-physical assistance systems are driving the fourth industrial revolution

Source: Siemens, Pictures of the Future, Spring 2013



How to interface? Education

Which skills for the transition to the low carbon economy and society?

- **All stages, including life-long**
- **All levels, including vocational training. Not only scientists and researchers**
- **Which skills for possible new sectors of the economy: urban agriculture, landscape stewardship, ecosystem management, nature based engineering, low carbon consulting etc.?**

Top 10 skills

in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

1. Complex Problem Solving
2. Coordinating with Others
3. People Management
4. Critical Thinking
5. Negotiation
6. Quality Control
7. Service Orientation
8. Judgment and Decision Making
9. Active Listening
10. Creativity

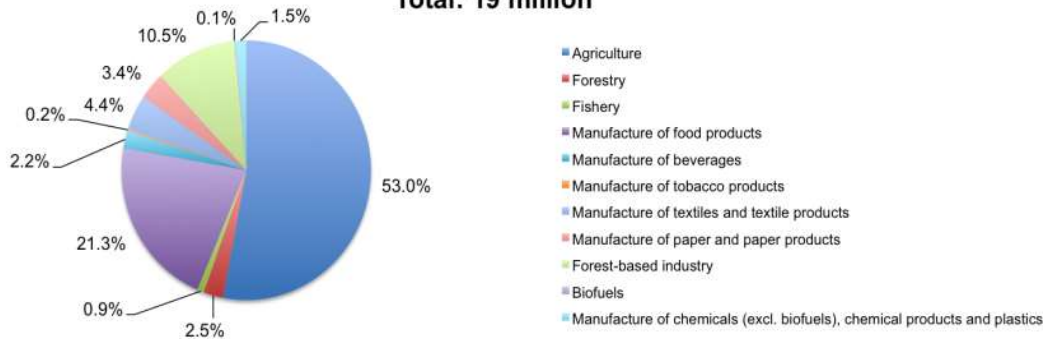


Source: Future of Jobs Report, World Economic Forum

How to interface?

Employment and social affairs

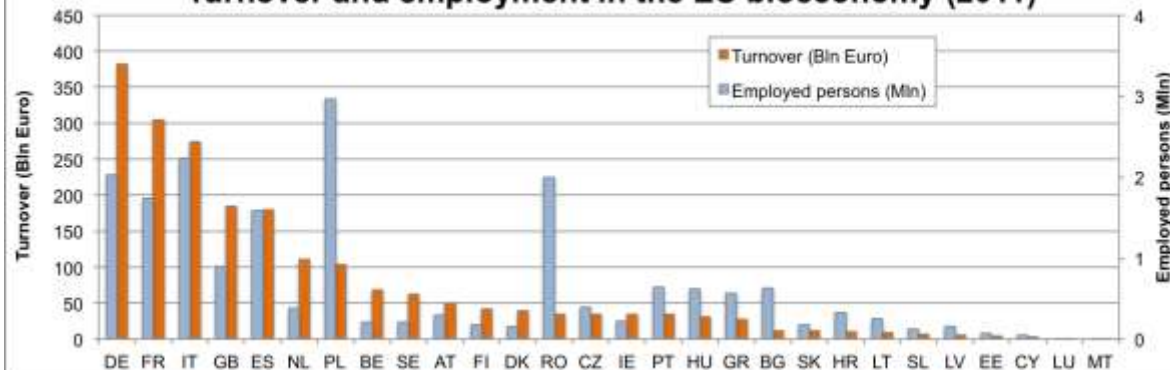
Employment in the EU bioeconomy (EU28, 2011),
Total: 19 million



➤ Which new jobs? How many and where in current and possible future bioeconomy sectors?

- Rural, urban, coastal and ocean jobs?
- Job potential from green growth? Impacts from robotisation

Turnover and employment in the EU bioeconomy (2011)

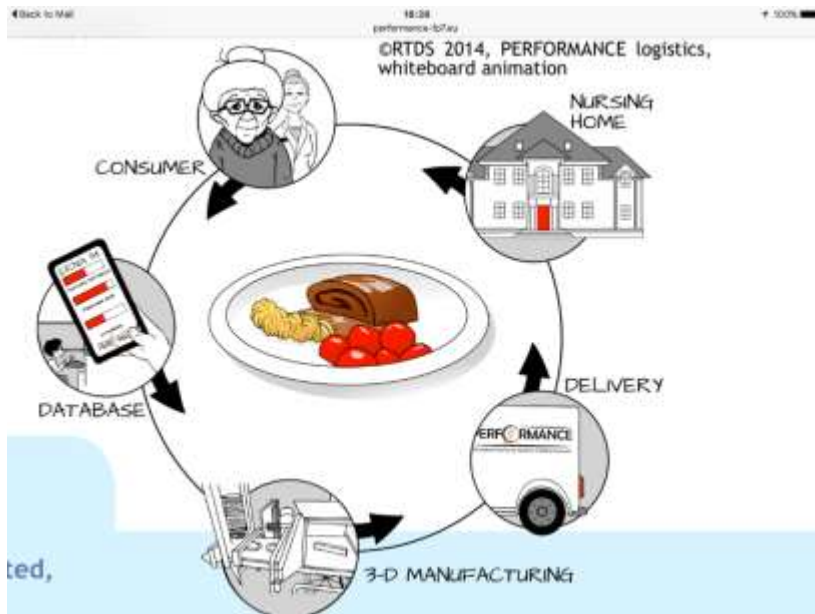


- Quid working poor in the food industry and other sectors? Quid precariat?
- Quid working conditions
- Towards post-employment society? Universal basic income and bioeconomy?



How to interface? Silver economy

- Much more than 3-D printed food for elderly with chewing problems

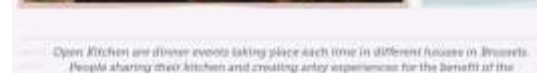
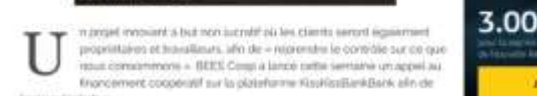


http://www.huffingtonpost.com/2014/03/24/sustainable-nyc_n_4886443.htm

How to interface?

Collaborative and Sharing Economy

- *E-commerce, with or without middleman?*
- *Voluntary engagement (even more in post-employment society?)*
- *Collaborative research platforms. How to integrate open science and open innovation?*
- *What future knowledge sourcing and IPR strategies in a collaborative economy*



How to interface?

Citizen Biotech Economy



Empowering citizen scientists : Nature Methods : Nature Publishing Group

nature.com

Applied Biosystems thermal cyclers

Request an in-lab demo

applied biosystem

nature methods

Techniques for life scientists and chemists

Menu

Advanced search

home - archive - issue - editorial - full text

NATURE METHODS | EDITORIAL

Empowering citizen scientists

Nature Methods 12, 795 (2015) | doi:10.1038/nmeth.3577

Published online 28 August 2015

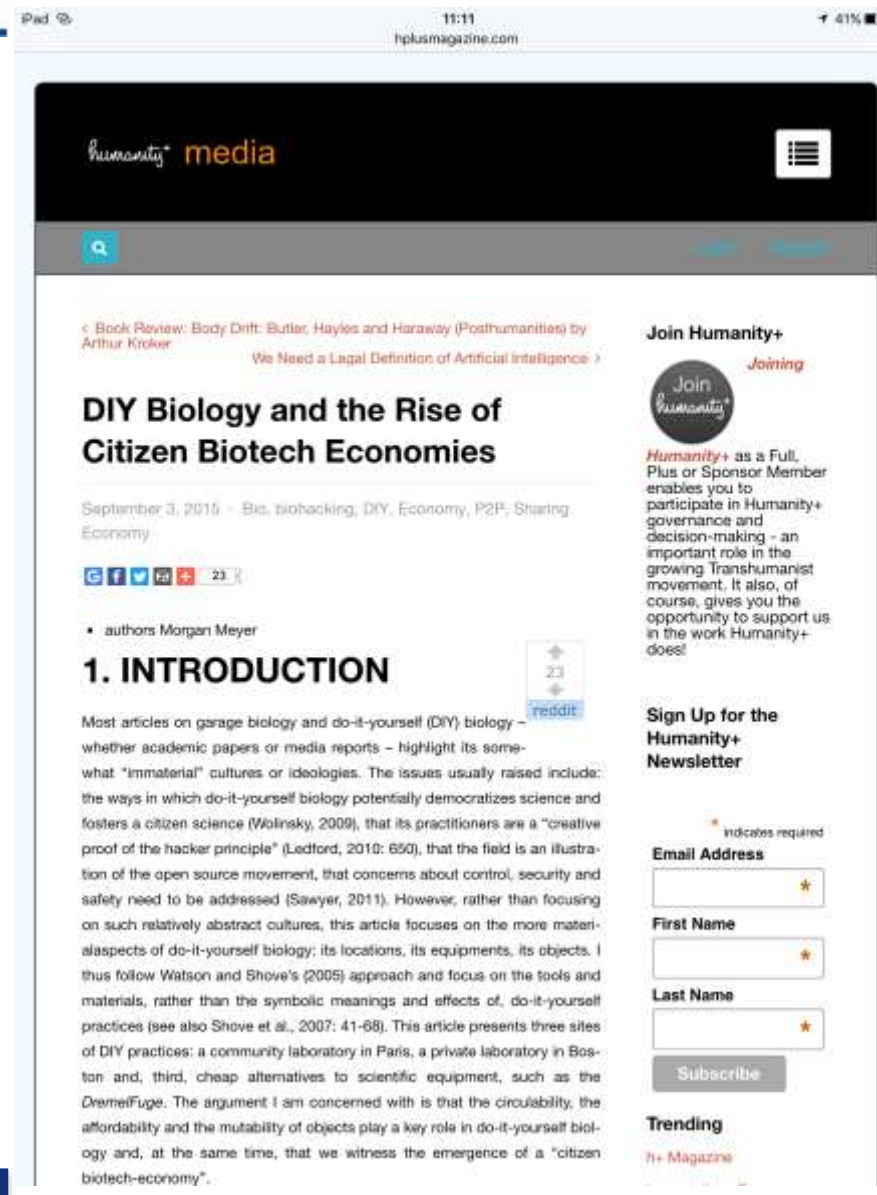
Download PDF Reprints Rights & permissions Article metrics

Scientists should consider engaging more with the DIYbio community.

Subject terms: Education • Molecular biology • Publishing • Synthetic biology

A scientifically literate general public ranks high on the wish list of biological researchers. According to a poll taken at a recent synthetic biology conference, scientists see a public uninformed about biotechnology as a threat to their work. Instead they want the 'man on the street' to understand and support what goes on in the lab. In our June Editorial we discussed different routes used to disseminate scientific information. We now want to encourage our readers to get involved in venues that give lay people a chance to get hands-on experience in biology: DIYbio labs.

These do-it-yourself (DIY) biology labs are organized and run locally, often by scientists who work on a volunteer basis. Their rationale, as Ellen Jorgensen—cofounder of Genspace in Brooklyn, New York—sums up in a TED talk, was to expand the use of biotechnology beyond the professionals and to put the tools in the hands of lay people to use in fun and creative ways.



humanity+ media

11:11 hplusmagazine.com

Back Review: Body Drift: Butler, Hayles and Haraway (Posthumanities) by Arthur Kroker

We Need a Legal Definition of Artificial Intelligence

DIY Biology and the Rise of Citizen Biotech Economies

September 3, 2015 • Bio, biohacking, DIY, Economy, P2P, Sharing Economy

authors Morgan Meyer

1. INTRODUCTION

Most articles on garage biology and do-it-yourself (DIY) biology—whether academic papers or media reports—highlight its somewhat “immaterial” cultures or ideologies. The issues usually raised include: the ways in which do-it-yourself biology potentially democratizes science and fosters a citizen science (Wolinsky, 2009), that its practitioners are a “creative proof of the hacker principle” (Ledford, 2010: 650), that the field is an illustration of the open source movement, that concerns about control, security and safety need to be addressed (Sawyer, 2011). However, rather than focusing on such relatively abstract cultures, this article focuses on the more material aspects of do-it-yourself biology: its locations, its equipments, its objects. I thus follow Watson and Shove’s (2005) approach and focus on the tools and materials, rather than the symbolic meanings and effects of, do-it-yourself practices (see also Shove et al., 2007: 41–68). This article presents three sites of DIY practices: a community laboratory in Paris, a private laboratory in Boston and, third, cheap alternatives to scientific equipment, such as the DremelFuge. The argument I am concerned with is that the circularity, the affordability and the mutability of objects play a key role in do-it-yourself biology and, at the same time, that we witness the emergence of a “citizen biotech-economy”.

Join Humanity+
Joining

Join Humanity+
Humanity+ as a Full, Plus or Sponsor Member enables you to participate in Humanity+ governance and decision-making – an important role in the growing Transhumanist movement. It also, of course, gives you the opportunity to support us in the work Humanity+ does!

Sign Up for the Humanity+ Newsletter

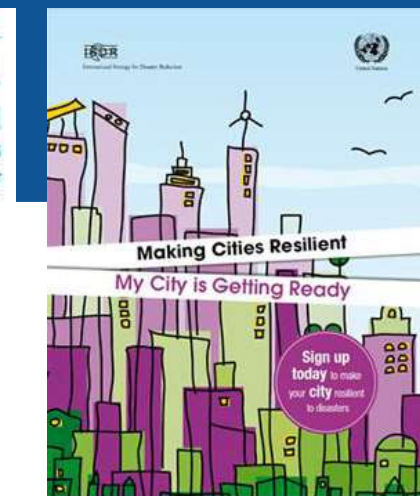
Email Address

First Name

Last Name

Subscribe

Trending
h+ Magazine



How to interface? Resilience



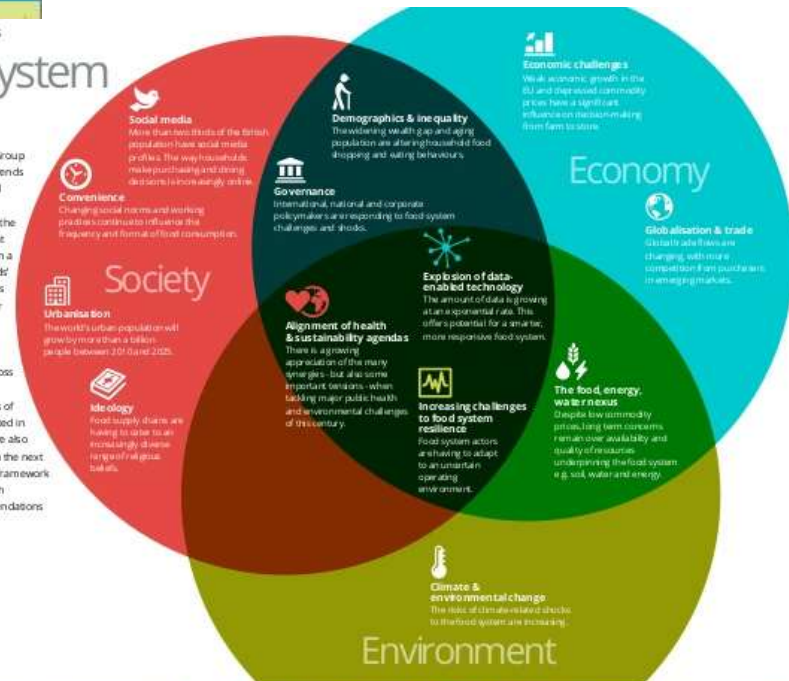
<https://www.hud.ac.uk/research/researchcentres/gdrc/internationalcollaborationsandnetworks/unisdrmakingcitiesresilientcampaign/>

- Resilience overtaking short-term profitability?
- Need for an adaptability and diversity strategy for food system?
- New challenges to resilience: crisis, systemic disruption, disasters, hybrid threats, war
- Can the European Bioeconomy do anything to preserve peace?

Introduction Trends

Food system trends

The Thought Leadership Group considered a number of trends that will influence the food system over the coming decade. However, early in the research it was agreed that the project should focus on a small number of 'key trends' that industry, policymakers and WRAP have the power to influence and engage with in the short term. These trends, which touch on a number of issues across the environmental, social and economic dimensions of sustainability, are highlighted in the diagram, right. They are also explored in more detail on the next page and are used as the framework for presenting the research conclusions and recommendations at the end of this report.



Source: WRAP,
<http://fr.slideshare.net/sustainablebrands/food-futures-from-busin>

How to interface?

Bioeconomy and Peace

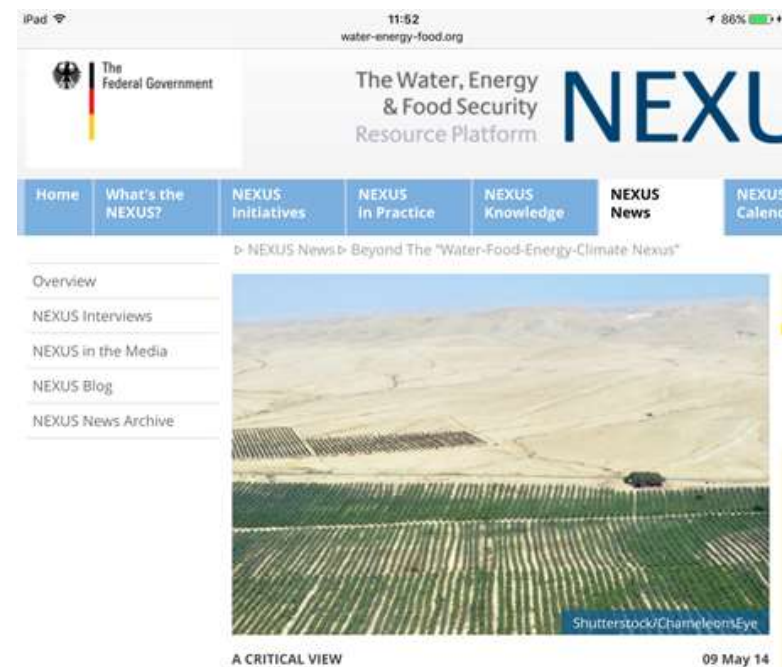


How to interface?

Security externalities and migration

"Nexus thinking is eloquent and compelling on the subjects of efficiency and innovation, but silent on the topics of equity and security. The billion plus people who remained destitute at the end of the twentieth century have now migrated into peri-urban squalor, lost land, assumed debts, remained illiterate, acquired drug-resistant pathogens, grown in numbers, and amassed cheap Cold War weapons and mobile phones.[...].

It would be wise to add equity and security to the nexus."

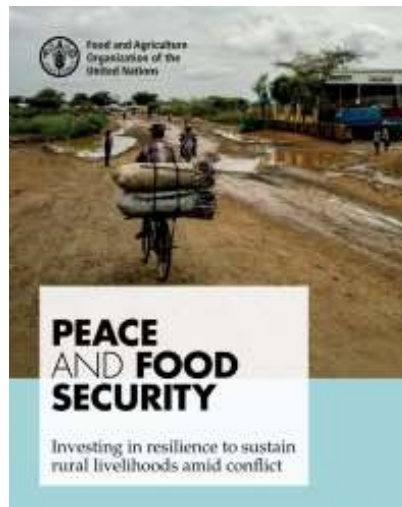


Beyond The "Water-Food-Energy-Climate Nexus"

In order to improve our environmental security, should we think of water, food, energy and climate in nexus-like ways? Richard Matthew is skeptical. While "nexus thinking" promises to reduce waste and inefficiency, it could also heighten inequality, instability and the potential for violent conflict.

In the past five years, a powerful narrative of global environmental rescue has been crafted by leaders from business and government.

http://www.water-energy-food.org/en/news/view_1696/beyond-the-water-food-energy-climate-nexus.html

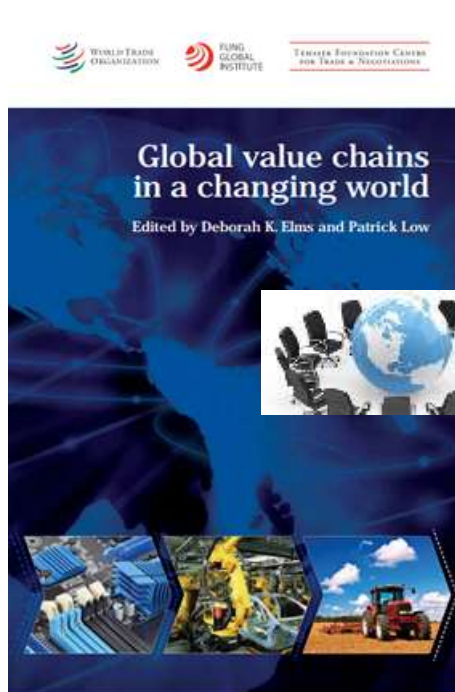


How to interface?

