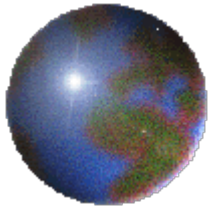


XV Convegno AISSA

Bolzano, February 23, 2018



The Bioeconomy in Europe and in Italy: new priorities and opportunities

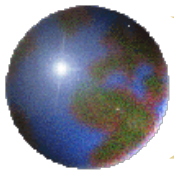
Fabio Fava

Italian Representative, i) *Horizon2020 SC2* Programming Committee; ii) "States Representatives Group" of *Public Private Partnership Biobased industry (BBI JU)*; iii) *BLUEMED Initiative* Strategic Board

&

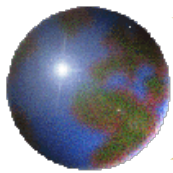
School of Engineering, *AlmaMater Studiorum*-Università di Bologna, Italy

(E-mail: fabio.fava@unibo.it)

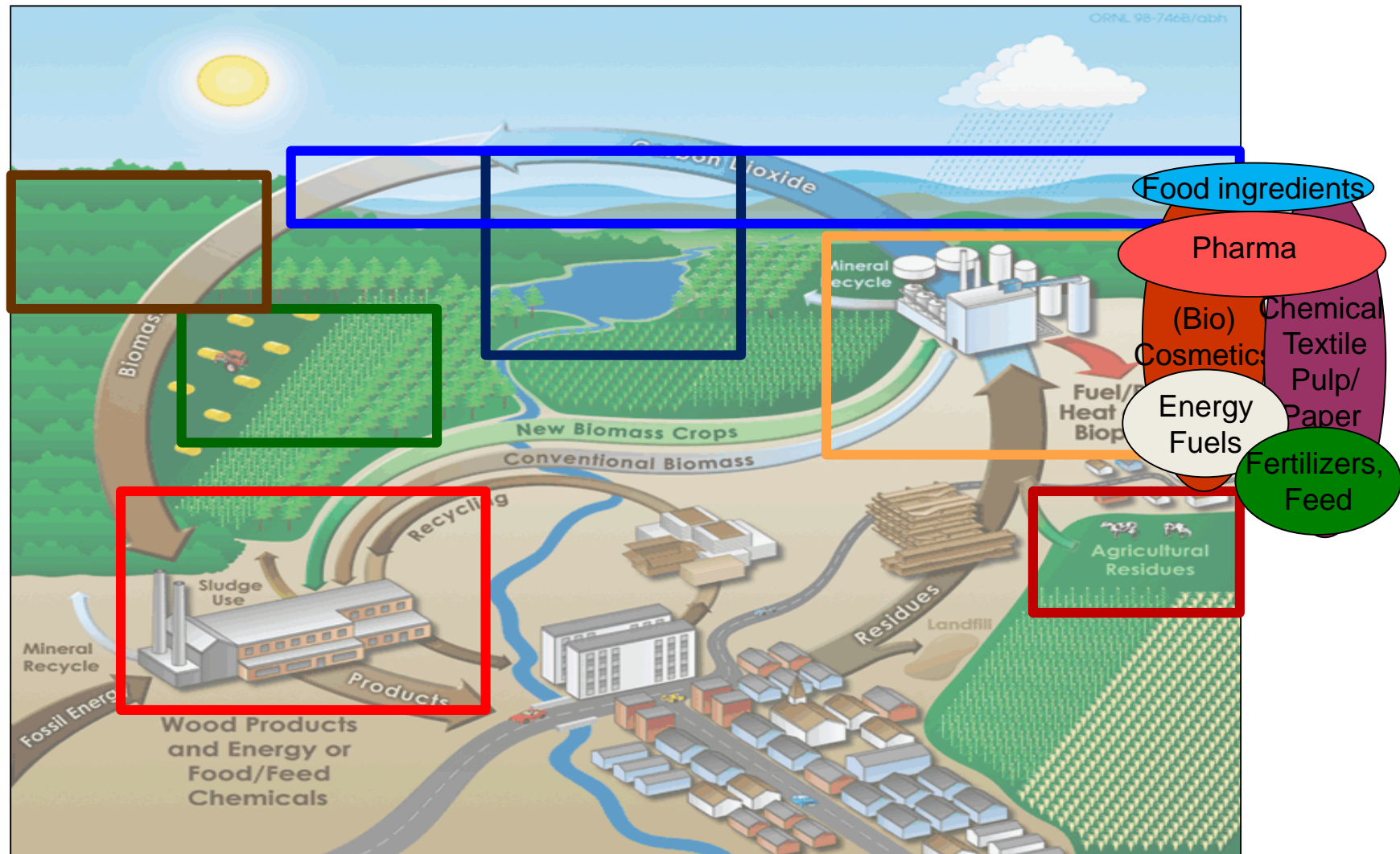


Outline

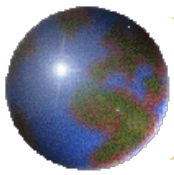
- The Bioeconomy Europe and in Italy: state of play, needs and opportunities;
- The Italian Bioeconomy strategy (BIT): objectives, priorities and roadmap;
- How Horizon2020 (SC2) and the PPP Biobased industry (BBI JU) sustain R&I in the Bioeconomy domain.



The European Bioeconomy (a)



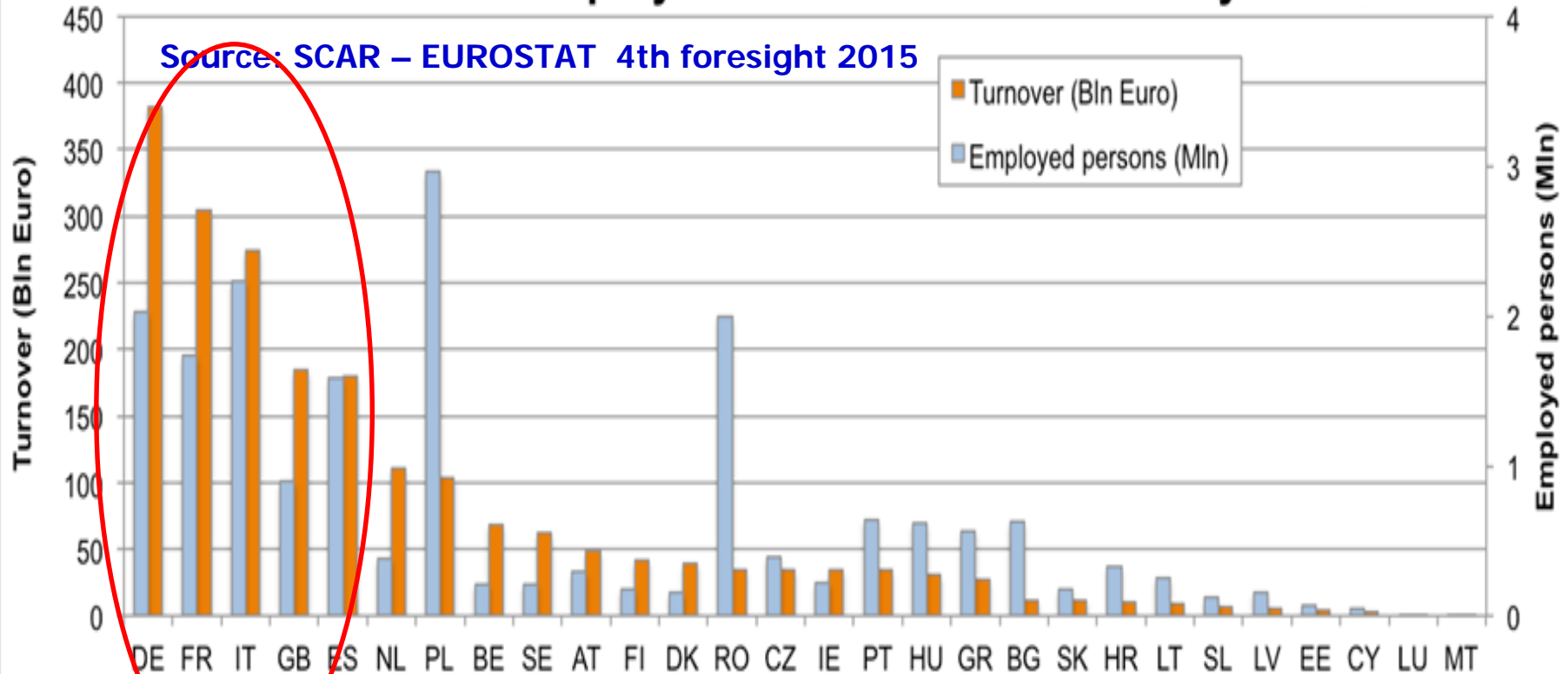
In Europe: about 2.200 Bln €/y and 18.6 Mln of jobs