Globalisation vs. identity, community, roots

- *What co-existence between globalized value chains and community-based solutions? Food choices? Locally preferred?*
- *Citizen-consumer values to drive sustainability of supply in bioeconomy?*

Agricultural Value Chains



12. FLASHLIGHTS: BIOECONOMY TODAY, OR MAYBE TOMORROW?


Is this Bioeconomy? Wood-based packaging

06:41
tetrapak.com

Find by Food Contact Tetra Pak Global site Search

Processing • Packaging • Services • Sustainability • About Tetra Pak •

Home • Sustainability • Environmental innovation • Sustainable products • Tetra Rex Bio-based



Case study: THE WORLD'S FIRST FULLY RENEWABLE CARTON

In January 2015, Tetra Pak delivered a world first, when customer Valio started using our fully renewable cartons for its Eila[®] lactose-free semi-skimmed milk drink.

[Read more](#)
[Awards and recognition for Tetra Rex[®] Bio-based](#)

The launch of the Tetra Rex[®] Bio-based package is an important milestone on a journey that began back in 2007, with the launch of the world's first Forest Stewardship Council[™] (FSC[™])-labelled cartons. As one of the world's largest consumers of paperboard, it was important for us to make a public commitment to obtaining our materials from sustainably managed forests. Since then, we have been working towards our ultimate goal – to produce a

We are using cookies. By continuing to use our website without changing the settings, you are agreeing to our use of cookies. [Learn more about our cookie policy](#) [OK, I understand](#)



06:42
tetrapak.com



It's the world's first 100% plant-based carton

09:05
beveragedaily.com

FREE NEWSLETTER [Your package arrives](#) [SUBSCRIBE](#)

Breaking News on Beverage Technology & Markets

ADM WILD SYRUP INNOVATIONS FROM WILD DISCOVER THE WORLD OF SYRUPS

NEWS • SECTORS • TRENDS • BIG BRANDS • PROCESSING & PACKAGING • LIBRARY • EVENTS • JOBS • BEER

Subscribe to our FREE newsletter [Click a link to subscribe](#) [ALREADY SUBSCRIBED](#)

PACKAGE PENDING FOR 2015 ROLL-OUT TO EUROPEAN CUSTOMERS

Tetra Pak unleashes plant power with 'world's first' 100% bio-based carton

By Ben Bouckley • 17-Oct-2014
Last updated on 17-Oct-2014 at 15:25 GMT



Related tags: Tetra Pak, Sustainability, Plant-based packaging, HDPE, LDPE, Paperboard

Tetra Pak claims to have harnessed the power of plants by launching the world's first milk carton made entirely from plant-based, renewable packaging materials.

The company will launch a 100% renewable version of its Tetra Rex package – developed in partnership and produced by biopolymer manufacturer Braskem – from 2015.

The bio-based packages will be available to buy from Swedish production centers in H1 2015 - Tetra Pak notes particular interest from Scandinavian clients - with the roll-out initially planned for European customers, with expansion to other regions based on demand.

The carton is the first to market using bio-based low-density polyethylene (LDPE) films and bio-based high-density polyethylene (HDPE) caps derived from sugar cane, as well as Forest Stewardship Council (FSC)-certified paperboard.

Tetra Pak plans bio-based expansion 'subject to

Most Popular News

1. Sulfate Brewery launches edible six-pack rings for beer
2. What's hitting the shelves? Coffee & broccoli, seasonal tea, and strawberry & cream gin
3. M&M's Board re-thinks Bag-in-Box concept with Elevated Drink Box
4. Beer: Low in sugar and carbs, but myths and misinformation abound, says report
5. European Commission approves AB InBev's acquisition of SABMiller

KEY INDUSTRY EVENTS

Food Vision USA
Chicago / Conference
16-17 Nov

Access all events [here](#)

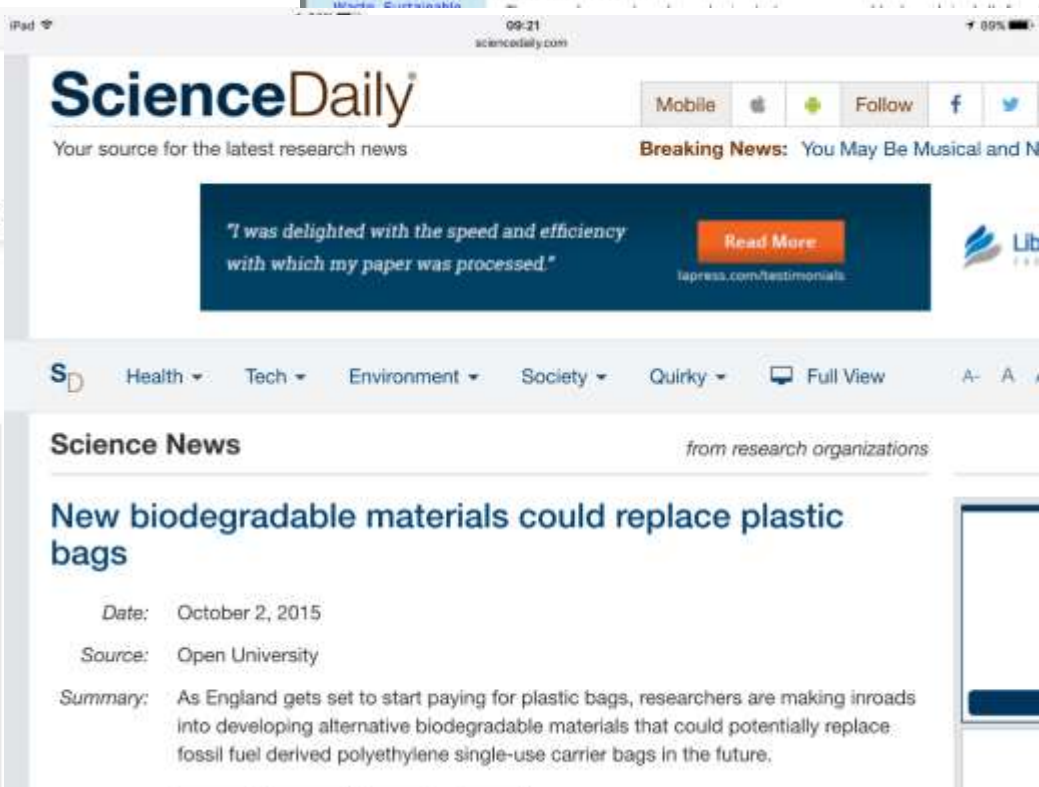
PRODUCTS

- Tapping into RC Cola's historic culture of innovation
Royal Crown Cola International
- Time to replace canines
DNT
- BREAKING DOWN THE MILLENNIAL MONOLITH
CRA
- Strategic Nutrition for Millennials – Part I
Fortitech: Premises by DSM
- Coconut Water Concentrate: A sustainable ingredient
(T) Tropics

We are using cookies. By continuing to browse the site you are agreeing to our use of cookies. [Read out more here](#)



Is this Bioeconomy? Plastics – biobased not always biodegradable and vice versa



Is this Bioeconomy?

Biodegradable versus durable

iPad 08:50 sustainablebrands.com

SUSTAINABLE BRANDS
The Bridge to Better Brands


News & Views Library Events Members Solution Providers

PACKAGING
Sustainable Brands' Bridge to Better

CHANNELS | Behavior Change Leadership Products & Design Supply Chain Marketing & Communications

The Push for Bioplastics and the Myth of Biodegradability

by Tom Szaky January 7, 2015



Related: Packaging, Chemistry and Materials, Coca-Cola

This is the first of a three-part series by TerraCycle CEO Tom Szaky that examines the benefits, risks, misconceptions and long-term viability of bioplastics.

Since the relatively recent rise in conscious consumerism, **bioplastics** — plastics made from biomass such as plants and algae — have been receiving significant attention. With the bioplastic market projected to grow in the next few years, many are pointing to plant-derived plastic alternatives as the ultimate solution to our unsustainable dependence on fossil fuel-based plastics. But one particular type of bioplastic has recently mobilized a torrent of misinformation, misplaced optimism and confusion: plastics labeled “biodegradable.”

13:40 sustainablebrands.com 62%

SUSTAINABLE BRANDS
The Bridge to Better Brands


News & Views Library Events Members Solution Providers

PACKAGING
Sustainable Brands' Bridge to Better

CHANNELS | Behavior Change Leadership Products & Design Supply Chain Marketing & Communications

Why Durable Bioplastics, Not Biodegradable, May Be the Answer

by Tom Szaky January 21, 2015



The Artform depicts the design created by Stuttgart University's (USt) Institute of Building Construction and Structural Design demonstrates the possible architectural and structural applications of bioplastic materials. (Image credit: Institute for Building Construction and Structural Design)

Related: Packaging, Materials, Building/Construction/Real Estate, Chemicals, Consumer Products, Manufacturing, Nature/Environment

To conclude this series about bioplastics and the biodegradability (or lack thereof) of plastic products and packaging, I want to discuss the future of what I consider to be one of the only viable alternatives to plastics derived from non-renewable resources: durable bioplastics.

The key word here is **durable**, because biodegradable plastics of any composition are not the long-term sustainable solution we need. When you compost a biodegradable plastic cup, that polymer can no longer be reused and maintained, meaning all of the energy and material inputs are lost in the soil. They can make sense in certain circumstances, particularly in countries that have large volumes of organic landfill waste. India is a prime example, where about 50-60 percent of the waste sent to landfills is organic and could be composted, but only as a short-term waste-reduction strategy.

Plastics biodegrade and can be recycled, but only under specific conditions.

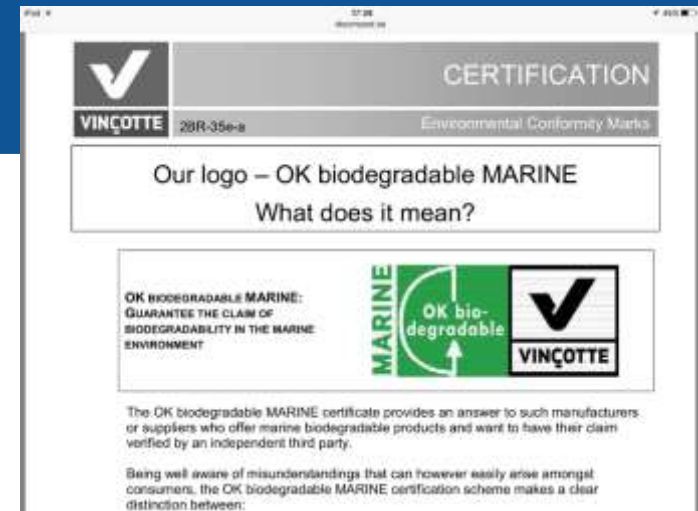
BASF
We create chemistry

LATEST NEWS FROM OUR MEMBERS

October 22nd, 2015
Food Futures: Two Paths for Water Conservation

Is this Bioeconomy?

Building biobased markets through strong standards and regulation



CERTIFICATION
VINÇOTTE 2BR-35e-a Environmental Conformity Marks

Our logo – OK biodegradable MARINE
What does it mean?

OK BIODEGRADABLE MARINE:
GUARANTEE THE CLAIM OF
BIODEGRADABILITY IN THE MARINE
ENVIRONMENT

The OK biodegradable MARINE certificate provides an answer to such manufacturers or suppliers who offer marine biodegradable products and want to have their claim verified by an independent third party.

Being well aware of misunderstandings that can however easily arise amongst consumers, the OK biodegradable MARINE certification scheme makes a clear distinction between:



DE-45
biobasedeconomy.de

100%

Open-Bio: Opening bio-based markets via standards, labelling and procurement

Open-Bio is the follow-up project to the FP7 research project called KBBPPS (Knowledge Based Bio-based Products Pre-Standardisation) and kicked off in November 2013. It comprises a broader consortium consisting of the KBBPPS group and a number of new partners, bringing in expanded expertise. Open-Bio builds on the results of KBBPPS, refining them and developing further knowledge on implementation of the standardisation result in relation to market development.

Open-Bio investigates how markets can be opened for bio-based products through standardisation, labelling and procurement. Therefore, one focus is on the sustainability of the bio-based resources and potential testing methods for this criterion. The end-of-life research will be expanded to different biodegradation scenarios, composting and recyclability. Functionality testing will focus on the gaps identified by KBBPPS and on the special properties of bio-based products.

The results of Open-Bio will be fed directly into the current standardisation processes of CEN/TC411.

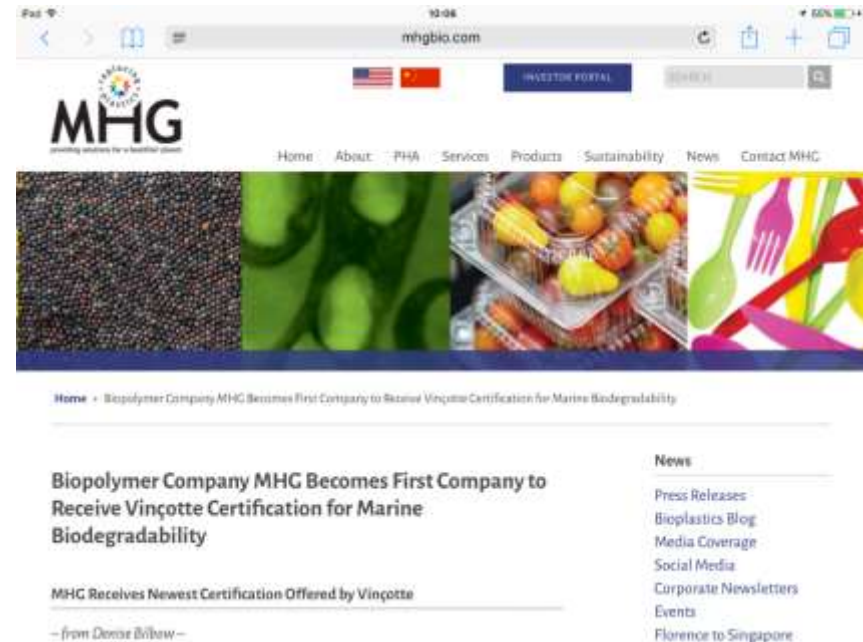
Project: Open-Bio

OPEN BIO

News

Partner events:

Public procurement workshop
organised by the EC Expert Group on Bio-based Products



10:08
mhgbio.com

MHG
providing solutions for a healthier planet

Home About PHA Services Products Sustainability News Contact MHG

Home • Biopolymer Company MHG Becomes First Company to Receive Vinçotte Certification for Marine Biodegradability

Biopolymer Company MHG Becomes First Company to Receive Vinçotte Certification for Marine Biodegradability

MHG Receives Newest Certification Offered by Vinçotte

— from Denise Billow —

News

- Press Releases
- Bioplastics Blog
- Media Coverage
- Social Media
- Corporate Newsletters
- Events
- Florence to Singapore

Is this Bioeconomy?

Biobased products in automotive and aviation industries


iPad 08:17 newsintst.com

MENU

f t e p + 0

TECHNOLOGY NEWS 12 November 2014

Bio-drone simply melts away when it crashes



Made by fungus and bacteria
(Image: CNRS/Weiz)

18:02 worldsciencefestival.com

Rethink Science


ABOUT US ATTEND WATCH READ LEARN PARTICIPATE NEWSLETTER DONATE

Dandelion Tires and Other Modern MacGyvering


01/16/15 See Comments Features

Like TV's MacGyver hacking together a flamethrower from a rubber hose, a paper clip, and some old gym socks, scientists have a knack for solving problems by putting seemingly random items to good use in unexpected ways. Here's a look at just a few of the strange and surprising engineering transformations that are being cooked up in labs across the world.

High Hopes for Making Tire Rubber from Dandelions




WATCH 2015 FESTIVAL PROGRAMS



Free Will Vs. the Brain: Who's in Charge?

10/08/15 See Comments



Planet of the Humans: The Leap to the Top

09/04/15 See Comments

Is this Bioeconomy?


Cross-industry mainstreaming of biobased and biodegradable materials

09:11
compositesmanufacturingmagazine.com

Composites Manufacturing

f t

HOME ABOUT MARKET SEGMENTS COLUMNS MAGAZINE



MIT's Biodegradable Hydrogel Composites Will Make 3-D Printing More Environmentally Friendly

Mary Beck December 1, 2014

f t

COMMENT NOW

f t

SHARE >

+

TRENDING

09:35
forbes.com

43%

Forbes Tech

The Little Black Book of Billionaire Secrets

SEP 8, 2015 @ 11:45 AM 2,288 VIEWS


Biodegradable Electronics Could Save Us From The E-Wasteland

Curtis Silver, CONTRIBUTOR
I muse on the effects of consumer technology in our tiny human lives

FOLLOW ON FORBES (1)

Options expressed by Forbes Contributors are their own.


FULL BIO



We all know that we are supposed to properly dispose of our laptop and computer batteries. We also know that we


PEGA CAN. CRM EVOLVED.

Learn more



Is this Bioeconomy? New bio-construction materials

Designed to build, not to smoke.



HEMPCRETE

- Strong, Lightweight & Breathable
- Energy Efficient
- Incredible Insulation
- Naturally Non-toxic
- Lasts 100's of Years
- Flame, Water & Pest Resistant
- Hemp + Lime + Water

CARBON NEGATIVE

EDMED
FB.COM/EDUCATIONNOTMEDICATION

CNN STYLE

Spreading like wildfire: Why wooden skyscrapers are springing up across the world

By Jenni Marsh, CNN
Updated 06:44 GMT (3:44 AM) April 27, 2018



Top stories

- Search continues for missing 9-year-old in Tennessee
- Turbulence rips plane's engine cover off and right

de zeen magazine

Magazine
Movies
Jobs
Watch Store
Most Loved

Like Dezeen on Facebook

8 April 2018 | 25 comments

Categories: Architecture | News | Inspiration | UK

PLP Architecture proposes London's first wooden skyscraper at the Barbican



Dezeen Daily

dezeen daily

PLP Architecture and researchers from the University of Cambridge revealed a concept for London's first wooden skyscraper – a addition to the Barbican housing estate.

Follow Dezeen

Is this Bioeconomy?

New aesthetics and functionalities of wood-based products

Pad 10 11:00 medaarch.com

HAVANA Linea d'arredo in cartone

La linea HAVANA nasce da una collaborazione tra lo studio **PicernoCarusoLab** e la cartotecnica **CRTS**. Il catalogo è strutturato in 3 sezioni che mostrano sette pezzi, tutti realizzati con tecnica a coste e montati a mano. In generale le possibilità plastiche del cartone sono messe in discussione dalle forme che assumono gli oggetti cercando di creare una tensione tra materia e forma. La prima sezione è dedicata agli spazi che si possono vivere in casa. Presenta infatti una lampada **Vulcania**, un tavolo basso **Four**, ed una parete d'ingresso **Backwall**.



Mediterranean FabLab

@mediterraneanfablab

Pad 10 11:15 facebook.com

nean FabLab

b



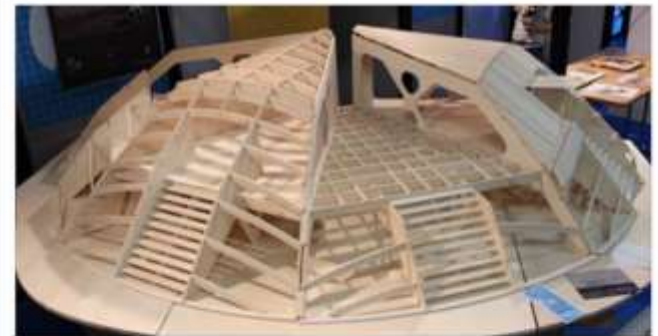
Mediterranean FabLab

8 décembre 2015 ·

#research #project: Octagon è una struttura abitativa a pianta ottagonale, pensata per la #ricostruzione post-tifone nelle #Filippine e per resistere alle #catastrofi naturali che si verificano nell'arcipelago asiatico.

a project by #Medaarch + Mediterranean FabLab

Voir la traduction



Medaarch – Octagon. Typhoon resistant know-house

Octagon è una struttura abitativa a pianta ottagonale, pensata per la ricostruzione post-tifone nelle Filippine e per resistere alle catastrofi naturali che si verificano nell'arcipelago asiatico. Octagon è il primo prodotto di know-house, progetto più...

MEDAARCH.COM

J'aime Commenter Partager

Is this Bioeconomy?

Re-thinking waste management



Friday 30 October 2015 - The Chemical Engineer... news and jobs from the chemical, biochemical and process engineering sectors.

Search GO
Advanced Search

Quick links

- Home
- Latest news
- Job search
- Chemical engineers who changed the world
- Consultants & contractors
- The student room
- Lessons relearned
- White papers
- Webinars
- Videos
- Podcast
- Subscriptions
- tce today app

News - full story



By 2050, around 70% of the world's 9bn people will live in cities, generating more waste

23/10/2015

Biorefineries could solve urban waste problem
Integrates recycling, power generation, composting

Helen Tunnicliffe

URBAN biorefineries could deal with municipal solid wastes such as plastics, paper and organic matter in built-up areas, according to UK researchers.

A biorefinery operates on a similar principle to an oil refinery, in that one plant can make many products from its feedstock and adjust the output according to demand. By 2050, around 70% of the world's 9bn people will live in cities, generating more waste and needing more energy. The researchers, from the universities of Oxford and Surrey, say an urban biorefinery could solve both of those problems.

The researchers, led by Oxford's Aidong Yang, considered paper, plastics and bio-organics. Bio-organic waste can be treated using either composting or anaerobic digestion (AD), which produces biogas that can be used in combined heat and power (CHP) plants, and solid residues that again can be used for compost. Paper can be processed using AD, composting, recycling, or incineration, with energy recovery for heat and power generation. Plastics can be recovered for re-use mechanically, or chemically, for example by pyrolysis or gasification, with incineration for energy recovery a final resort.

Members' area

Membership/Ref No

Pin/Password

LOGIN

Forgotten login?
Change password
IP Login 147.67.241.226

Share this page



Tweets

TheChemicalEngineer
@tceomagazine
The latest issue of The Chemical Engineer is now live at thechemicalengineer.co.uk
[pic.twitter.com/tce/VtUjWf](https://twitter.com/tce/VtUjWf)

Put your heads
together



10 JULY 2015 REPORT

Incineration Versus Recycling: In Europe, A Debate Over Trash

Increasingly common in Europe, municipal "waste-to-energy" incinerators are being touted as a green trash disposal alternative. But critics contend that these large-scale incinerators tend to discourage recycling and lead to greater waste.

BY KATE SEELTZNICH

For communities short on landfill space, "waste-to-energy" incineration sounds like a bulletproof solution: Recycle all you can, and turn the rest into heat or electricity. That's how it's been regarded in much of Europe, where nearly a quarter of all municipal solid waste is burned in 430 incinerators, and increasingly in the United States, where dozens of cities and towns are considering new, cutting-edge plants.



ABOUT
Kate Seeltznich is the environmental health reporter for the *Washington Post*, and a frequent contributor to *Environmental Health Perspectives*, and other print and online outlets.



RELATED ARTICLES

Will Tidal and Wave Energy



Sorting plastic from other plastics to separate biodegradable materials

23/03/2015



The new mixtures of plastic need to be separated into different facilities if the plastic is to be recycled into biodegradable and non-biodegradable material. The construction of a fine sorting machine will lead to savings in CO2 emissions, energy and water consumption.

The recycling of plastics is increasingly complex because there are so many types of plastic and many have different processing requirements. FILMSORT is an EU-funded project that is looking at an efficient and sustainable way of recycling waste plastic bags and films, while also ensuring that they are separated into biodegradable and non-biodegradable types.

Is this Bioeconomy? Fighting marine pollution

iPad 09:23 ehp.niehs.nih.gov 40%

ehp ENVIRONMENTAL HEALTH PERSPECTIVES



Search...

Browse Articles About EHP Authors Podcasts International Program Careers and Funding EHP 中文版

FOCUS | NEWS VOLUME 123 | ISSUE 2 | FEBRUARY 2015 ANNOUNCEMENTS

Environmental Health Perspectives DOI:10.1289/ehp.123-A36

New Link in the Food Chain? Marine Plastic Pollution and Seafood Safety




ISSEE 2015 Abstracts Now Available

EHP is pleased to present [the abstracts](#) for the 2015 annual conference of the [International Society for Environmental Epidemiology \(ISEE\)](#), "Addressing Environmental Health Inequalities," held 30 August–3 September 2015 in São Paulo, Brazil.

New Editor-in-Chief

We are pleased to announce that Sally Perreault Darney has been selected as the new Editor-in-Chief of EHP. Sally comes to EHP from the U.S. Environmental Protection Agency, where she most recently co-lead a large research project focused on assessing health disparities in vulnerable groups and providing healthy environments for children. Learn more about Sally and her [vision for the journal](#) in the September issue of EHP.



11 TOP DELTARES TESTS CONFIRM WORKABILITY OF BOOM DESIGN. In the past months our engineering team has continued its work on developing the

23 AUG THE OCEAN CLEANUP PREPARES FOR 2009 PACIFIC CLEANUP, SUCCESSFULLY COMPLETES MEGA EXPEDITION

29 JUL TRANSPAC PARTICIPANTS TEAM UP WITH THE OCEAN CLEANUP IN MEGA EXPEDITION. Three weeks and several storms later on board the

23 JUL RESEARCH VESSEL "OCEAN STARR" KICKS OFF MEGA EXPEDITION. Today the 171 ft research vessel "Ocean Starr" departed from San Francisco to

iPad 12:42 oceanconservancy.org 44%



Stemming the Tide:
Land-based strategies for a plastic-free ocean



Ocean Conservancy

McKinnon Center for Business and Environment



Is this Bioeconomy?

Re-inventing cosmetics Chasing micro-plastics

iPad 08:23 7%
Microplastics in personal care products: the tip of the iceberg - Bio-based News - The portal for bio-based economy a...

Bio-based News

BIO-BASED ECONOMY
BIO-BASED CHEMICALS AND MATERIALS
INDUSTRIAL BIOTECHNOLOGY
CARBON CAPTURE AND UTILIZATION

Home Top news Suppliers nova press releases Your Banner Contact & Imprint

Home > Microplastics in personal care products: the tip of the iceberg

29 Oktober 2015

Microplastics in personal care products: the tip of the iceberg

nova-Institute shows that the amount of microplastics in personal care products washed to the sea, although appreciable, is dwarfed by microplastics from other sources

Microplastics are a major source of water pollution. The litter found in oceans and inland waters is dominated by plastics. This litter does not only consist of large items like plastic bottles and bags, it also contains microplastics if only because the large objects tend to decompose into small particles. A recent study by nova-Institute shows that the amount of microplastics in personal care products washed to the sea, although appreciable, is dwarfed by microplastics from other sources.

Nova-Institute concentrates on Germany and gives the figure of 500 tons of microplastics in personal care products (cleansers, shower gels and skin-care products) discharged annually into surface waters. Another estimated 300 tons may come from industrial products like detergents, disinfectants and blasting agents. Manufacturers of cosmetic products have responded to the criticism on their use of non-biodegradable microplastics and are on the road towards reduction or abandonment. However, this is not yet the case for other applications, markets or regions. So far, manufacturers of industrial products do not seem to be prepared to reduce their use of microplastics. For personal care products, there are alternatives such as beeswax, cellulose, casein and minerals, as well as innovative products like the bio-based plastics polylactic acid (PLA) and polyhydroxyalkanoate (PHA). Although we do not know yet for sure if all these alternatives are sufficiently biodegradable.

Major other sources of microplastics

But there are major sources of microplastics that are not at all affected by public opposition. Take

Full text search

Follow us on Twitter

Subscribe to our daily email newsletter

Subscribe to our RSS feed

★ EVENTS

EFIB 2015

10th bio-plastics conference

MICROPLASTIC IN THE ENVIRONMENT

Sixth WPC & NFC Conference, Cologne

Is this Bioeconomy?

Fabric-recycling technology in the textile industry



ADELI PETERS | 05.13.16 | 6:00 AM

This newest pair of Levi's started as five old T-shirts. Using a new fabric-recycling technology, Seattle-based startup Evrnu worked with Levi's to dissolve the used clothing into a new, high-quality thread. That thread was then used to make the new pants. It's a process that could ultimately start to replace water-intensive cotton grown in the field with cotton saved from discarded clothes.

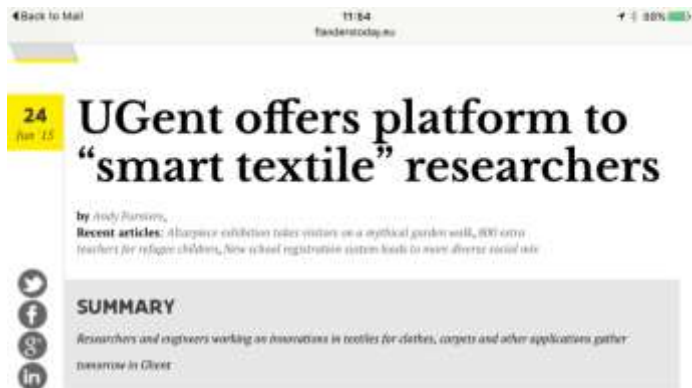


Source:
<http://www.evrnu.com/blog/>



Is this Bioeconomy?

Smart textiles and wearables



Salon at MIAT

The fourth edition of the Smart Textiles Salon takes place tomorrow in Ghent's Museum of Industry, Labour and Textile (MIAT). Every two years, Ghent University (UGent) provides a platform to international researchers working with so-called smart textiles. UGent researchers are internationally renowned for their innovations in the field.



Smart textile uses integrated electronic technology, like sensors, which can be used for a multitude of applications. It can, for example, be used in clothing to protect firefighters, analyse the condition of patients and determine athlete fitness.

The Smart Textiles Salon gathers the latest innovations and prototypes in the international field. The department of

textiles at UGent and the university's Centre for Microsystems Technology (CMST) will also showcase their work.

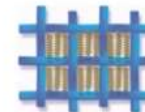
WEARABLE ELECTRONICS

- They can be used in wearable textiles to dial telephones, pager messages and control music from MP3 players.
- Examples include a business suit with a mobile phone incorporated, a child's anorak with a tracking device, sportswear to monitor heart rate, aerobic outfits with music players incorporated, and club wear which changes colour etc.



Nano Technology

- Nano-particles are permanently attached to cotton or synthetic fibers. The change occurs at the molecular level, and the particles can be configured to imbue the fabric with various attributes. Nano-technology combines the performance characteristics associated with synthetics with the hand and feel of cotton



Nano-fibers attached to cotton fibers



Nano-fibers cause liquids to roll off

- Nano-fibers 1/1000 the size of a typical cotton fiber are attached to the individual fibers. The changes to the fibers are undetectable and do not affect the natural hand and breathability of the fabric

Source: Slideshare

Is this Bioeconomy?

Phytomining – Phytoremediation



Forum—Using Superplants To Clean Up Our Environment

Phytoremediation is an innovative use of green plants to clean up our environment. The term comes from the Greek word for plants ("phyto-") that can detoxify, or remediate, soil or water contaminated with heavy metals or excess minerals.

Think of the industrial wastes, toxins, and byproducts that emerge from our daily activities—everything from sewage sludge from cities to toxic heavy metals from mines or factories to chemicals from agriculture. Produced and used in moderation and disposed of properly, these compounds aren't a threat to human health or the



Home | Features | Earth | Life | Technology

FEATURE 19 March 2014

Metal-eating plants could mine riches through roots

By Katia Moskvitch



Why mine for metals when we can cultivate them? (Image: Pierluigi Lanza)

Eni's Commitment

Technological Platforms

Technological Focus

Eni's R&D on
Renewables

Intellectual Property

Eni Award

Alliances and
partnerships in R&D

Eni's Technological
Development Research
Centers

News & Events

Homepage > Innovation & Technology > Technological Focus

Phytoremediation – Remediation technologies for contaminated soils promoted by trees and herbaceous plants



Soil pollution by heavy metals (as arsenic, mercury, nickel and copper), organic and chlorinated compounds is one of the most relevant environmental problems. Eni has long been involved in identifying and implementing technologies for removing soil pollutants or reducing them to levels not dangerous for human health, with the aim of extending the portfolio of low-impact remediation technologies available to **Syndial**, eni's company for environmental remediation.

Is this Bioeconomy? Artificial Photosynthesis

18:35
nature.com

nature chemistry

Home | Current issue | Comment | Research | Archive | Alerts & references | About the journal

home • advance online publication • abstract

ARTICLE PREVIEW
view full access options >

NATURE CHEMISTRY | ARTICLE

A supramolecular ruthenium macrocycle with high catalytic activity for water oxidation that mechanistically mimics photosystem II

Marcus Schüler, Valentin Kunz, Peter D. Frischmann & Frank Würthner

Affiliations | Contributions | Corresponding author

Nature Chemistry (2016) | doi:10.1038/nchem.2503
Received 26 November 2015 | Accepted 08 March 2016 | Published online: 02 May 2016

Reprints | Rights & permissions | Article metrics

Abstract
Abstract | References | Author information | Supplementary information

Mimicking the ingenuity of nature and exploiting the billions of years over which natural selection has developed numerous effective biochemical conversions is one of the most successful strategies in a chemist's toolbox. However, an inability to replicate the elegance and efficiency of the oxygen-

Shown Product Development Cycles and Lower RAD Costs Using TracePro

Editors' pick
Site-specific modification of proteins web focus >

Science jobs | Science events

nature events directory
Institute of Structural and Molecular Biology
7th Symposium
29 June 2016 — 30 June 2016
London, United Kingdom

5th International Symposium on DNA-encoded chemical libraries

18:31
sciencedaily.com

Google | Adobe - Installation d'Adobe Flash Play... | Fit Tonic | Sites suggérés | Galerie de composants Web Slice

Calé | Glyphosat... | Cette vidéo... | Startup W... | Blockchain... | How Bitcoin... | Ugent offe... | Toward...

ScienceDaily
Your source for the latest research news.

Breaking: Bacteria 'Team Up' to Evade Antibio...

Recombinant Proteins > Research Tools, Higher Quality Lower Price, Superior Service
sinobiological.com/Proteins

Health | Tech | Enviro | Society | Quirky | Full View | A- A+ A+ Q

Science News from research organizations

Toward artificial photosynthesis: Mimicking the ingenuity of nature

Date: May 3, 2016

Source: Julius-Maximilians-Universität Würzburg, JMU

Summary: A clean, climate-friendly energy source that is virtually inexhaustible: This is the promise artificial photosynthesis holds. Chemists have now got one step closer to reaching this goal.

Share: f t G+ in + e

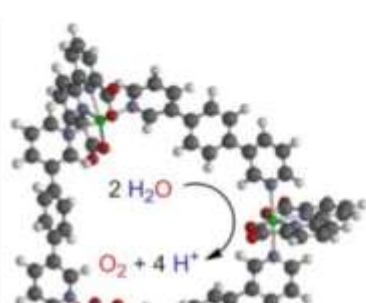
FULL STORY

Related Stories

How to Train Your Bacterium
Jan. 4, 2016 — Researchers are using the bacterium *Moorella thermoacetica* to perform photosynthesis and also to synthesize semiconductor nanoparticles in a hybrid artificial photosynthesis system for converting ... [read more >](#)

DNA Constructs Antenna for Solar Energy
June 19, 2013 — Researchers have found an effective solution for collecting sunlight for artificial photosynthesis. By combining self-assembling DNA molecules with simple dye molecules, the researchers have created ... [read more >](#)

Groundbreaking X-Ray Snapshots of Active Photosynthesis
June 4, 2012 — Scientists are opening new avenues to





Is this Bioeconomy? Bio-inspired and bio-mimicry

TERRAPIN REPORT

Tapping into Nature

The Future of Energy, Innovation, and Business

[Go to the Report](#)

ABSTRACT

By tapping into billions of years of research and development, innovative companies are abstracting strategies from the natural world and developing truly transformative technologies. Organisms have flourished on Earth for nearly 4 billion years, continuously adapting to our planet's diverse environments and diffuse energy flows. *Tapping into Nature* explores how pioneering companies are leveraging these adaptations and demonstrates the vast and largely untapped market potential of bioinspired innovation.

In this paper, Terrapin explores nine cross-sector topics and selects natural strategies related to each. The biological strategies represent only a fraction of the designs found in nature. Each section then presents bioinspired products—some of which are Terrapin collaborations—that have been developed by companies using these strategies. All told, this set of strategies and products begins to convey the breadth of innovation in the natural world.

TAPPING INTO NATURE
THE FUTURE OF ENERGY, INNOVATION, AND BUSINESS

NEW

SHARE:

Back to Mail 17:58 conference@bioneers.org

BIONEERS

GREEN CHEMISTRY AND BIOMIMICRY IN STEM EDUCATION: INTERDISCIPLINARY APPROACHES TO BRINGING SUSTAINABILITY INTO THE CLASSROOM



The seminal co-founder of Green Chemistry **John Warner** and his esteemed partner green chemistry educator **Amy Cannon** are co-founders of the groundbreaking green chemistry education non-profit Beyond Benign. They'll show how the combination of green chemistry and biomimicry in the STEM curriculum provides a unique opportunity to inspire students to make connections with the natural world and to use that inspiration to become creators of truly sustainable products and processes. They'll focus on techniques and resources for adopting green chemistry and biomimicry throughout educational systems, highlighting K-12 and higher education programs aimed at transforming STEM education.

inhabitat

NEWS ENVIRONMENT ARCHITECTURE DESIGN HOME

Search inhabitat

875 Molate Terminali, Denpasar to 224854 - Profiteer nu online!

Elite Spanplafonds

More info to inhabitat, give online guide to the best green design ideas, resources and inspirations to build a greener, brighter, and better future.

Get the free Inhabitat Newsletter

Enter Address

SUBSCRIBE

POPULAR TODAY

POPULAR ALL TIME

Scientists discover the world's strongest natural material

By Shirley Sommer

These little sea shells lurking on your bathroom shelf are hiding quite a secret—at least, their teeth are. According to a new study from the University of Portsmouth, the strongest material found in nature is the tooth of a tiny sea creature. The aquatic snail-like creature's astonishingly long teeth feature a biological structure so strong that it could provide us with a way to build tougher cars and planes in the future.

Is this Bioeconomy? Bio-lightning



Home | News | Life | Technology

214

DAILY NEWS 26 February 2016

Glow-in-the-dark bacterial lights could illuminate shop windows



What if we could use less electricity to light today's civilizations? Glowee is a French start-up willing to take on this challenge by using genetically modified bacteria to produce light. I had the chance to talk with the company's CEO Sandra Rey and will give you my thoughts.

It all started from a student project in a design college. Back in 2013, the team behind the project won the ArtScience Prize, created by a professor from Harvard. Traction from the market was visible and large companies started to contact them, but they had nothing scientific yet. So they decided to launch the startup and joined an incubator in Paris.

"But we had no idea on how to produce light with bioluminescence" told me Rey. In September last year, the ArtScience Prize winners started working on the science. They inserted gene producing lighting proteins into bacteria. The micro-organisms were then cultivated in a specific medium in order to avoid the later to be consumed too fast and to keep it as transparent as possible. Today, Glowee is able to produce a bioluminescent solution lighting capable of lasting up to 40 hours. "The lighting intensity is basically close to a nightlight."





Is this Bioeconomy? Bio-Refitting of cities



Transformer la petite ceinture de Bruxelles en forêt urbaine ? Le rêve de l'architecte Vincent Callebaut



<http://www.bbc.com/future/story/20140402-a-vision-of-new-york-in-2050>

http://www.terreform.org/projects_urban-new-york-city-state.html

http://www.huffingtonpost.com/2014/03/24/sustainable-nyc_n_4886443.html



European
Commission

Is this Bioeconomy? Bio-retrofitting and bio-designing of buildings?

iPad 9th 10:55 medaarch.com

Antonia Gravagnuolo, Amleto Picerno Ceraso, Emanuela Lanzara, Rossella Notari, Giuseppe Luciano, Elena Auferio, Giuseppe Di Domenico, Gianmarco Covone, Carlo Paolucci: **Smart & Fab: enhancing resilience in post-industrial urban environments**

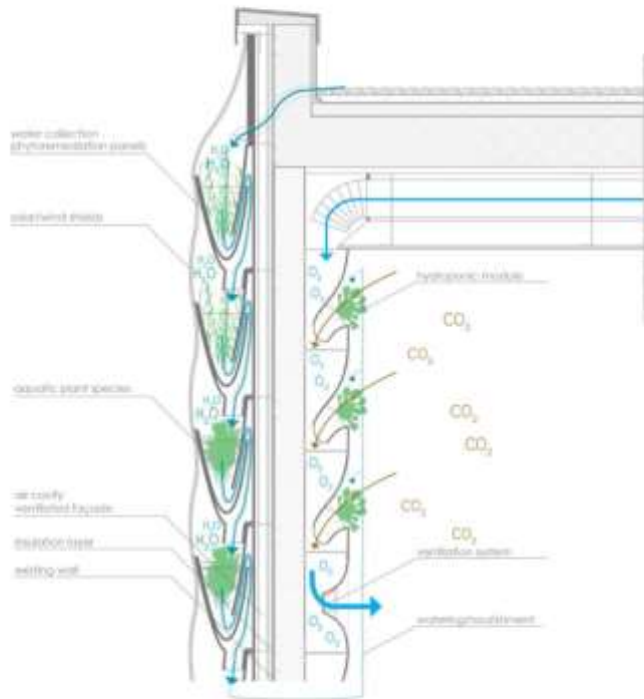


Figure 11: Recovery of existing walls

The filtered water thus obtained is used for plant nutrition within the Vertical Farm and for domestic sewage through a double water supply, dramatically reducing the consumption of drinking water. Moreover, the recovery of rainwater reduces the load on the sewer system, decreasing at the same time the risk of overload.