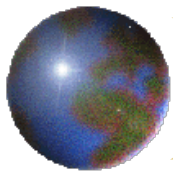


The European Bioeconomy (b)

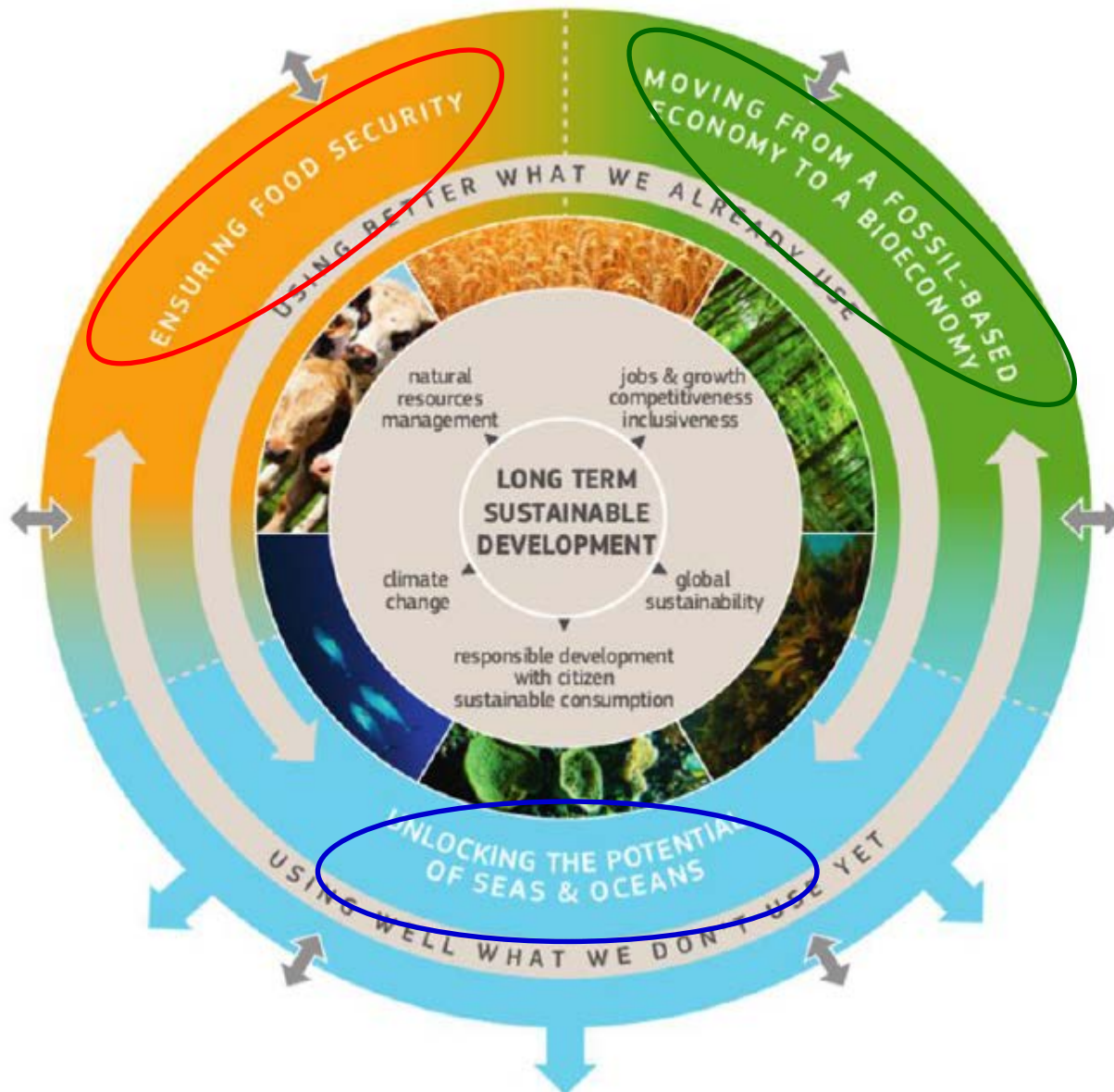
Turnover and employment in the EU bioeconomy

Source: SCAR – EUROSTAT 4th foresight 2015

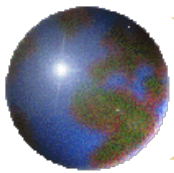




The European Bioeconomy Strategy: main priorities (*under revision*)