York University



Is this Bioeconomy?

Urban agriculture for sustainable food cities

iPad 22:20 weburbanist.com

webUrbanist


Onbepaalde betaalwijze & sms'en + 5GB Bizz Smart XL Intense €40 /maand excl. btw gedurende 12 maanden

New Articles Daily on Urban Architecture, Art, Design, Travel, & Technology

World's Largest Indoor Farm is 100 Times More Productive

Article by Urbanist, filed under **Offices & Commercial** in the **Architecture** category.

proxiplus TV Replay est maintenant disponible pour tous!



iPad 11:37 fastcoexist.com

CO.EXIST SUBSCRIBE

2 MINUTE READ

In This Huge Urban Farming Lab, LED "Recipes" Grow Juicier Tomatoes And Sweeter Basil

The massive Netherlands center run by the lighting company Philips is pushing indoor farming to its limits.



01 / 03 The GrowWise Center is one of the world's largest urban farming research centers

Facebook Twitter LinkedIn Email

Is this Bioeconomy? Aquaponics



Back to Mail 10:04 foodialogues.com

SEARCH MENU

The FOOD DIALOGUES

About USFRA Media Room Contact USFRA For Affiliates

WHAT ROLE WILL AQUAPONICS AND HYDROPONICS PLAY IN FUTURE FARMING?

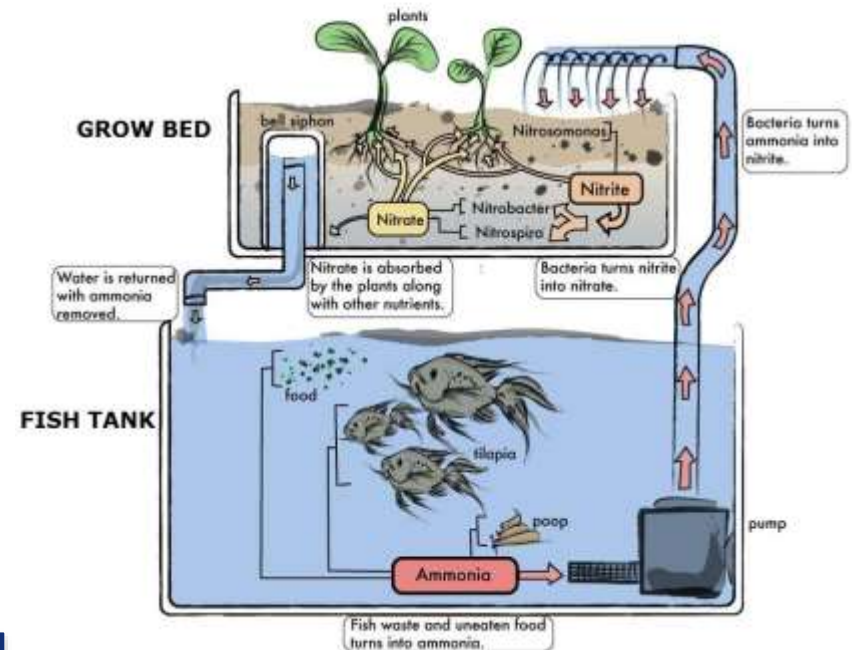


Editor's Note: USFRA's FoodSource is a place to get information on the most asked questions by today's consumers. After reviewing the topics, if visitors still have questions, they can submit their own on our website. This post is based on a recent question submitted through FoodSource.

Raising fish and plants together can be done – and can be accomplished successfully and sustainably. Aquaponics and hydroponics systems are quickly moving from the realm of experimental to commercial as researchers and growers alike have turned the systems into working models of sustainable food production. Aquaculture, for example, is one of the fastest growing segments of the U.S. and global agricultural economies, growing at a rate of 6.5 percent per year, according to the Fisheries Technologies Associates, Inc. The 2007 USDA census of agriculture counted 6,409 farmers and ranchers reporting freshwater aquaculture sales in the US. Total sales were \$1.4 billion.

AQUAPONICS BASIC DIAGRAM

<http://kanat.jsc.vsc.edu/student/grzyb/main.htm>



Is this Bioeconomy? Digital home aquaponics?



In attesa della nuova edizione, la sesta, di digitalMed, come spin-off dei risultati ottenuti dalla nostra scorsa Summer School, abbiamo deciso di mettere a punto un **sistema per la coltura in idroponica di piccoli ortaggi in-house** e rilasciare in open source sia i file di stampa 3D, sia la documentazione relativa al montaggio dell'intera struttura e al sistema di controllo realizzato con Arduino.



Rendere open-source questa ricerca, ci sembra il modo migliore per diffondere l'utilizzo di pratiche che, nel quotidiano, possono migliorare nettamente la qualità della nostra vita.



Scarica qui i file del progetto: [Download Hydroponic House System](#)



RICERCHE SIMILI



Is this Bioeconomy? Edible landscapes and food sharing

Back to Mail 12:18 pm22100.net 100%



VALEURS COMMUNES SOLIDARITÉ

Nourriture à partager

INCROYABLES COMESTIBLES

MOUVEMENT ANTI-CRISE

En transformant l'espace public de leur ville en jardins potagers gratuits, des citoyens créent un nouvel art de vivre par le partage. Découvrez.

Comment rendre attractive une petite ville en plein de Nord de l'Angleterre ? En 2006, Todmorden, 14 500 habitants, affrontait 25 000 en 1960, mais la crise économique après le déclin de ses industries dans les années 1970. Parce que les légumes et les fruits frais sont peu accessibles aux chômeurs, des citoyens décident d'en planter en bordure de trottoirs. Et lancent ainsi le mouvement des Incredible Edibles, les Incroyables Comestibles en français, en référence aux lieux improbables où les jardins publics, sur les genres de l'histoire ou devant le point de police... Ils ont planté des légumes, des herbes et autres autres fruits, mais à la disposition des habitants. Quelque 30 ans passant aujourd'hui la ville.

CHIFFRES CLÉS

Il existe environ **250** communautés Incredible Edible à travers le monde. Chaque jour, un nouveau groupe au minimum démarre. Les Incroyables Comestibles français reçoivent **une quinzaine** de demandes d'information par jour, contre **trois** au début du mouvement.

VALEURS COMMUNES

12



kitchen commons

About KC What We Do Resources Get involved! Events Blog

Kitchen Commons

Kitchen Commons fosters a network of community kitchens that bring people together to share food, resources and relationships. We support grassroots leaders and their kitchen partners through training and resources.

Community Kitchens **Become a Member!** **Resources** **Pitch in!**

Looking for a kitchen? Many hands make



Is this Bioeconomy? Neglected and forgotten crops revolution

Back to Yammer 12:11 abc.net.au 85%

Site ABC Search


RN

Programs Guide Subjects Features Social Media Podcasts About Search RN

RN First Bite Program Home Post Programme Features Subscribe About Us Contact Us

Seeding the future: tapping gene banks to secure our food future

Wednesday 7 August 2013 8:01AM
Alicia Wood



Presented by Michael Mackenzie

NAME: BOTANIST JO USBYRNE ZAMMER A SPECIMEN PRESERVED AT THE ROYAL BOTANIC GARDENS, LONDON. SCIENTISTS HOPE TO DISCOVER SEEDS THAT WILL PROVIDE BETTER TOLERANCE TO PLANT DISEASE AND STRESS. (PETER MACDONALD/GETTY IMAGES)

Thousands of years of crop domestication mean that fewer than a dozen flowering plant species now account for some 80 per cent of the world's diet. Some scientists argue the global food crisis could be solved by re-opening seed banks to refresh crop gene pools and increase diversity.

ABC Radio National
Refreshing the seed gene pools to meet food demands...


Share

iPad 11:21 thefuturescentre.org 100%

forum for the future futures centre ABOUT PARTNERS TOPIC HUBS TRENDS THE LONG VIEW Log in Register

What can nearly 12,000 'orphan crops' do to address the nutrition gap?

18 Sep 2015
by Juliette Apin



Could 'orphan crops' become a food security and income generation solution for the world's poorest communities?

Vote Up 0 users have voted. Share

Tell us more

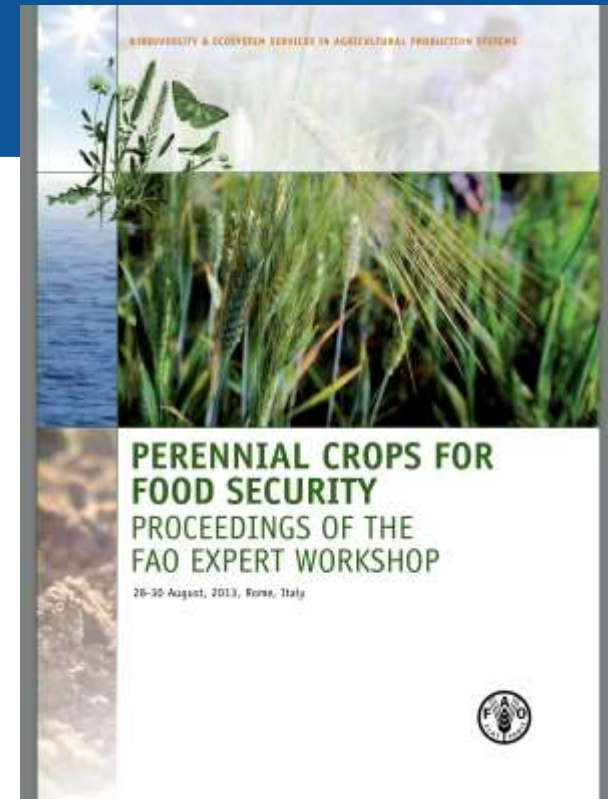
Please register or Log in to comment.



Belgomarkt, Bruxelles



Is this Bioeconomy? Perennials

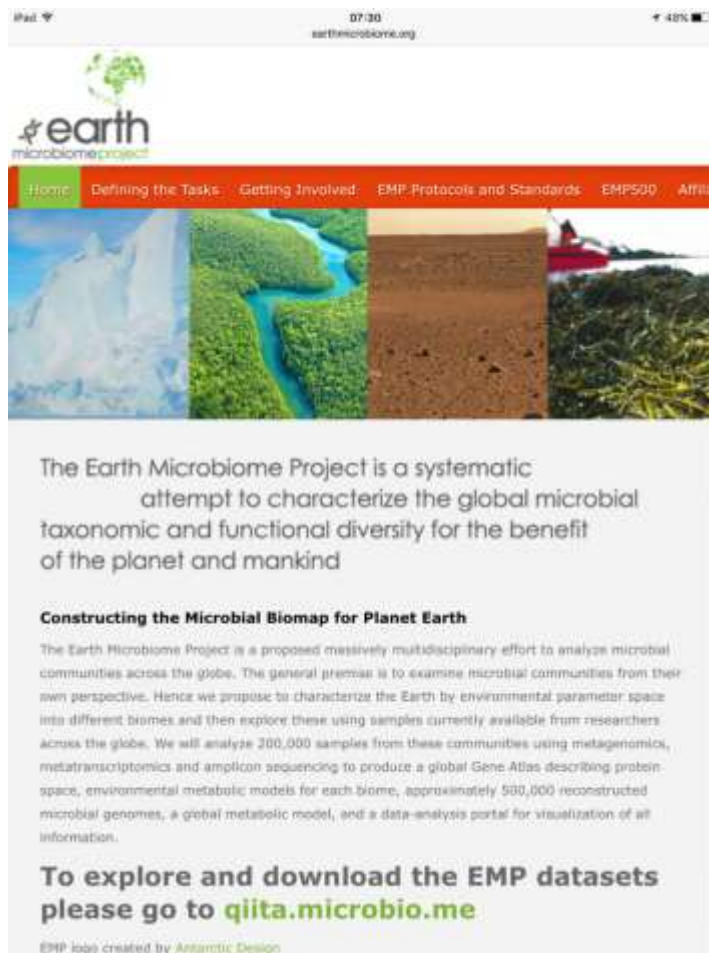


"Perennial cereals, legumes and oil species represent a paradigm shift in agriculture and hold great potential to move towards sustainable production systems. today, most agronomic practices used to grow annual crops require excessive water consumption, significant amounts of synthetic mineral fertilizers, labour, emissions of co2 and disrupt natural biological processes. Perennial crops instead are more rustic, improve soil structure and water retention capacity and contribute to increase climate change adaptation and mitigation practices and promote biodiversity and ecosystem functions."

<http://www.fao.org/3/a-i3495e.pdf>

Is this Bioeconomy?

Mapping the puzzle of microbiome potentials



The Earth Microbiome Project is a systematic attempt to characterize the global microbial taxonomic and functional diversity for the benefit of the planet and mankind

Constructing the Microbial Biomap for Planet Earth

The Earth Microbiome Project is a proposed massively multidisciplinary effort to analyze microbial communities across the globe. The general premise is to examine microbial communities from their own perspective. Hence we propose to characterize the Earth by environmental parameter space into different biomes and then explore these using samples currently available from researchers across the globe. We will analyze 200,000 samples from these communities using metagenomics, metatranscriptomics and amplicon sequencing to produce a global Gene Atlas describing protein-space, environmental metabolic models for each biome, approximately 500,000 reconstructed microbial genomes, a global metabolic model, and a data-analysis portal for visualization of all information.

To explore and download the EMP datasets please go to qiita.microbio.me

EMP logo created by Antimatic Design



Why It's Time to Map the Microbiome (Kavli Roundtable)

By Alan Brown, The Kavli Foundation | December 2, 2015 02:23pm ET

EXPERT VOICES OP-ED & INSIGHTS

Alan Brown, writer and editor for The Kavli Foundation, edited this roundtable for Live Science's Expert Voices: Op-Ed & Insights.

Microbes make life on Earth possible, yet we know so little about them. Now, a team of scientists aim to change that through an ambitious effort — with researchers from 50 institutions — called the Unified Microbiome Initiative.

Their goal is to develop next-generation technologies to unlock the secrets of

microbiomes, complex ecosystems of microorganisms — from bacteria and fungi to algae and viruses — that inhabit nearly every square inch of the planet and have densely colonized our bodies.

Credit: Pacific Northwest National Laboratory

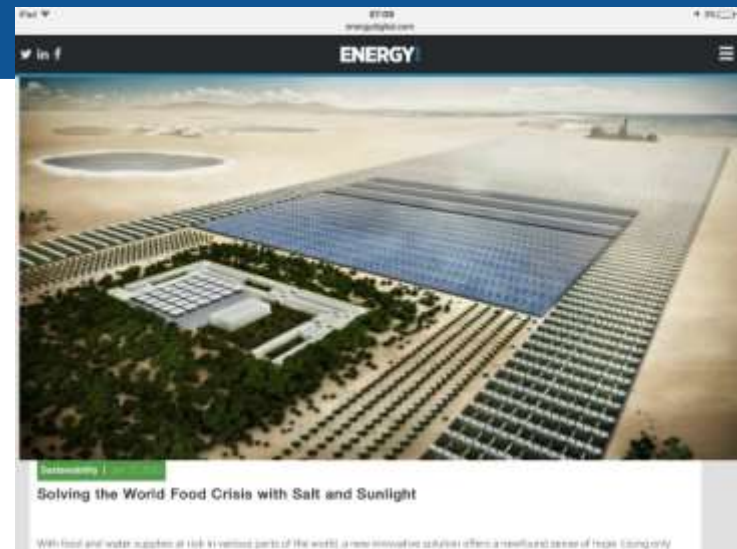
Is this Bioeconomy? Re-thinking the water nexus



High and Dry: Climate Change, Water, and the Economy



A new World Bank reports finds that water scarcity, exacerbated by climate change, could hinder economic growth, spur migration, and spark conflict. However, most countries can neutralize the adverse impacts of water scarcity by taking action to allocate and use water resources more efficiently.





Is this Bioeconomy?

Saltwater agriculture

iPad 06:43 cbc.ca 2%

CBCnews | Technology & Science

Home World Canada Politics Business Health Arts & Entertainment Technology & Science
Technology & Science Quirks & Quarks Blog Spark Photo Galleries

Salt-tolerant plants eyed as crops of the future rises

20 per cent of world's irrigated farmland already contaminated with salt

By Katy Daigle, The Associated Press Posted: Aug 17, 2015 12:02 PM ET Last Updated: Aug 18, 2015 11:01 AM ET



Salicornia brachiata, is a wild-growing halophyte or salt-tolerant plant known to locals as "chicken feet." It thrives on fields tainted by saltwater from a neighboring shrimp farm near Velankanni, India. (Aljaz Rahi/Associated Press)

1 of 10

627 shares

Facebook

Twitter

Reddit

On a sun-scorched wasteland near India's southern tip, an unlikely garden filled with spiky shrubs and spindly greens is growing, seemingly against all odds.

The plants are living on saltwater, coping with drought and possibly offering viable farming alternatives for a future in which rising seas have inundated countless coastal farmlands.

Sea rise, one of the consequences of climate change, now threatens



Stay Connected



Top News



The hacking of Neil Macdonald

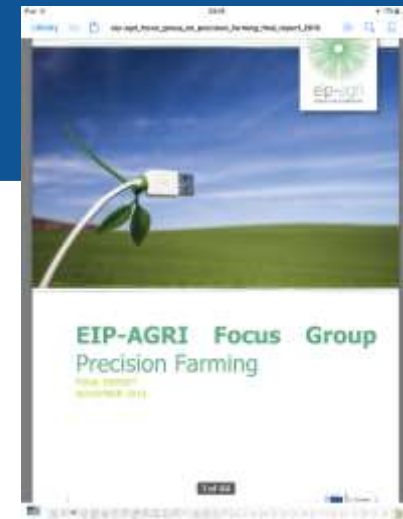
'Are we going CBC account

Live from Ne



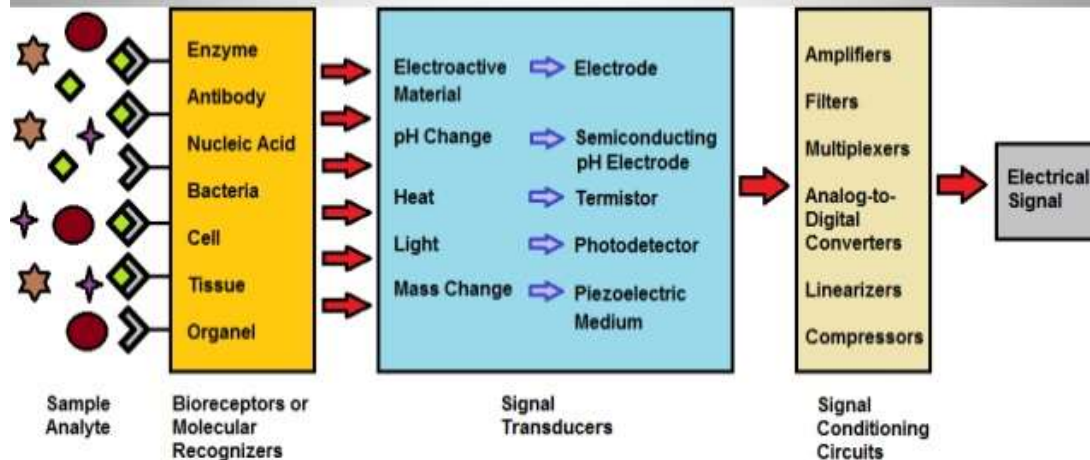
Is this Bioeconomy?

Biosensors in agriculture



What are biosensors?

- Biosensors are analytical devices which convert a biological response into an electrical signal.