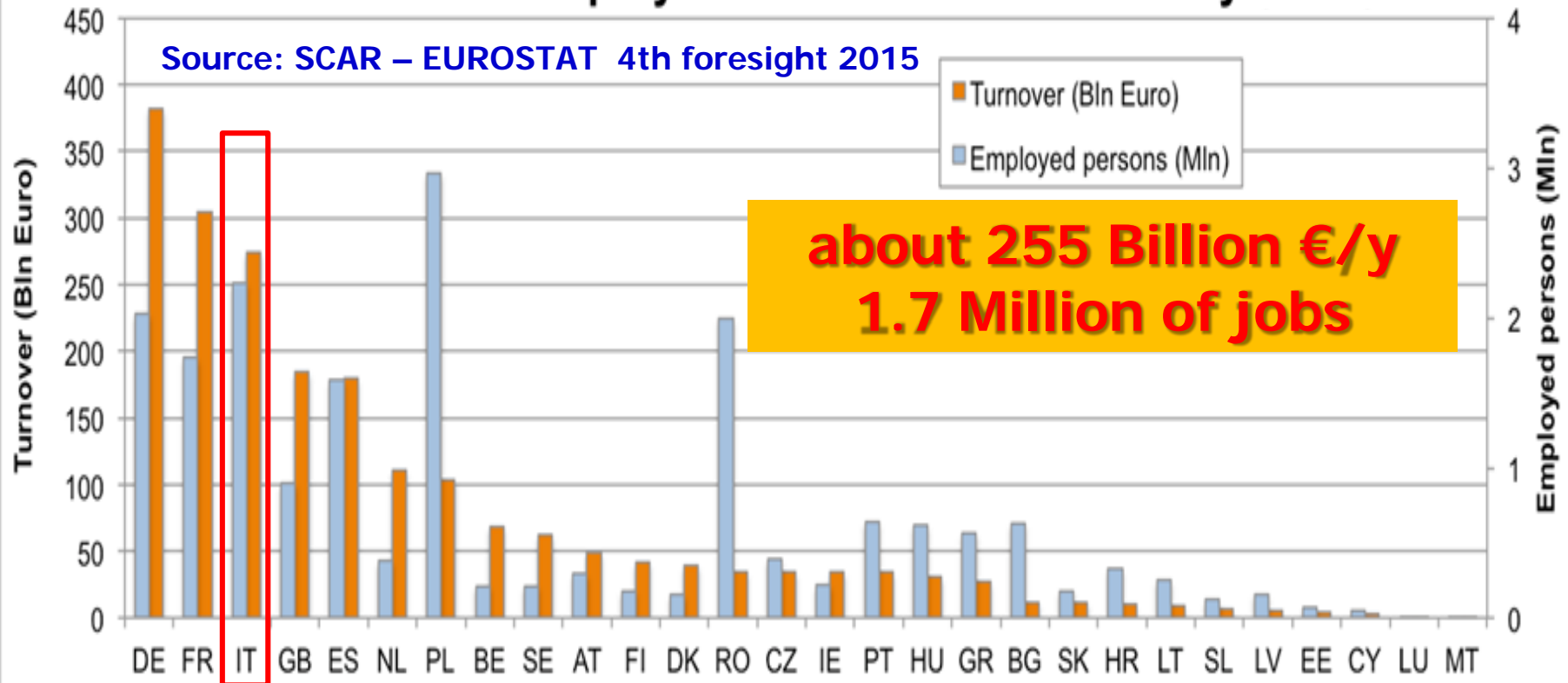
- Productive and resource-efficient primary production systems
- Sufficient supplies of safe and high quality food and bio-based products, including bioenergy
- Competitive and low carbon value chains.



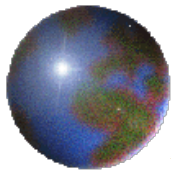
Bioeconomy in Italy

Turnover and employment in the EU bioeconomy

Source: SCAR – EUROSTAT 4th foresight 2015



IT is the 2nd EU-MS as success rates in Horizon2020 SC2 & BBI JU programs. Qualified R&I scores and public/private actors/stakeholders but often fragmented, lack of coordination among national policies, funding programmes and infrastructures.



Primary production: main challenges and opportunities

Agriculture, Livestock and aquaculture.

Used land: ~ 13 M
ha, 90% in
rural areas

~ 56 Billion €/y
~ 920,000 jobs

Problems:

- ❑ Limited profitability due to low average size and low revenue of farms, poorly organized value chains → abandonment, reduction of cultivated land surface;
- ❑ Poorly innovative agricultural practices and systems;
- ❑ Depletion of soil organic matter and water scarcity.

Opportunities:

- ❑ Valorize plant/animal biodiversity and ecosystem services;
- ❑ Improvements crops/agricultural practices; precision farming;
- ❑ Valorize agricultural residues and effluents.

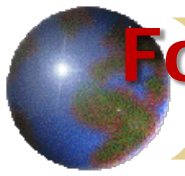
Forestry.
Used area:
~ 12 M ha

Problems:

- ❑ Limited valorization of forest products -> abandonment with biodiversity depletion, also due to climate change;
- ❑ Lack of training of forest company managers on new opportunities and business management.

Opportunities:

- ❑ Integrated management of forest with valorization its biodiversity, ecosystem services, wood and products.



Food and biobased industry: main challenges and opportunities

Food Industry.

~132

Billion €/y
~ 390,000
jobs

Problems:

- ❑ Structural limitations (very small SMEs), lack of value chain coordination;
- ❑ Strong products counterfeiting and imitations;
- ❑ Low efficiency of food chains with remarkable food/biomass losses, energy and water consumption and by-products/waste production;

Opportunities:

- ❑ Leading position for “typical/quality” foods (DOP, IGP, STG, etc.);
- ❑ Digitalization of entire value chains (Industry 4.0);
- ❑ Use by-products as sources of ingredients/bioproducts

Problems:

- ❑ Wood processing industry based on imported raw material and on the production of medium/low value products;
- ❑ Limited availability of low cost, sustainable non-food feedstocks;
- ❑ Limited market for national biobased products; occurrence on the market of products that do not comply to international standards/labeling;
- ❑ Insufficient clarity in the labeling of bio products;

Opportunities:

- ❑ Connect locally wood production and wood processing industry and biorefineries to produce conventional and new/higher value products;
- ❑ Use biowastes (byproducts/effluents/residues/waste) as feedstocks;
- ❑ Exploit abandoned/marginal lands for producing biomass for the local biobased industry and re-covert former industrial sites.



Marine and maritime sectors: main challenges and opportunities



About 8,000 km of coastline

~ € 43 Billion €/y
~ 835,000 jobs
~ 20% due to
Bioeconomy

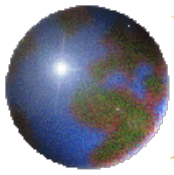
After: V RAPPORTO
SULL'ECONOMIA DEL MARE
Unioncamere, 2016

Problems:

- ❑ Unsustainable fishery; productions highly affected by climate changes;
- ❑ Increasing import of fish from areas with uncertain regulations and monitoring;
- ❑ Sea pollution (due to chemicals, litter, etc), presence of invasive species;
- ❑ Coastal urbanization, over- and un-sustainable exploitation of beaches.

Opportunities:

- ❑ Exploit marine aquaculture (also off shore);
- ❑ Exploit local marine biodiversity;
- ❑ Exploit potential of bioeconomy at the land/sea interface.