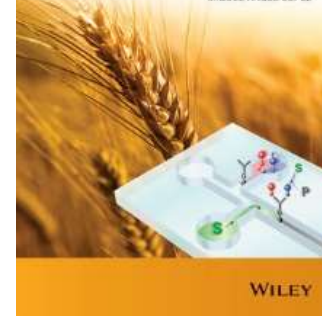


Working principle of biosensors



AGRICULTURAL AND FOOD ELECTROANALYSIS

ALBERTO ESCARPA
MARÍA CRISTINA GONZÁLEZ
MIGUEL ÁNGEL LÓPEZ



WILEY



Is this Bioeconomy? Swarm robotics



Sweet Pepper Harvesting Robot



ICT Robotic Use Cases project in the H2020

programme of the EU

Sweeper's main objective is to put the first generation greenhouse harvesting robots into the market, until now this has never been achieved and it will ensure Europe's leading role in agricultural robotics.

In modern greenhouse there is a high demand for automatic labour. The availability of a skilled workforce that accepts repetitive tasks in the harsh climate conditions of a greenhouse is decreasing rapidly. The current state of the art in automated harvesting of fruits and vegetables has remained remarkably stationary in the past decades. In the EU FP7 project CROPS some unique robotic and extensive research has been performed on agricultural robotics. One of the applications was a sweet pepper harvesting robot, SWEEPER will use the technology developed in CROPS to introduce, test and validate a robotic harvesting solution for sweet pepper under real-world conditions.



Dr. Zainal Abidin

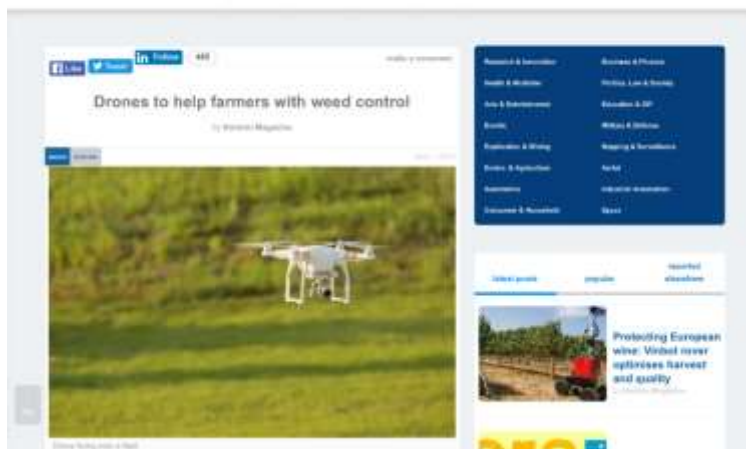
Managing Director of Agriculture Workshop (H) Sdn. Bhd.

Follow

ATTRACT YOUNG PEOPLE BACK TO AGRICULTURE WITH ROBOTIC FARMING

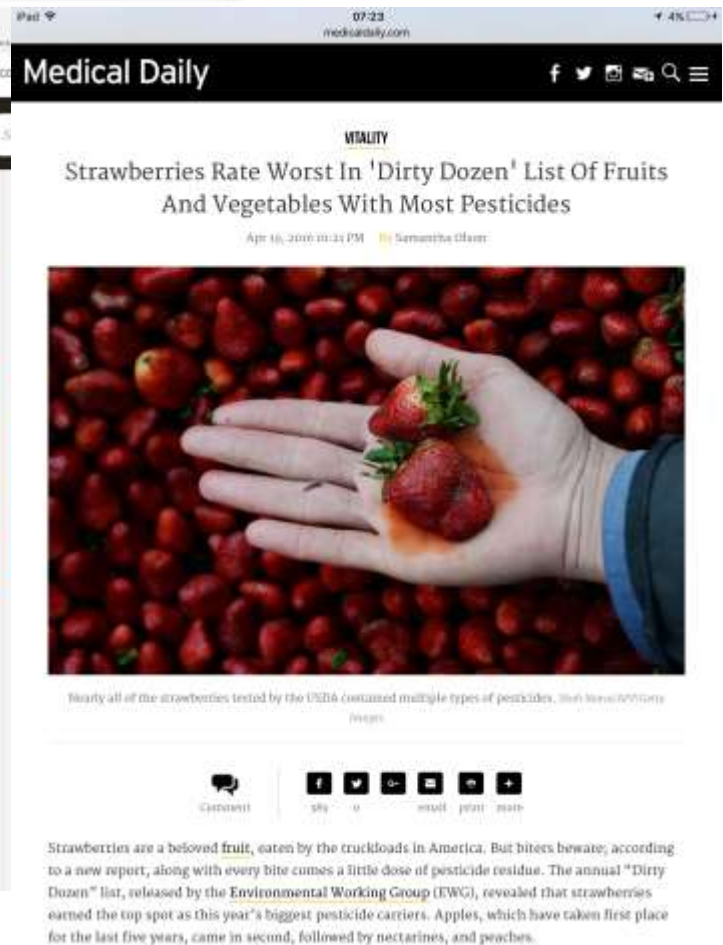
May 20, 2018 213 views 27 Likes 3 Comments

The agricultural sector is growing rapidly due to booming World population. On the other hand the farmers' population is being reduced due to age and health factors. The younger generation is not attracted to this profession due to its nature and lack of prestige being a farmer. But the market demand for agricultural products keep on increasing. Due to this, the demand exceeds supply in a big way, pushing up the prices.





Is this Bioeconomy? Re-thinking plant protection





Is this Bioeconomy? Cyborg husbandry



Cyborg swarm maps unknown environments

October 17, 2013



(Credit: Edgar Lobaton.)

Remember the much-debated "biobots" (remotely controlled cockroaches — see [How to remotely control cockroach cyborgs](#) and [Kinetix tracks bionic rescue roaches](#)) created by researchers from North Carolina State University?

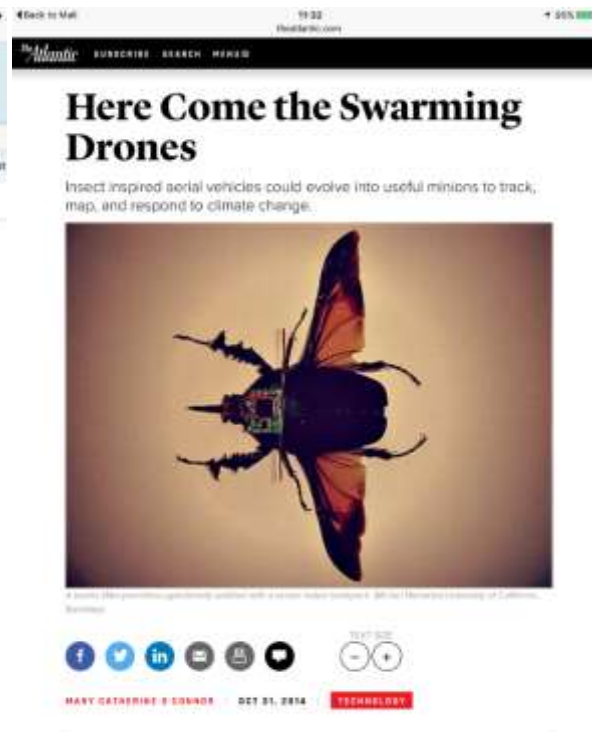
Well, here's an update: they have now developed software that allows for mapping unknown environments — such as collapsed buildings — based on the movement of a swarm of insect cyborgs.

"We focused on how to map areas where you have little or no precise information on where each biobot is, such as a collapsed building where you can't use GPS technology," says Dr. Edgar Lobaton, an assistant professor of electrical and computer engineering at NC State and senior author of a paper on the research.

"One characteristic of biobots is that their movement can be somewhat random," Lobaton says. "We're exploiting that random movement to work in our favor."

Here's how the process would work in the field.

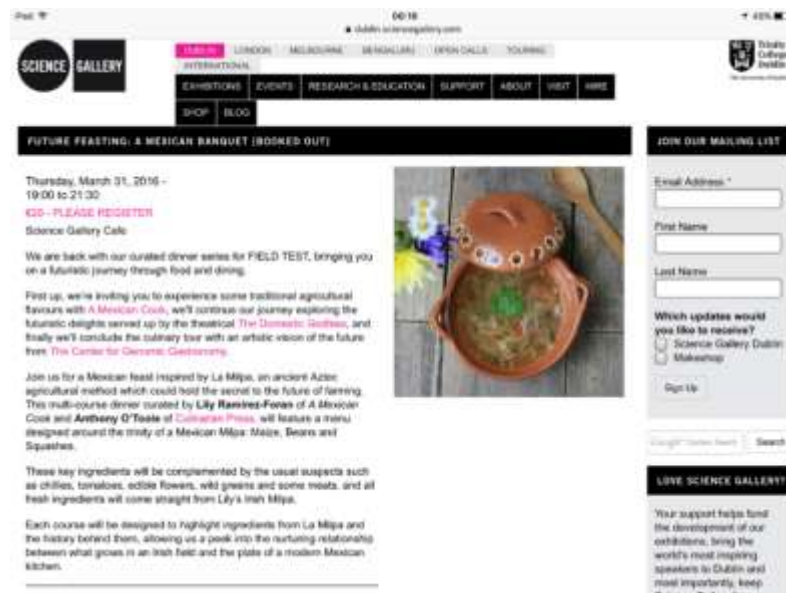
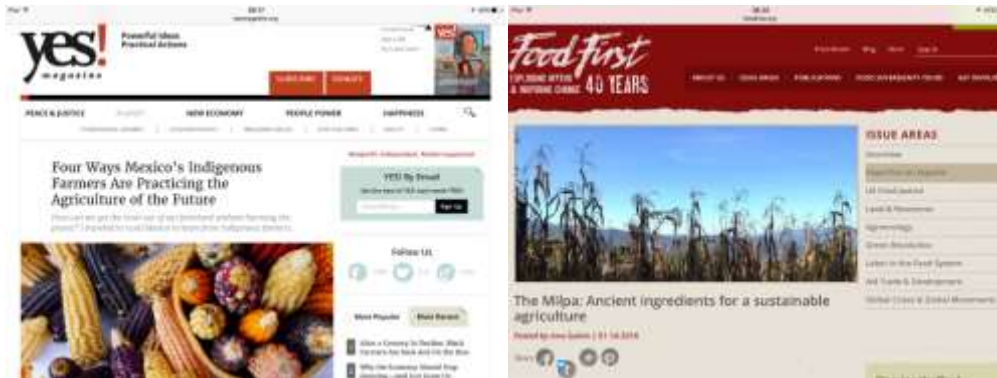
1. A swarm of biobots would be equipped with electronic sensors and released into a collapsed building or other hard-to-reach area.
2. The biobots would initially be allowed to move about randomly. Because the biobots couldn't be tracked by GPS, their precise locations would be unknown. However, the sensors would signal researchers via radio waves whenever biobots got close to each other.
3. Once the swarm has had a chance to spread out, the researchers would send a signal commanding the biobots



Since the dawn of entomology (more or less), scientists have been pondering the question posed so eloquently in "High Hopes," a song Jimmy Van Heusen and



Is this Bioeconomy? Traditional knowledge for the future



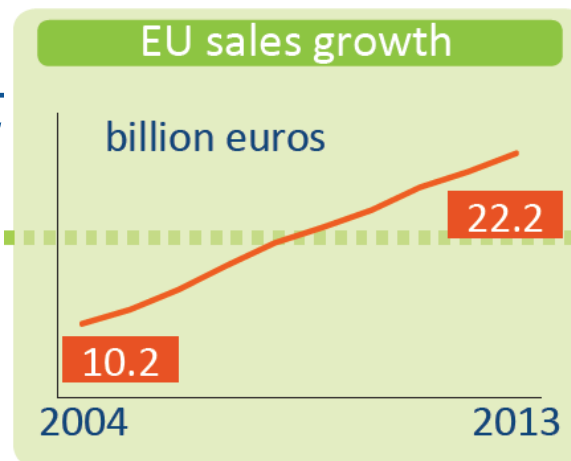
La Milpa, in the Nahuatl language of the Aztecs literally means 'what's planted in the field'. This agricultural method is able to produce food all-year-round from a small plot of land, a Milpa can grow up to 15 different crops at once, all feeding from each other and supporting the soil. Based on the natural cycles and seasons of the land; it's sustainable, with crop rotations and periods of fallow and it is said to be one of the richest and more complex organic ecosystems ever found. The green movement and the demand from consumers searching for milpa to table alternatives, has created a new wave of small, modern farmers that are taking this two and a half thousand year old baton and carrying it into the future, hailing La Milpa as the key to food security, sustainable farming and the protection of local biodiversity.

<https://dublin.sciencegallery.com/events/2016/04/futurefeastingmexicanbanquetbookedout>

Is this Bioeconomy? Organics



The study found that the yield gap between organic and conventionally grown crops could be lowered to just 8 per cent. Getty Images



Source; European Parliament
Research Service
<https://epthinktank.eu/2015/05/20/organic-food/>



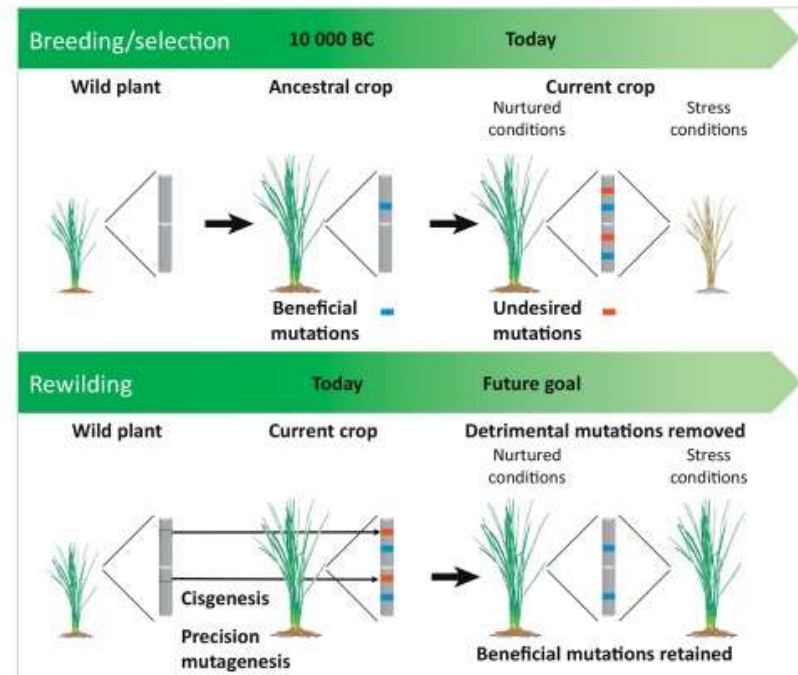
Marché bio les Tanneurs, Bruxelles

Is this Bioeconomy? Rewilding



Highlights

- Reverse breeding is here defined as introduction of ancestral traits into crops.
- Reverse breeding provides a promising future path for sustainable agriculture.



Is this Bioeconomy? Agroforestry



<http://www.thesolutionsjournal.com/node/971>



Science Domains



Systems Science

Smallholder farmers in the tropics have enjoyed few livelihood improvements because... [more](#)



Markets, value chains and institutions

This research area seeks answers to critical questions related to the organization of... [more](#)



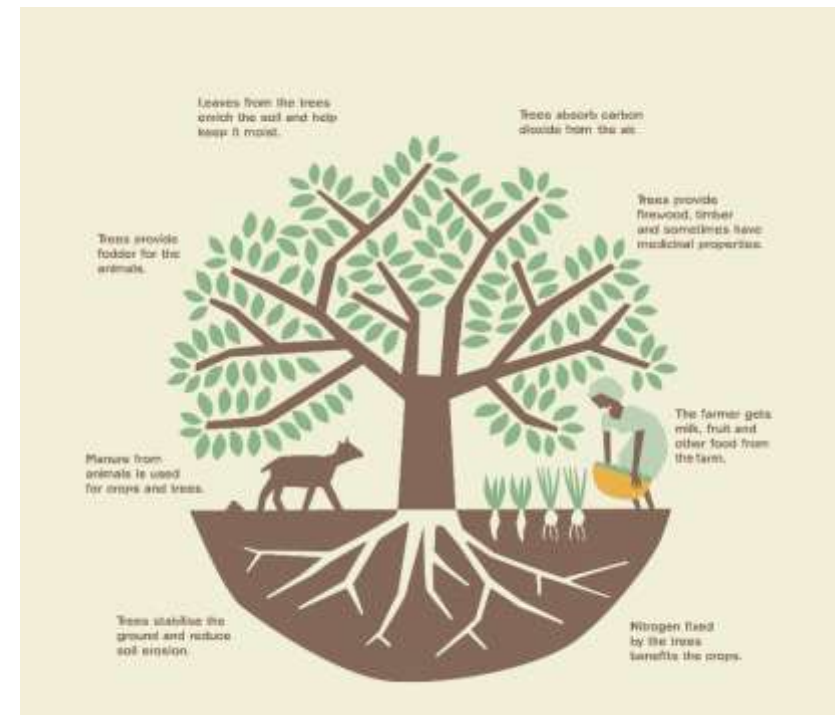
Tree diversity, domestication and delivery

Deals with identifying, delivering and conserving quality tree germplasm, as well as... [more](#)



Land Health Decisions

The aim is to improve policies, strategies and plans for the prevention and... [more](#)



<http://www.viagroforestry.org/what-we-do/agroforestry/>



European
Commission

Is this Bioeconomy? Circular farms



(<http://www.slideshare.net/JanDeWilt/ecoferm-montpellier-15062015>)

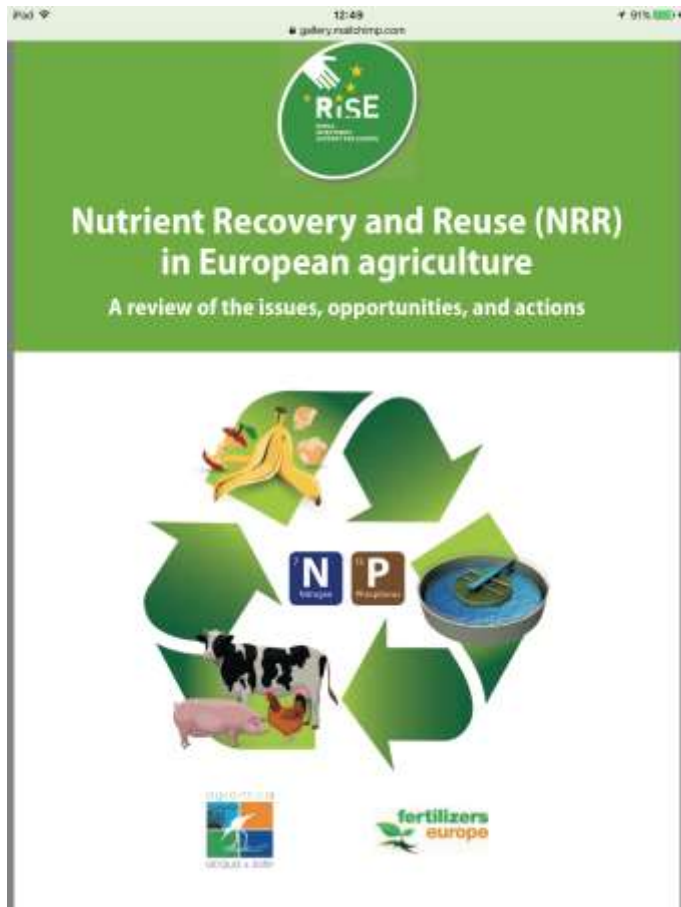
Is this Bioeconomy?

Integrated landscape stewardship in multifunctional business models



Is this Bioeconomy?

Mainstreaming Nutrient Recovery and Reuse globally



“Every ton of nutrient which is intercepted from a waste flow and processed into a form suitable to be used to fertilize crops represents a ton less which would have leaked into water, the air, or the atmosphere, or ended up in land fill.

Europe can perform a leadership role in improved nutrient management. Since the transition is unavoidable this would also create first mover advantage and economic opportunities.”

Is this Bioeconomy?

Re-thinking human waste and toilet technology



Office blocks and universities could turn pee into commercially available phosphorus and nitro fertilisers, thanks to a bioelectrical reactor in development by researchers across the EU.

Fresh urine contains approximately nine grammes of nitrogen and one gramme of phosphorus per litre, an average person produces between one and one-and-a-half litres a day which currently goes to waste. Researchers believe human urine could provide 18 % of the phosphorus and 25 % of the nitrogen currently used for soil fertilisation in the EU.

By extracting these compounds rather than flushing them down the sewer, we could reduce energy-intensive ammonia production and cut our reliance on imported phosphorus ore.

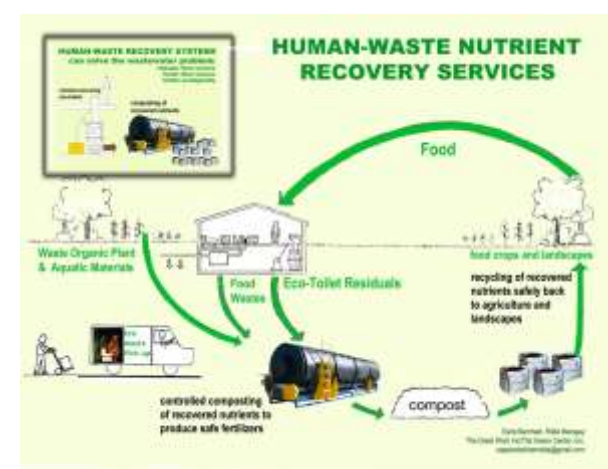
"We require phosphorus to ensure the production of crops and, with a growing human population and almost no phosphorus reserves in Europe, we rely on imports," said Dr Philipp Kuntke, from Dutch water research firm Wetsus, who was involved in the project, known as ValueFromUrine.

It's possible thanks to urine-separation toilets and urinals, which stop it being diluted by other wastewater streams.

It means the EU-funded project, which finishes next year, has been able to develop a three-step process that uses a bioelectrical

"With a growing human population and almost no phosphorus reserves in Europe, we rely on imports"

Dr Philipp Kuntke, Wetsus





Is this Bioeconomy? Re-thinking bio-circularity



Start-up turns methane from manure into eco-friendly plastic



Mark Herrera is CEO of Newlight Technologies, a Costa Mesa company that uses methane, a greenhouse gas, to make plastic. (Dina Porazo, Los Angeles Times)



By Andrew Khouri - Contact Reporter



Is this Bioeconomy?

Greenhouse gases as feedstock

iPad 08:17 28%

Plastixportal
Plastics & Packaging Directory South Africa


Listing Options - Plastics News Search

CONVERTORS PRODUCTS PACKAGING MATERIALS MACHINES MOULDS SERVICES

4th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers

Highly efficient and cost-effective CO₂ utilization will spark a revolution

Published: 2015-06-25



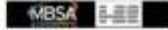

29–30 September 2015
Haus der Technik, Essen (Germany)

www.co2-chemistry.eu



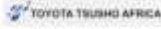
Highly efficient and cost-effective CO₂ utilization will spark a revolution – Leading players will showcase their latest technological breakthroughs in Essen (Germany)

nova-Institute is proud to host the "4th Conference on Carbon Dioxide as Feedstock for Fuels, Chemistry and Polymers" on 29 - 30 September 2015 in Essen, Germany (<http://co2-chemistry.eu>) and invites interested stakeholders to register. More than 200 experts are expected to join Europe's largest event on Carbon Capture and Utilization (CCU). The main focus of the conference topic is on technological




Premium

Premier Packaging

Carbon Dioxide as Feedstock – for Fuels, Chemistry and Polymers

Organiser	Patronage	Premium Partner	Silver Sponsor
 www.nova-institute.eu	 www.wissenschaft.nrw.de	 www.energieagentur.nrw.de	 www.infraServ- Knapsack.de/en





Is this Bioeconomy?

Re-thinking use of primary biomass



Avoiding Bioenergy Competition for Food Crops and Land

Creating a Sustainable Food Future, Installment Nine

by [Tim Searchinger](#) and Ralph Helmlich - January 2015

[Twitter](#) 213 [Facebook](#) [LinkedIn](#) [More](#)

Installment 9 of *Creating a Sustainable Food Future* shows that any dedicated use of land for growing bioenergy inherently comes at the cost of not using that land for growing food or animal feed, or for storing carbon.

It recommends several policy changes to phase out forms of bioenergy that use crops or that otherwise make dedicated use of land.



[DOWNLOAD](#) 741.7 KB / PDF

[PUBLICATION](#)

CONTACT:
[Tim Searchinger](#)

PROJECTS:
[World Resources Report](#)

TOPICS:
[Climate](#), [Energy](#), [Food](#)

TAGS:



Is this Bioeconomy? Towards end of combustion engines – noise or trend?



CleanTechnica is the #1 cleantech-focused
news & analysis site in the world. [Subscribe today!](#)
The future is now.

About Electric Car Reviews Exclusives Power **Transport** Surprise! Search →

Norway (+ Netherlands, Austria, & India) On Verge Of Banning Gas Cars (Edit: Rumor May Be False)

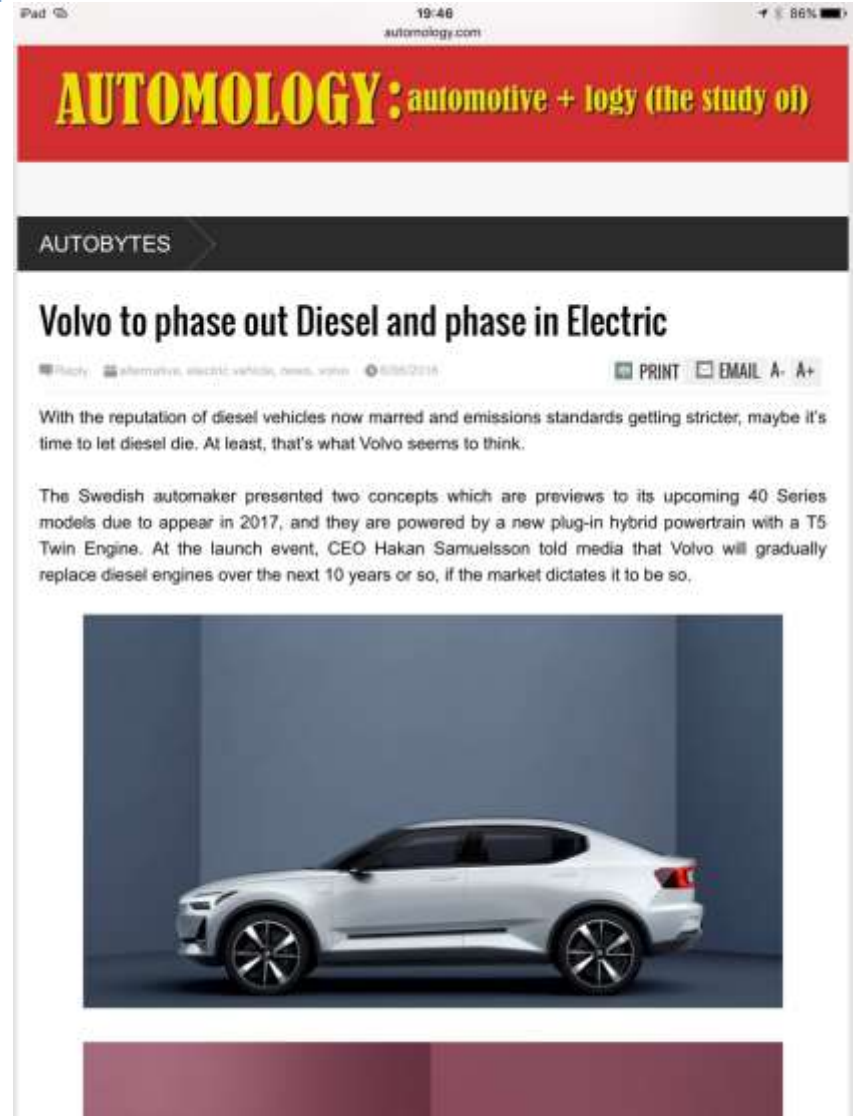
June 4th, 2016 by [Guest Contributor](#)

Edit: From some Norwegian, we hear that the reports from the newspaper Elan tweeted have the story wrong. The story, according to other sources, is that Norway will just implement a goal of 100% electric cars by 2025, not a ban on sales of new gas cars. But it's hard at this point to know which reports are accurate. Naturally, we'll keep you posted as more information is revealed, as we've been doing for months.



Solar Power

Sponsored By:



Is this Bioeconomy?

Sustainability challenge of scaling up aquaculture



Improving Productivity and Environmental Performance of Aquaculture

Creating a Sustainable Food Future, Installment Five

by Richard White, Marcom Beveridge, Randall Brummett, Sarah Costine, Nuttapon Chaiyawanrakorn, Sadaivarn Koushik, Rattanasorn Muekgung, Supasat Neewapapit and Michael Phillips - June 2014

[Twitter](#) [Facebook](#) [LinkedIn](#) [More](#)

Installment 5 of *Creating a Sustainable Food Future* explores the potential role of aquaculture in meeting global fish demand in 2050, finding that aquaculture production will need to more than double by midcentury. We examine scenarios of aquaculture's growth and environmental impacts in 2050 and close with a series of recommendations for how to sustainably grow aquaculture production.



DOWNLOAD

PUBLICATION

CONTACT
Richard White

PROJECTS
World Resources Report

TOPICS
Food

TAGS
aquaculture, creating a sustainable food, food security, world resources

FILED
10



SUSTAINABLE AQUACULTURE



Grand Challenge

As human populations grow and increase in prosperity, the global demand for protein is anticipated to skyrocket over the next several decades. And with almost all of the world's arable land overtaxed already, new sources of protein and other food are needed, with only the ocean as a viable opportunity. But we need to meet the rapidly growing global demand for seafood without destroying ocean ecosystems. Wild fisheries have likely peaked, and current industrial fishing practices are wasteful, killing millions of unused fish, birds, sea turtles and marine mammals.

Aquaculture, or fish farming, is already making up for the losses in some wild-caught fisheries, and it is one of the fastest-growing food production systems. Yet aquaculture will need to more than double in size by 2050 to meet growing seafood demand, and many current aquaculture farms are inefficient, destructive to the environment and so filthy that they can threaten human health. In many cases aquaculture does more harm than good.

This prize will transform the productivity, efficiency, and sustainability of aquaculture farms by developing cutting-edge techniques for "aquaponics" which combines

Is this Bioeconomy? Off-shore agriculture

Back to Yammer 11:36 fr.metro@me.be 89%

metro #MUST READ #NEWS #WEEKEND #APP #VIDÉO #START #WIN #FRIENDS

POURRIE : CETTE FERME SOLAIRE FLOTTANTE POURRAIT RÉPONDRE AU PROBLÈME DE LA FAIM DANS LE MONDE

Cette ferme solaire flottante pourrait répondre au problème de la faim dans le monde

04/06/2015



#VIDEO

Le pisse-debout, un accé permettant aux femmes debout, débarque dans les supermarchés français

VIDEO. Une mystérieuse découverte à 3.700 mètres de profondeur

Téléchargez notre app gratuite

Votre dose quotidienne d'actu et de divertissement.

cliquez ici

Pad 09:42 motherboard@ice.dns

MOTHERBOARD



HELL OF SALT WATER

Underwater Agriculture: The Scuba Divers Growing Crops in Bubbles Under the Sea

WRITTEN BY EMIKO JOZUKA
August 11, 2015 11:00:30 AM EDT

Imagine sailing out to sea to tend to your garden underwater. Or envision a world where large scale farming could be moved into the depths of the ocean.

In a project dubbed *Nemo's Garden*, a team of engineers at Ocean Reef Group, a family-run scuba diving business, are currently experimenting with such ideas. They're trialing an alternative agricultural method which involves growing terrestrial crops in the sea. Now in their third year running, they think their underwater "biospheres"—soft plastic bubbles filled with air—could eventually provide the key to sustainably cultivating crops.

Is this Bioeconomy? Algae economy

AQUAFUELS
ALGAE TOWARDS BIOFUELS



Back to Mail

11:30
labiotech.eu

83%



LABIOTECH.eu
The European Biotech News Website

CATEGORIES

LOCATIONS

EVENTS

JOBS

Q

+

+

+

+

+

+

+

Ultimate Review: The Unlimited Biotech Potential of Algae

GREEN TECH REVIEW

6/16/2016

Is the Future of Biotech...Green? The Algae Industry ranges from Biofuels to Nutrition to Fashion and Microalgae hold lots of potential for the industry to expand. But why? And do Venture Capitalists agree?

Microalgae have already been established as incredibly valuable to the biotech industry, in part due to their [ancient genetic diversity](#) and resilience, providing a bio-platform for production of food supplements, biofuels and even aesthetic effect (see [Algaemy from Berlin](#)).

So what kind of Industries are looking to Exploit Microalgae?



+

in

f

+

+

Is this Bioeconomy? Seasteading



Floating cities could be a reality by 2020



Danielle Mujica · 62
 29 Mar 2016, 5:55 PM · 12,000



FACEBOOK



LINKEDIN



TWITTER



EMAIL



PRINT

Floating cities could be the future of living.



The Seasteading Institute made waves in 2008 (sorry, not sorry) when notable VC Peter Thiel decided to co-found the project. The floating cities are meant to serve as politically autonomous experiments with their own economies.

The project still seems far from completion, but the Seasteading Institute remains committed to its 2020 goal of bringing the futuristic cities to life. Here's a closer look at their plan.

Is this Bioeconomy?

Food industry innovating itself out of junk food

10:39
innovationexcellence.com

innovation EXCELLENCE

THE 4 LENSES OF INNOVATION
A PRACTICAL GUIDE TO INNOVATION


The World's Most Popular Innovation Website - Serving visitors from 170+ countries

Home Content Research Community Directory Advertising on IX Login

Is Your Innovation Pipeline Full of Junk Food?

Posted on October 12, 2015 by Anthony Sklar

In the early part of the Twentieth Century, companies used science, technology, and a product led & and then go sell it. It didn't matter much what their customers thought of it as customers just didn't have that many choices to choose from. So long as it wasn't a mess, it got bought. As Henry Ford famously said, "You can have it in any color you want so long as it is black." And that was that. The marketplace was characterized by a few undifferentiated products that all more or less suited the same. The world was small in a way of black cars. The balance of power lay squarely with the producers. It was an era of indifference.



But then things changed. After World War II, competition, especially global competition, entered markets, and with it, more choice of choice. Suddenly, the balance of power began to shift toward the customer, and what customers thought began to matter to producers. Companies began to listen, and at least somewhat care. If for no other reason than their own survival. Those that didn't listen didn't survive. It was at the point that the market research industry came into its own. As this went on, companies began inventing "customer voices." By the time the 1980s rolled around, the concept of being customer-centric was firmly entrenched. The motto of the day was to listen to the "voice of the customer." And as a way of such things, an entire consulting industry sprang up to capture the VOC and provide its services. The focus group was in vogue.

This era - from the 1980s to the 1990s - was an era of listening. Unfortunately, it was not an era of thinking... all thinking deeply about the human psychology and motivations involved. It was what I refer to as "the golden age of gullibility." As an example of the Twentieth-Century, and companies continued to catch up market before other market failure, despite their listening, the evidence was mounting that something was not right. Fortunately, a man was up around the corner.

First off, a new wave of thinkers came along and demonstrated - via Outcome Driven Innovation - that for creating product heterogeneity, instead of thinking in terms of demographics, we needed to think in terms of being of jobs, outcomes, and constraints, allowing us to segment markets more effectively according to desired outcomes, which derive primarily from individual and needs (functional and emotional). This often ended up being quite different from what traditional Voice of the Customer inputs were telling us. All of a sudden we realized that the customer's voice was not always that reliable. Second, people like Steve Jobs came along and made it clear that, at least for new product categories, there was no such thing as an explicit Voice of the Customer. We had to look back beyond what customers were saying and doing, as those were limited in the context of what they already knew. Instead, we had to place our focus on what jobs and outcomes they ultimately needed doing, as well as the obstacles to doing those, together with the experiences required to best deliver those outcomes. From this, we could then suss out what "bright line" - something entirely new and different. As a result, the world got iPods, iTunes, and iPads. This seemed to be the way we are now in... an era of listening, listening, listening, and listening - and, most importantly, of thinking deeply about the customer's needs and the underlying human motivations behind those. I call it the "age of considered multi-tasking".

Think of being the leader. Not at least the past few years, how the tools have evolved - together with an understanding of how to use them - to find an innovation pipeline with right caliber inputs. And yet, the bad part is that most companies

10:35
foodnavigator.com

FOOD
navigator.com

FREE NEWS
Breaking News on Food & Beverage

NEWS | SECTORS | TRENDS | MULTIMEDIA | WORDS/DEBTS | EVENTS | JOBS | MIDDLE EAST

PRODUCTS & LIVE SUPPLIER WEBINAR

Roundtable discussion: A lighter world: whose fault is globesity and what is being done to combat it?

25-May-2016
4:15PM Paris

Published: 27-Apr-2016 | Format: Webinar | Document type: Supplier Webinar
Related applications: Fats & oils | Fruit, vegetable, nut ingredients | Health and nutritional ingredients

Many fingers have been pointed from lady consumers to greedy food companies to inept governments but it has done little to solve the problem - obesity and overweight rates continue to rise.

In this keynote roundtable we bring consumer, industry and academic voices together to better understand the scale of the problem, and consider ways to tackle a genuine global public health crisis.

REGISTER NOW!

Speakers:

- Andrew Shaw**
Vice President, Global Nutrition Policy, Herbalife
- Carrie Ruston**
Dietitian & Nutrition Consultant, Nutrition Communications
- Pauline Castree**
Food Policy Officer, BEUC
- Shane Starling**
Senior Editor, Nutritional Ingredients, FoodNavigator & FoodNavigator-Asia
- Ten Hoorst**
Director of Corporate Affairs, Food and Drink Federation


The site uses cookies. By continuing to browse the site you are agreeing to our use of cookies. [Find out more here](#)

10:17
BBC News

Why is there so much sugar in some savoury foods?

By Justin Perkinson
BBC News Magazine

22 April 2016 | Magazine



Top Stories

- Brazil's leader Rousseff vows to fight on**
49 minutes ago
- Alberta fire emergency declared**
28 minutes ago
- Paranote 'reduced with virtual reality'**
6 hours ago

Personalised news at your fingertips

Download on the App Store

Get it on Google Play

- Meat, fish and savoury ingredients
- Preservatives and acidulants
- Proteins
- Sweeteners (intense, bulk, polyols)
- Food safety

Is this Bioeconomy? Low-impact foods



What's Next Why low-impact diets are the next big opportunity

share this
article



Matt Loose
Director
SustainAbility



Aimee Watson
Analyst
SustainAbility

Matt Loose and Aimee Watson
Wednesday, November 5, 2014 - 4:00am



Window Farms.

What if everyone could have access to food that meets their dietary needs without preventing future generations from meeting theirs? That's the idea at the heart of sustainable nutrition. Increased attention to the environmental impacts of food types drives interest in sustainable nutrition, helping spur innovation and interest in those foods that can deliver nutritional value with a reduced [environmental footprint](#).

The agricultural footprint — the land required to grow the



Breaking News on Food & Beverage Development - North America

"We are the catalyst for discoveries that spark the senses and transform the everyday"

NEWS | SECTORS | TRENDS | MULTIMEDIA | INGREDIENTS | EVENTS | JOBS

NEWS + SUPPLIERS

Test size | Post | Forward

Subscribe to our FREE newsletter | |

Earth's first superfood? Solazyme's whole algae protein gains traction as formulators seek more vegan options



By Elaine Watson
10-Sep-2015
Last updated on 10-Sep-2015 at 10:58 GMT



Algae's whole algae protein, which contains 63% protein, along with fiber, acids and micronutrients such as lutein and zeaxanthin, has a slightly nutty taste similar to crushed pistachios.

Related tags: Algae protein, Solazyme, Algae, AlgaVia, Protein

New sources of protein from edible insects to hemp are being incorporated into a growing number of products from bars to beverages. But does microalgae have what it takes to become a serious player in the so-called 'alternative proteins' market?

This site uses cookies. By continuing to browse the site you are agreeing to our use of cookies. Find out more here

Available on the App Store

Follow @foodnavigatorusa

Like | 1.4k

Join our LinkedIn group

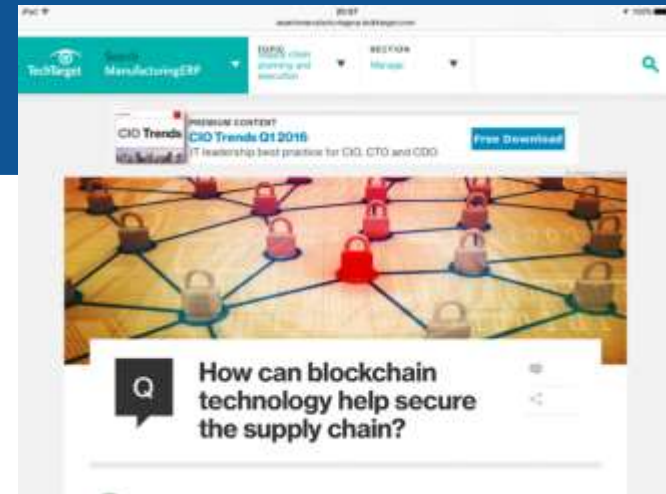
Volges | 100



MOST POPULAR NEWS

- 1 Beverage entrepreneurs watch: From bone broth to...
- 2 FOOD VISION USA CEO 'nature'?
- 3 The Greek yogurt category again, says Chobani, calls data
- 4 Muller Quaker Dairy 2V's disappointment, but what
- 5 KRAVE Jerky founder to New Year and launch into new CPG brands

WACKER



Is this Bioeconomy?