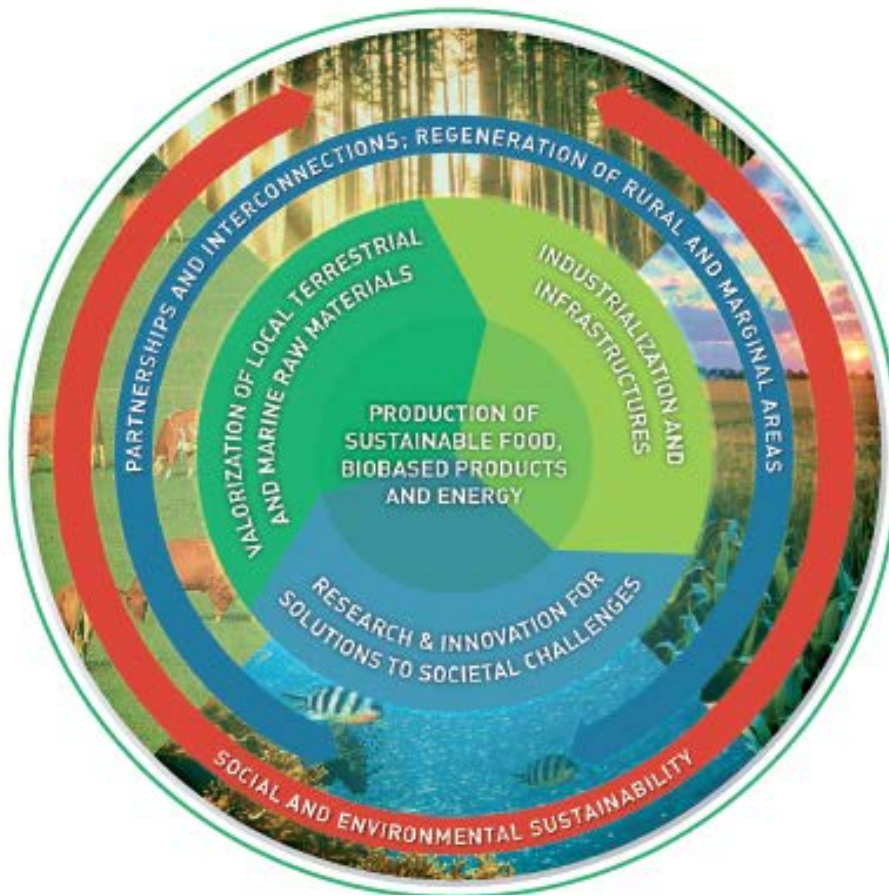


Outline

- The Bioeconomy Europe and in Italy: state of play, needs and opportunities;
- The Italian Bioeconomy strategy (BIT): objectives, priorities and roadmap;
- How Horizon2020 (SC2) and the PPP Biobased industry (BBI JU) sustain R&I in the Bioeconomy domain.

BIT

Bioeconomy in Italy



A unique opportunity to reconnect
ECONOMY, SOCIETY
and the **ENVIRONMENT**

The Italian Bioeconomy strategy

AVAILABLE AT web site:

www.agenziacoessione.gov.it/it/S3/Consultazioni_pubbliche/Bioeconomy.html

1 Bioeconomy – Basics

- 1.1 In the global and EU context
- 1.2 At Italian level
- 1.3 Bioeconomy at regional levels

2 Raw materials sources and the opportunities of biowaste

3 Bioeconomy in everyday life

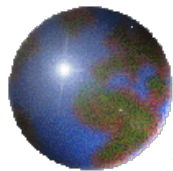
4 The social dimension of the bioeconomy

5 Legislative framework, funding measures and market pull measures

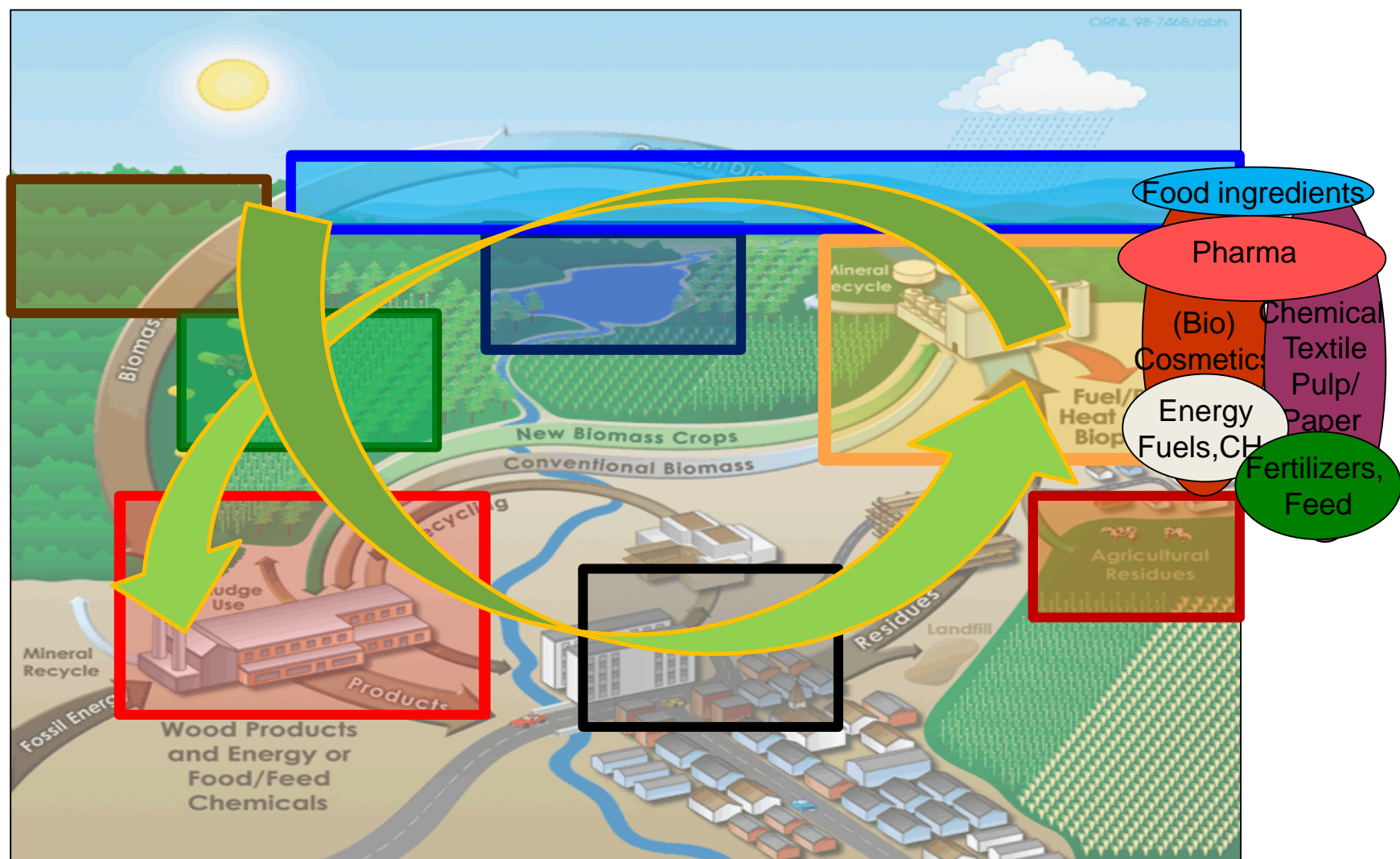
6 Challenges and action plan for the Italian bioeconomy

7 Implementation and monitoring

8 Actors involved and road map



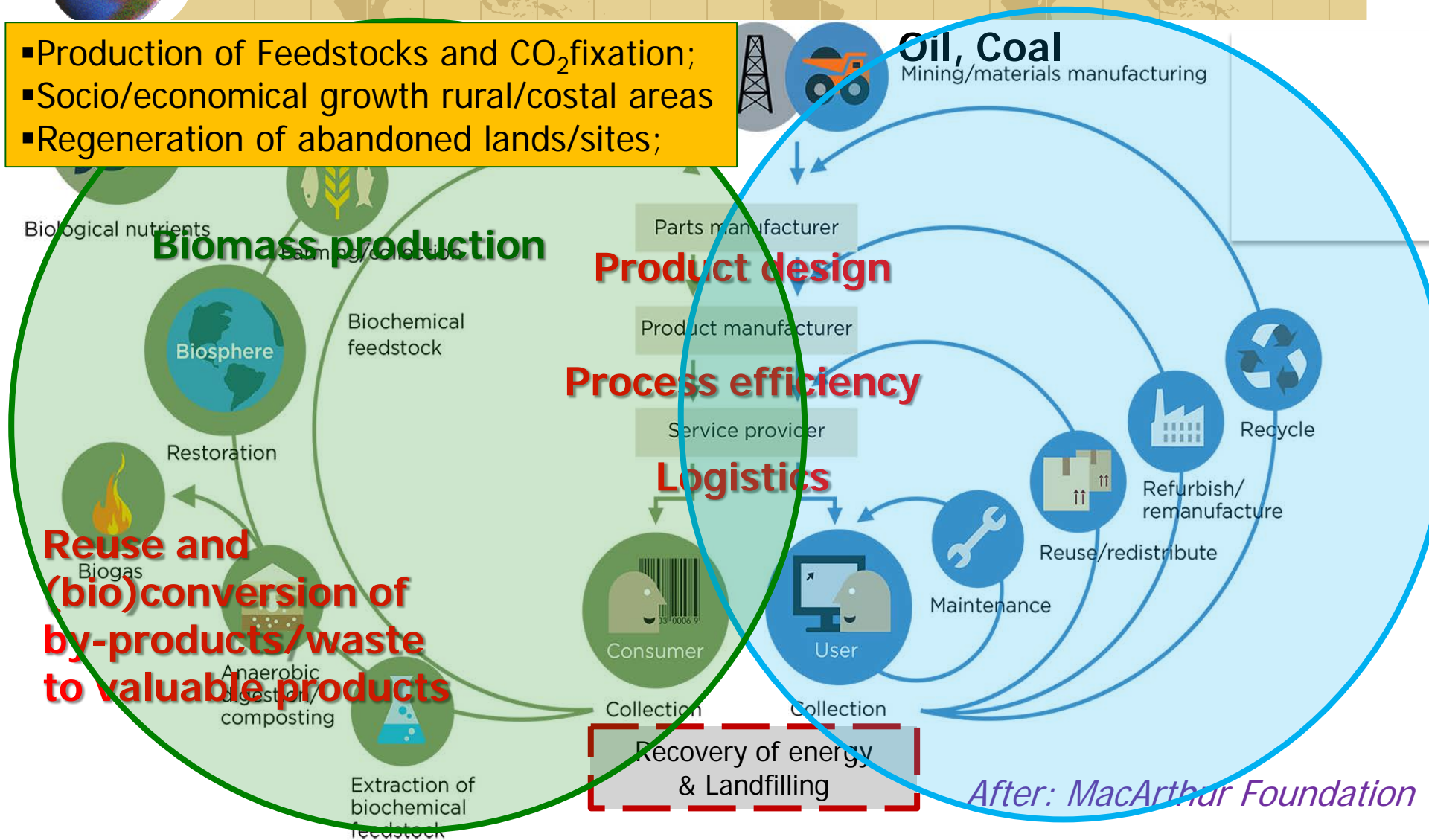
The Italian Bioeconomy strategy: the vision