Provenance technology for supply chain traceability

FarmShare:
Blockchain Community-Supported Agriculture
By William E Bodell III // STRATUM

1. Introduction:
This document is intended to provide an overview of the potential application of internet-connected sensor devices and a blockchain-based alternative ownership model in the context of a rural agricultural community. The proposal builds upon the existing business model known as Community-Supported Agriculture (CSA), which aims to create mutually beneficial relationships between farmers and local communities by involving CSA members/subscribers in the production and decision-making processes. The FarmShare application serves as a platform for facilitating collaboration between farmers and shareholders, which has generally proved difficult for CSA organizations relying on traditional modes of planning and communication.

1.1 Community-Supported Agriculture
Community-supported agriculture is an alternative economic model for the production and distribution of locally grown food. It originated in the 1980s in the north eastern United States, based on the concept of biodynamic agriculture first proposed by Rudolf Steiner. CSAs operate on a shared risk-reward model, in which a community of shareholders funds the operation of a local farm at the beginning of the growing season in exchange for weekly deliveries of fresh produce and other food products (such as eggs, dairy, meats, etc) over the course of the harvesting period.

ars technica
MINISTRY OF INNOVATION | BUSINESS OF TECHNOLOGY

IBM wants to move blockchain tech beyond bitcoin and money transfer
Traditionally, blockchain is distributed ledger technology, primarily used for cryptocurrencies like Bitcoin.

The idea of creating a distributed ledger technology (DLT) is not new. IBM has been working on this for years. In 2015, IBM announced that it was working on a blockchain-based system for supply chain management. This system would allow companies to track the origin of their products, from the raw materials to the finished goods. This would help to reduce fraud and improve the efficiency of the supply chain.

CLOUDBET 5BTC WELCOME BONUS PLACE YOUR BETS

How Bitcoin's Technology Could Make Supply Chains More Transparent
Read Williams (@rwilliams_j) Published on May 25, 2015 at 10:00 BST

Read Williams is a senior designer and engineer at IDEO Futures, where he works at the intersection of technology, design, and new venture creation. Alongside Joe Gerber, he is kicking off the Bits + Blocks Lab, a pop-up blockchain startup creation lab hosted at the Harvard Innovation Lab.

This post, which examines how the technology behind bitcoin could make supply chains much more transparent, is part of the *Humans + Bits + Blocks* series.

Is this Bioeconomy?

Marketing uglies and recycling food waste



Delhaize, Drôles de legumes



Brussels Beer project, Beer from recycled bread

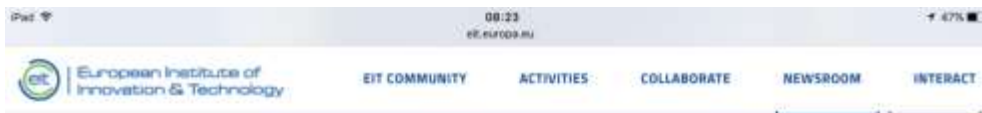
Is this Bioeconomy? Re-thinking food packaging (or no-packaging)



Mushroom® Packaging

Mushroom® Packaging is a premium alternative to your current fabricated foam packaging solution. Protect your product and differentiate your brand with attractive, natural, custom-designed protective packaging.

[LEARN MORE ABOUT MUSHROOM PACKAGING](#)



Featured Content

First steps towards the selection of new EIT Governing Board members: EIT Steering Committee appointed

"Then no one can stop you" - Interview with Govinda Upadhyay

EIT Awards 2016: call for nominations open!

EIT Alumni Startup Days 6-8 November 2015

Evaluation Criteria for the EIT's 2016 Call for KIC



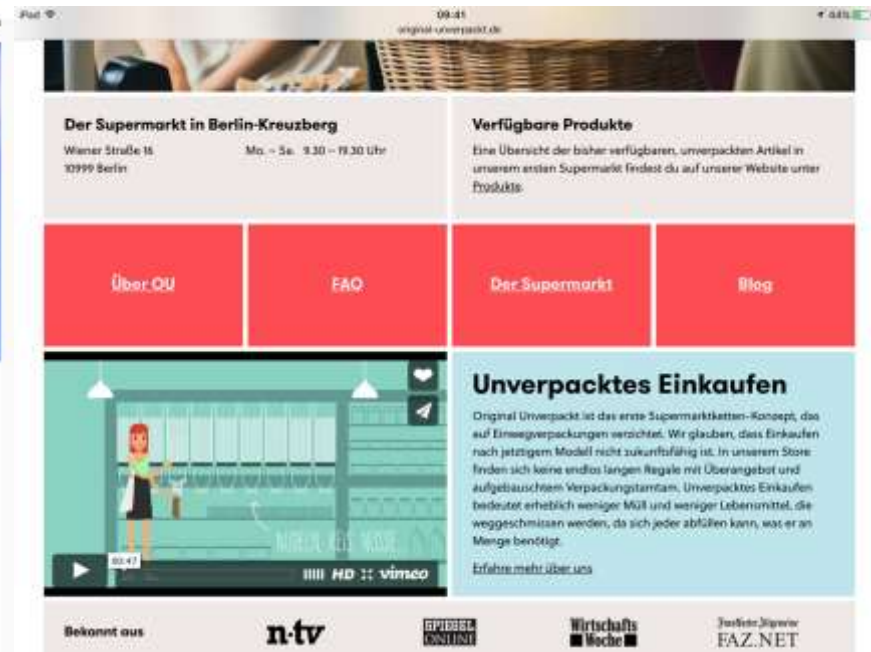
You can eat your water bottle!

News 15/09/2015

Ooho! ☑ Climate-KIC's UK Venture Competition 2015 ☑ winner is making a revolution with edible water bottle. Biodegradable, hygienic and costs 1p per unit to make!

Inspired by the way nature encapsulate liquids using membranes, Ooho! proposes an alternative to the plastic bottle. After experimenting with the culinary technique of spherification with different ingredients, proportions and dimensions, a recipe was found to create "Ooho!" with a double gelatinous membrane and in different sizes.

Ooho! won the joint award with Alchemie Technologie ☑ , creating a digital way of dispensing dye for the textile industry.



Is this Bioeconomy? Personalized nutrition advice



Is this Bioeconomy? Nutraceuticals

NUTRACEUTICALS RESEARCH + DEVELOPMENT

LEARN MORE



Back to Mail 11:26 pm live.com 95%

PMLiVE

Home News Intelligence Thought leadership Appointments Awards Blogs Clinical

News Research Sales Marketing Regulatory Healthcare Jobs and recruitment

Trending Bayer's digital transformation Roche prepares atezolizumab filing Communiqué entry kit Genital herpes vaccine p

Nutraceuticals: Big Pharma or Big Food's next Big Growth area?

Evidence-based nutrition might seem a strong growth area for pharma but amidst the opportunities there are challenges...

Think about the last time you made a visit to a GP as a patient. If it was a sick visit, you presented with a series of symptoms. Your doctor asked about them, and depending on your answers, had some follow-up questions to help give context to your condition, and then prescribed a treatment.



Article by
Bryan Russiano and Pat
Thistlethwaite



EXAMPLES OF NUTRACEUTICALS CURRENTLY AVAILABLE IN MARKET

VITAMIN AND MINERAL SUPPLEMENTS :
VitaminA (Beta- Carotene)

ADDITIONAL SUPPLEMENTS :
cod liver oil, primrose oil,
glucosamine, garlic etc.

SPORTS PRODUCTS-
Glucon-D (Heinz),
Glucose D (Dabur)



The addition of a nutraceutical to a patient's diet will decrease or even eliminate his or her drug use.

CREDIT: (LEFT: OF PHARMASOURCE)



Is this Bioeconomy? Alternative sources of protein

Food Research: High Quality Plant Proteins

Published: 17 March 2015

Plant-derived proteins provide an ideal answer to the increasing demand for nutritious protein-rich food, now and into the future as population growth further increases the need for proteins. However, many plant proteins available today have lost functionality during the isolation and drying processes. Scientists around the world are trying to find ways to



Home > New Plant Protein Powerhouses

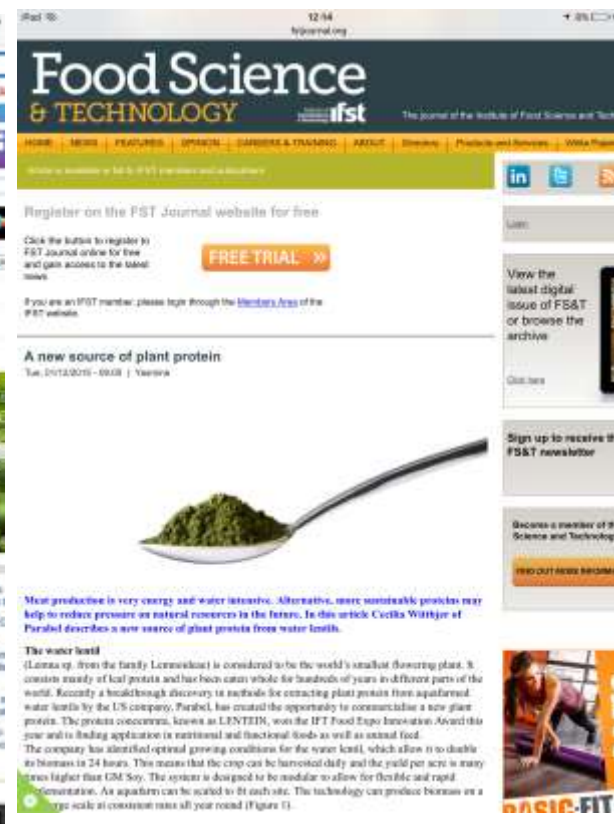
New Plant Protein Powerhouses

The most abundant dietary protein sources on earth are in fruits and vegetables—and food and beverage processors are poised to take full advantage of that

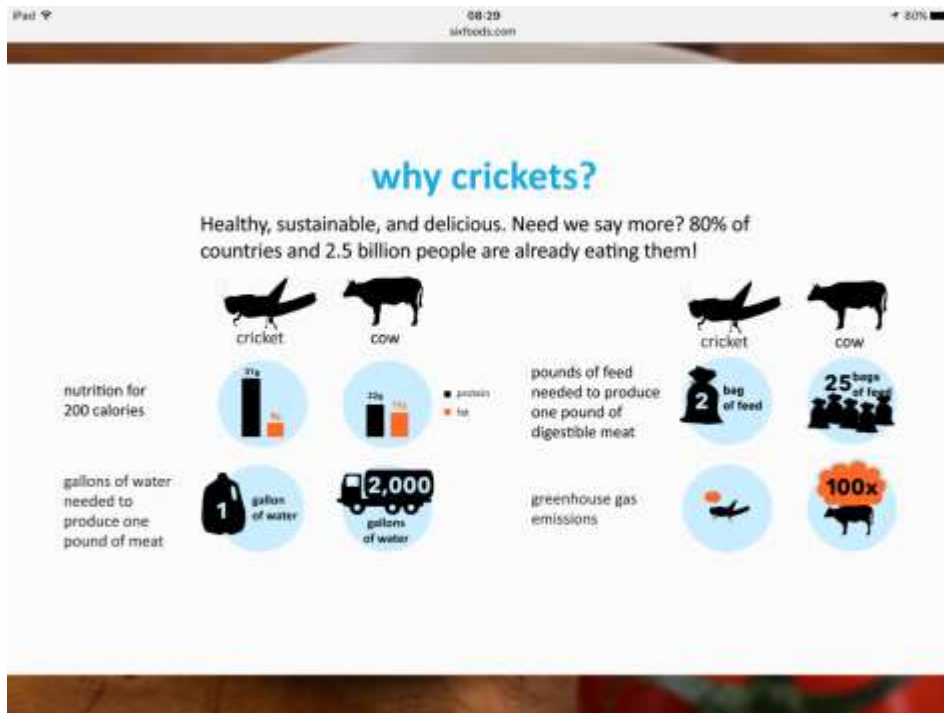


Pure powder derived from highly sustainable Wolffia (duckweed) is at least 43% protein, as well as eco-friendly and non-GMO.

SOURCE: Hironan Ltd. www.hironan.com



Is this Bioeconomy? Insects



Risk profile related to production and consumption of insects as food and feed

EFSA Scientific Committee

Abstract

The present opinion has the format of a risk profile and presents potential biological and chemical hazards as well as allergenicity and environmental hazards associated with farmed insects used as food and feed taking into account of the entire chain, from farming to the final product. The opinion also addresses the occurrence of these hazards in non-processed insects, grown on different substrate



It is a new nature to eat meat as this is eaten all around the world, and beyond India, the co-founder of Grub. Photograph: Photomontage/Photomontage/Corbis

Sponsored by:



About this content

Shane Hickey

Sunday 1 February 2015 12:44 GMT



1,182
140




Is this Bioeconomy? Plant-based meatsimilars

11/17/2015 - BY MONICA WATROUS

Share This: [f](#) [t](#) [in](#) [g+](#) [r](#) [e](#) [m](#)

Search for similar articles by keyword: [Consumer], [Protein]



Beyond Meat offers plant-based meat substitutes that have the taste and texture of animal protein.

EL SEGUNDO, Calif. – What's the future of protein? In a word, plants.

PROVEN TO SOLUTION: ALL CONTAIN...
Advance your control today
WATCH VIDEO
X-Ray Checkweighers


MOST POPULAR
READ SHARED COMMENTS
1 Perdue "appalled" by cruelty
2 Tyson's Smith discusses remaining supply contracts
3 All-day breakfast working for...
4 Bringing home the bacon...
5 Bacon comes home to roost

FOR OVER 60 YEARS

FORTUNE

Fake meat sales are growing, but is it really better for you?

by Mark Koba MAY 11, 2015, 11:42 AM EST



Sellers of meatless meat products, like this vegetarian soy burger, say business has never been better.
Photograph by Lari Patterson — Getty Images

Sales of meatless and vegetarian products are soaring, although only 7% of U.S. consumers call themselves vegetarian.

The hunger for fake meat — or meatless meat — is getting bigger. So much so that the latest sales numbers of plant-based meat alternatives reached \$553 million in 2013, representing a growth spurt of 8 percent from 2010. "We are doubling the business annually," said Ethan Brown, CEO of Beyond Meat, which makes non-animal food products like the Beast Burger and has an active group of investors that includes Bill Gates and former Twitter execs Biz Stone and Evan Williams.


23:44 likemeat.de

Legal information Contact

Products - LikeMeat Partner Messerwerke Storefinder All Grillen - Grillen

LikeMeat - products - Fresh product line

Our fresh product line



Gyros-Strips
Pure plant based Gyros Fillet-Strips

Naturally Pulled
Pure plant based Naturally Pulled

Natural-Fillet-Steak
2 pure plant based Fillet-Steaks



Team wants to sell lab grown meat in five years

By Faten Ghannam
Science correspondent, BBC News
10 October 2013 | Science & Environment



The Dutch team who have grown the world's first burger in a lab say they hope to have a product on sale in five years.



Coming soon: chicken meat without slaughter

An Israeli foundation is first in the world to research mass production of cultured chicken breast, a real meat product starting from a single cell of a real bird.



Is this Bioeconomy? Post-animal bioeconomy





Is this Bioeconomy? Factory-made meal replacements

iPad 07:51 13% weburbanist.com

web Urbanist Bored with your boards? **web Urbanist** is now on **Pinterest**

New Articles Daily on Urban Architecture, Art, Design, Travel, & Technology

Soylent 3.0: 100K Sq Ft Warehouse Could Feed 4 Million People
Article by Urbanist, filed under [Conceptual & Futuristic](#) in the [Technology](#) category.


Enex International
Engineers & Business Consultants Chemicals, Petrochemicals, Fuels

Categories

- Architecture
- Art
- Design
- Technology
- Conceptual & Futuristic
- Gadgets & Geekery
- Gaming & Computing
- Vehicles & Mods
- Vintage & Retro
- Travel
- Archives
- March
- February
- January
- December
- November
- October

More Articles from WebUrbanist

Gajitz
Tech with a Twist





Is this Bioeconomy? Ultralocal food



- About OpenAG
- Overview
- Background
- Food Computers
- Build a Personal Food Computer
- Climate Recipes
- User Interface
- Open Source
- Related Resources

Welcome to the MIT Open Agriculture Initiative

The Open Agriculture Initiative (OpenAG) is on a mission to create more farmers for the future of food production. We are developing the open source hardware and software platforms for sensor-controlled hydroponic and aeroponic



HEALTH
Will smart appliances encourage us to eat at home?



Is this Bioeconomy? DIY Biology

Back to Mail 00:10
faircoexist.com

CO.EXIST SUBSCRIBE

1 MINUTE READ

This Photosynthetic Furniture Can Grow You Dinner

The ultra-local protein of the future will be grown right in your living room.



01 / 12 Will the living room of the future house a glowing green blish of microorganisms?

ADOLE PETERS | 08.10.15 | 6:00 AM

Discovery paves way for homebrewed drugs, prompts call for

UC Berkeley

Berkeley News

Research People Campus & community Arts & culture

MIND & BODY, RESEARCH

Discovery paves way for homebrewed drugs, prompts call for regulation

By Sarah Yang, Media relations | MAY 18, 2015

Fans of homebrewed beer and backyard distilleries already know how to employ yeast to convert sugar into alcohol. But a research team led by UC Berkeley bioengineers has gone much further by completing key steps needed to turn sugar-fed yeast into a microbial factory for producing morphine and potentially other drugs, including antibiotics and anti-cancer therapeutics.

Fab 10 19:52
labioctech.eu

We use cookies to ensure that we give you the best experience on our website. Accept More Info

LABIOCTECH.eu

The European Biotech News Website

CATEGORIES LOCATIONS EVENTS JOBS

A Glimpse into the DIY Biotech Movement: Biohacking, Vegan Cheese, Algae Beer and Bacterial Art!

BIOTECH NEWS BIOHACKING VEGAN CHEESE ALGAE BEER BACTERIAL ART

Fab Labs have become hugely fashionable since 2010... But what about Bio Fab Labs? Have you ever thought about sharing your RNA or DNA amplification equipment? It can be a massive help for entrepreneurs or students, and Bio Fab Labs are starting to emerge in backyards across the world for Education, Innovation and even creative SynBio art. This new era of DIY biotech is AWESOME.

FAB LAB

Fab Labs started as digital virtual laboratories set up to 'inspire' people more than anything, by encouraging students and entrepreneurs to turn their ideas into tangible prototypes. It allowed them to have access to a range of advanced digital fabrication curricula and manufacturing technologies, including 3D printers. This project was then organized for the mass scale by the Fab Lab Foundation in 2009, as a non-for-profit support system at MIT for the growing Fab Lab network.

The principle of this type of workshop was born at MIT's Center for Bits and Atoms program.

Twitter LinkedIn Facebook Email Plus

Is this Bioeconomy?

Wetware – the next frontier of garage innovation



Just as big tech companies like Google found their start in garages, the future of biology will be built in garages and kitchens, too.

At the South by Southwest festival in Austin, Texas, on Friday, a group of researchers described how experimenting with and hacking biological systems had become as accessible as the Internet was during Google's early days, when computer scientists developed software that would change the way people used the Web.

ADVERTISEMENT



Is this Bioeconomy?

Exploring options for diet change

07:59
ec.europa.eu

A-Z Index | FAQ | Mailing lists | Cookies | Legal notice | Contact | Search | English (en)

JOINT RESEARCH CENTRE
The European Commission's in-house science service

European Commission > JRC Science Hub > News & events > JRC News > Nitrogen on the Table - an argument for demitarianism

About us | Research | Knowledge | Working with us | News & events | Our Institutes

Our Communities

News & events

JRC News

News highlights
Other news

Events

JRC Newsletter

Press centre

28 APR 2014

Nitrogen on the Table – an argument for demitarianism

The key findings of a United Nations Economic Commission for Europe (UNECE) special report on the influence of food choices on nitrogen emissions and the European environment were released at a press conference on Friday 25 April. They claim that halving the amount of meat and dairy eaten in Europe could slash nitrogen pollution from agriculture, improve health and boost food exports.

The report, co-authored by IES scientist A. Leip, quantifies, for the first time, how much our food choices affect pollutant nitrogen emissions, climate change and land-use across Europe. It shows how much cutting down on meat and dairy in our diets would reduce nitrogen pollution of air and water, and greenhouse gas emissions, while freeing up large areas of farmland for other purposes such as food export or bioenergy.

While nitrogen is an abundant element that occurs naturally in all organisms, it is also introduced artificially through fertilisation to replace nutrients in soil that have been removed during plant growth. Excess nitrogen can lead to air, water and soil

Reducing meat and dairy consumption could help cut nitrogen pollution
© EUC Photo: P. Brändt
Download hi-res

Related topics

Environmental monitoring

JRC Institutes

IES

22:54
theguardian.com

the guardian

Halving meat and dairy consumption could slash farming emissions

Adopting a 'demitarian' diet would lead to a 25-40% reduction in nitrogen emissions from agriculture in Europe, report shows



Herd of cattle with calves near Quarebeg, County Clare, West of Ireland. Photograph: Tim Graham/Getty Images

Adam Vaughan
@adamvaughan_uk
Friday 25 April 2014 06:00 BST

2,751 Shares 221 Comments

Ⓢ This article is 1 year old

Greenhouse gas emissions from agriculture would be cut by 25-40% if Europeans cut their meat and dairy consumption by half, according to a UN report.

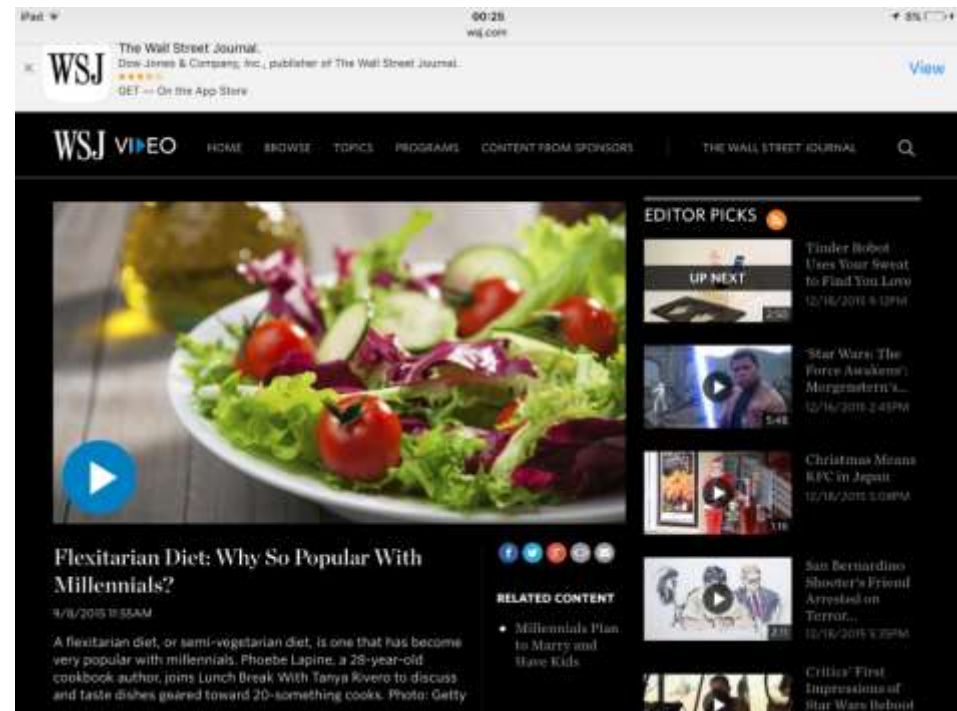
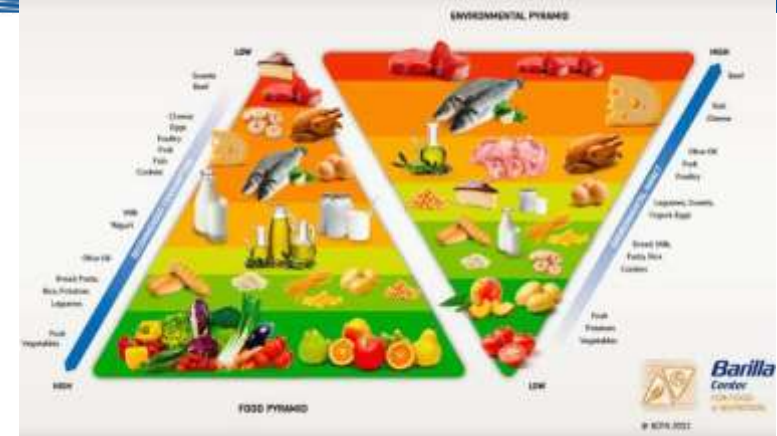
Scientists from the UN Economic Commission for Europe say that as well as cutting air and water pollution, adopting a "demitarian diet" - cutting meat and dairy consumption in half - would lead to a 40% cut in Europeans' intake of

Is this Bioeconomy?

Co-leapfrogging globally towards sustainable and healthy diets



Cook 'n' Smile is a unique recipe page based on an extensive database of





European
Commission

Is this Bioeconomy?

Co-leapfrogging globally beyond the convergence of diets?



ENDING CHILDHOOD OBESITY IS A GLOBAL CHALLENGE

BY SANIA NISHTAR, PETER GLUCKMAN ON 1/30/16 AT 12:02 PM



Obesity in developing countries is on an alarming upward trend, according to a report by the World Health Organization.

GUANG MU/CHICPHOTOS

Childhood obesity is no longer the preserve of wealthy nations. There are more overweight and obese children in the developing world, in terms of absolute numbers, and an upward trend is evident.

In Africa, the number of overweight children under five years of age nearly doubled from 1990 to 2014. Current estimates of



The vegetable will set you free - embracing vegetarianism and flexitarianism in Africa

17 APR 2015 19:50 | SAMANTHA SPOONER



It takes a small swimming pool of water to make four of our favourite steaks.



(Photo: Trisala Bid)

f 11



G+ 1

in 78

INNOVATION HUB

TECHNOLOGY

IN PARTNERSHIP WITH
WWW.MGAFRICA.COM



Subscribe to the MG Africa newsletter

Email address

SUBSCRIBE

YOU MAY ALSO LIKE

MOST READ MOST COMMENTED

Big Politics
Surprise, surprise: A very unlikely country tops Africa in new UN quality of life ranking

Big Politics
The little signs that Botswana's democracy is under stress as president Khama's autocratic streak grows



Is this Bioeconomy? For purpose enterprises

14:04 hbr.org 58%

Harvard Business Review

The For-Benefit Enterprise

by Heerad Sabeti

FROM THE NOVEMBER 2015 ISSUE

SUBSCRIBE > SIGN IN

WHAT TO READ NEXT

- How a New Generation of Business Leaders Views Philanthropy
- Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility
- 5 Bad Reasons to Start a For-Profit Social Enterprise

SUMMARY SAVE SHARE COMMENT TEXT SIZE PRINT BUY COPIES \$9.95

We are in a new era. For-profit businesses are tackling social and environmental issues, nonprofits are developing sustainable business models, and governments are forging market-based approaches to service delivery. Out of this blurring of traditional boundaries, a different model of enterprise is emerging, driven by entrepreneurs who are motivated by social aims.

ARTWORK: SARAH MORRIS, ALPHE L'OEIL (XIXIIE), 2000. GLESS HOUSEHOLD PART ON LARVAE, 2013. CH

Harvard Business Review

FREE WEBINAR

Big Data to Big Profits: Success with Data and Analytics

Featuring Russell Walker

WATCH THE REPLAY >

3/4 FREE ARTICLE DELIVERY > REGISTER FOR MORE | SUBSCRIBE > SAVE!

Wired June 2016 WRED 06.16 \$9.95 Subscribe

Already Link your account to the digital edition

My Account

Wired

Featuring LITTLEBITS! AYAN BOEIR

Build something meaningful.

The rise of the MISSION-DRIVEN business

Wired Wired

Is this Bioeconomy?

Circular business model for a biobased product

Lease a Jeans



Stap 1
Kies de jeans die bij jou past
Heren Dames



Stap 2
Kies een kleur en de juiste maat



Dames maten: 26/27/28/29/30/31/32/33/34
Length: 32
Heren maten: 29/30/31/32/33/34/36/38
Length: 34

Stap 3

Vul je gegevens in en betaal eenmalig €20,-

Dit instapbedrag is inclusief verzendkosten
Betalen via iDeal, creditcard of bankoverschrijving



Stap 4

Ontvang een orderbevestiging en betaal maandelijks €5,-

Betaal een maandelijks bedrag van slechts €5,- gedurende 12 maanden
Via automatische incasso



Stap 5

Na 12 maanden maak je een keuze uit 3 opties



Stuur de jeans retour naar Mud Jeans



Ruil de jeans om voor een nieuw model, betaal 7,50 euro
switchkosten en opnieuw 12 maanden termijn van 5 euro

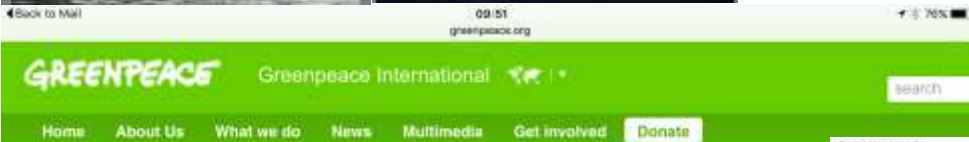


Betaal 4 extra 'statiegeld' termijnen van 5 euro en draag de jeans zolang je wilt. Dit bedrag ontvang je bij retour van de jeans als korting op je volgende aankoop.



Is this Bioeconomy?





Home > Press Centre > Press Releases >
McDonald's and global seafood providers in landmark move for Arctic protection

Like 16 Tweet Email Share G+ 0 Print RSS

McDonald's and global seafood providers in landmark move for Arctic protection

Press release - 25 May, 2016

Amsterdam, 25 May 2016 - Global brands, including McDonald's, Tesco, Iglo, Young's Seafood, Icelandic Seachill, alongside the Norwegian Fishing Vessel Owners Association, Fiskebåt, Russian fishing giant, Karat and Europe's largest processor of frozen fish, Espersen, have today said "no" to the further expansion of cod fishing into the previously-frozen Northern Barents Sea — an area twice the size of France. [1]

The ground-breaking agreement brokered by Greenpeace marks the first time the seafood industry has voluntarily imposed limitations to industrial fishing in the Arctic. This means that any fishing companies expanding into pristine Arctic waters will not be able to sell their cod to major seafood brands and retailers.



Is this Bioeconomy? Teaming up for Arctic protection



Industry Group Agreement to Cod fishery in the northern part of North-East Atlantic (FAO area 27, ICES division IIb2 and Ib*)

We acknowledge that climate change and the melting of the ice sheet in the above areas has caused concern related to fishing activities in the vast area around Svalbard.

We acknowledge Greenpeace's role in bringing attention to the region under these changing circumstances.

We understand that the marine area around Svalbard have been identified in several scientific programs as important.

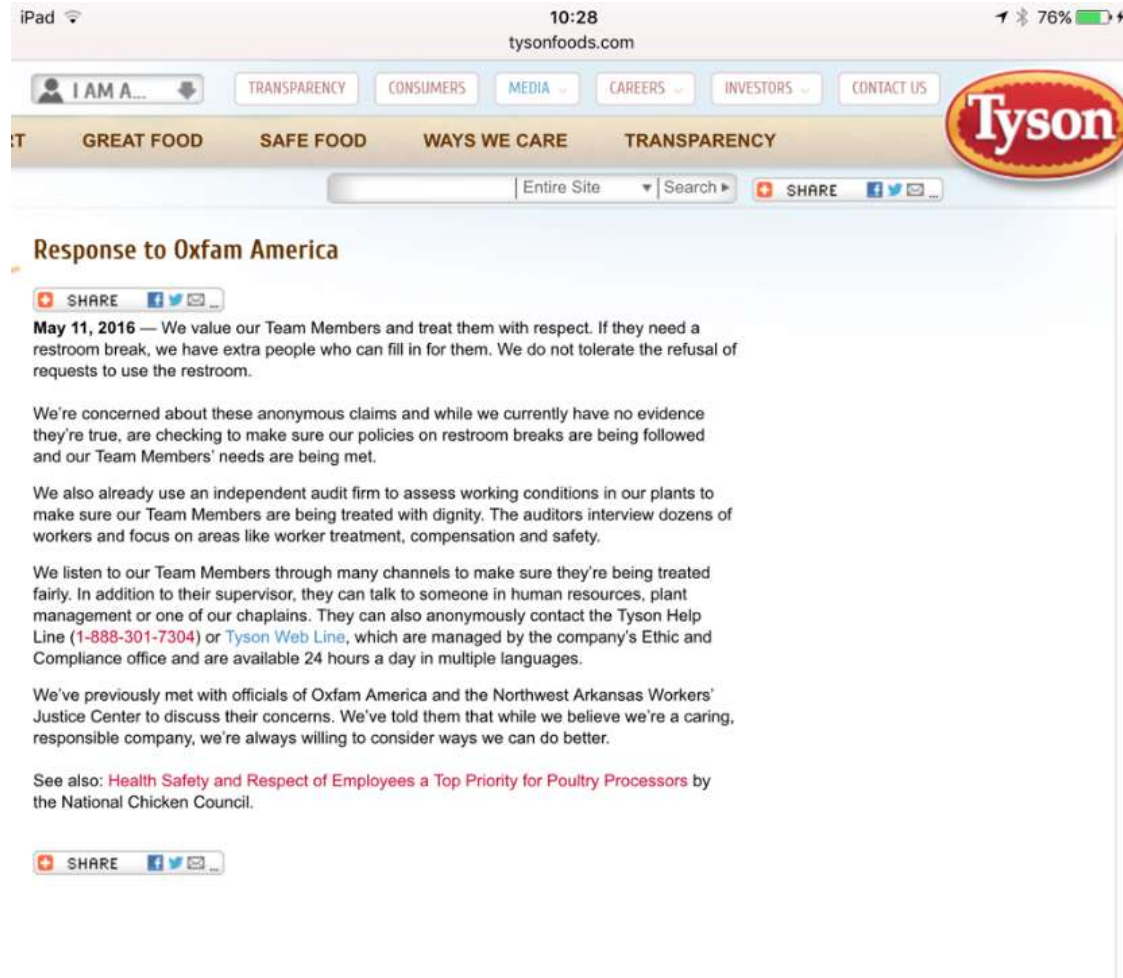
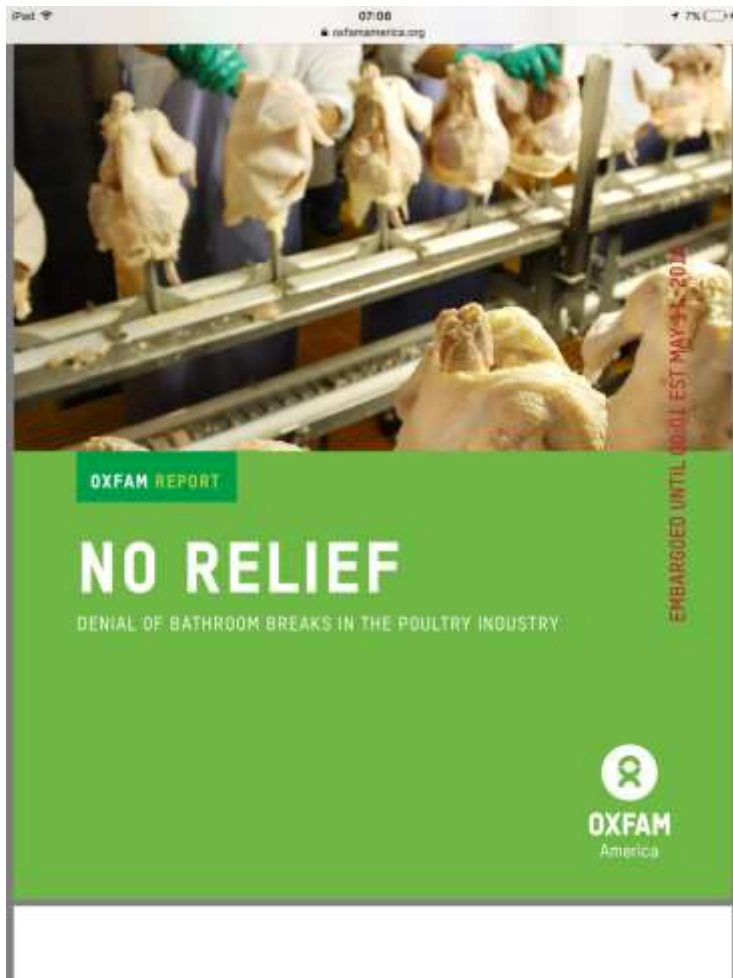
We recognise that the fisheries in the northern Barents Sea and Norwegian Sea including the marine areas around Svalbard are amongst the best regulated fisheries in the world. Most of these fisheries are independently certified by the Marine Stewardship Council (MSC) as compliant with their standard for sustainable and well-managed fisheries. Additionally there are many protected areas already established around Svalbard to safeguard ecological biodiversity.

We have agreed that from the 2016 season the catching sector will not expand their Cod fishing activities with trawl gear into those areas where regular fishing has not taken place before. This is a precautionary measure *until* through initiatives such as those mentioned below the fishing activity in future years will be determined by improved knowledge replacing the need for this precautionary approach.



Is this Bioeconomy?

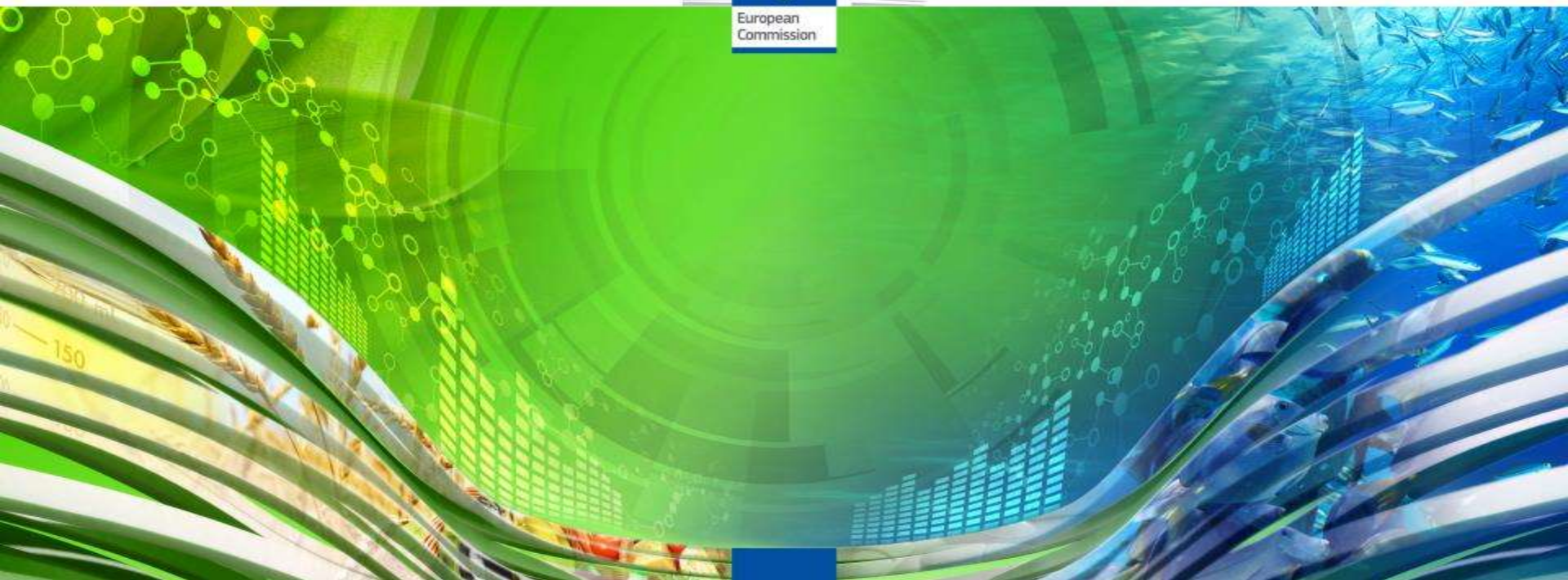
Re-thinking working conditions in food industry



Is this Bioeconomy?

Business models for short circuits





Thank you!

HORIZON 2020