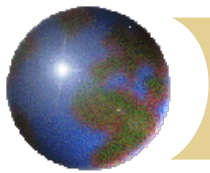


Bioeconomy & Circular Economy

- Production of Feedstocks and CO₂ fixation;
- Socio/economical growth rural/costal areas
- Regeneration of abandoned lands/sites;



Parliament Resolution: Jul 9 2015; EU adoption of Circular Economy package: Dec 2, 2015
In EU by 2030: +30% resource saving; -50% CO₂ emission; +3% GDP; +1 M jobs



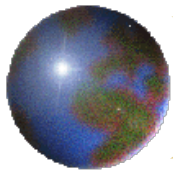
The Italian Bioeconomy strategy: main objective and priorities

Main priorities:

- a) Improve sustainably the productivity and quality of products of each of the sectors and more efficiently interconnect them, by creating longer and more locally routed value chains, where the actions of public and private stakeholders integrate across all major sectors;
- b) Exploit national terrestrial/marine biodiversity, ecosystem services and circularity, and regenerate abandoned/marginal lands and former industrial sites;
- c) Contribute to the growth of bioeconomy in the Mediterranean area via PRIMA and BLUEMED initiatives, for a greener and more productive region, a wider social cohesion and political stability in the area;
- d) Create: i) a wider and more coherent political commitment, ii) more investments in R&I, spin off/start up, education, training, communication (public engagement), iii) new and better tailored policies; iv) a better coordination between regional, national and EU stakeholders/policies, and v) tailored market development actions.

Objective:

Increase Italian Bioeconomy turnover and jobs by 20% by 2030.



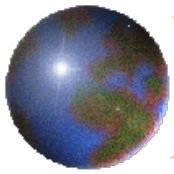
Tools for boosting IT Bioeconomy



*Cluster
tecnologico
nazionale **Blue
Growth BIG***

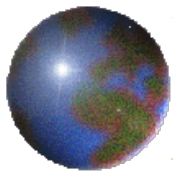
Mission & actions:

- ❑ Integrate major national public and private actors of the sector;
- ❑ Identification of main regional & national R&I needs and opportunities;
- ❑ Promotion of identified priorities/needs towards regional, national and EU institutions funding R&I;
- ❑ Promotion of partnerships and the participation of public R&I institutions, industry and associations in regional (PNR, FESR, FSE, etc.) national and EU (Horizon 2020, BBI JU, JPIs) agendas/programs for R&I, by reducing fragmentation and duplication, and fostering effective innovation.



Outline

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- How Horizon2020 (SC2) and the PPP Biobased industry (BBI JU) sustain R&I in the Bioeconomy domain.



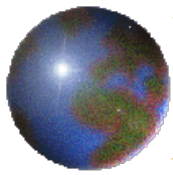
Bioeconomy: one of the Societal Challenges

Societal challenges

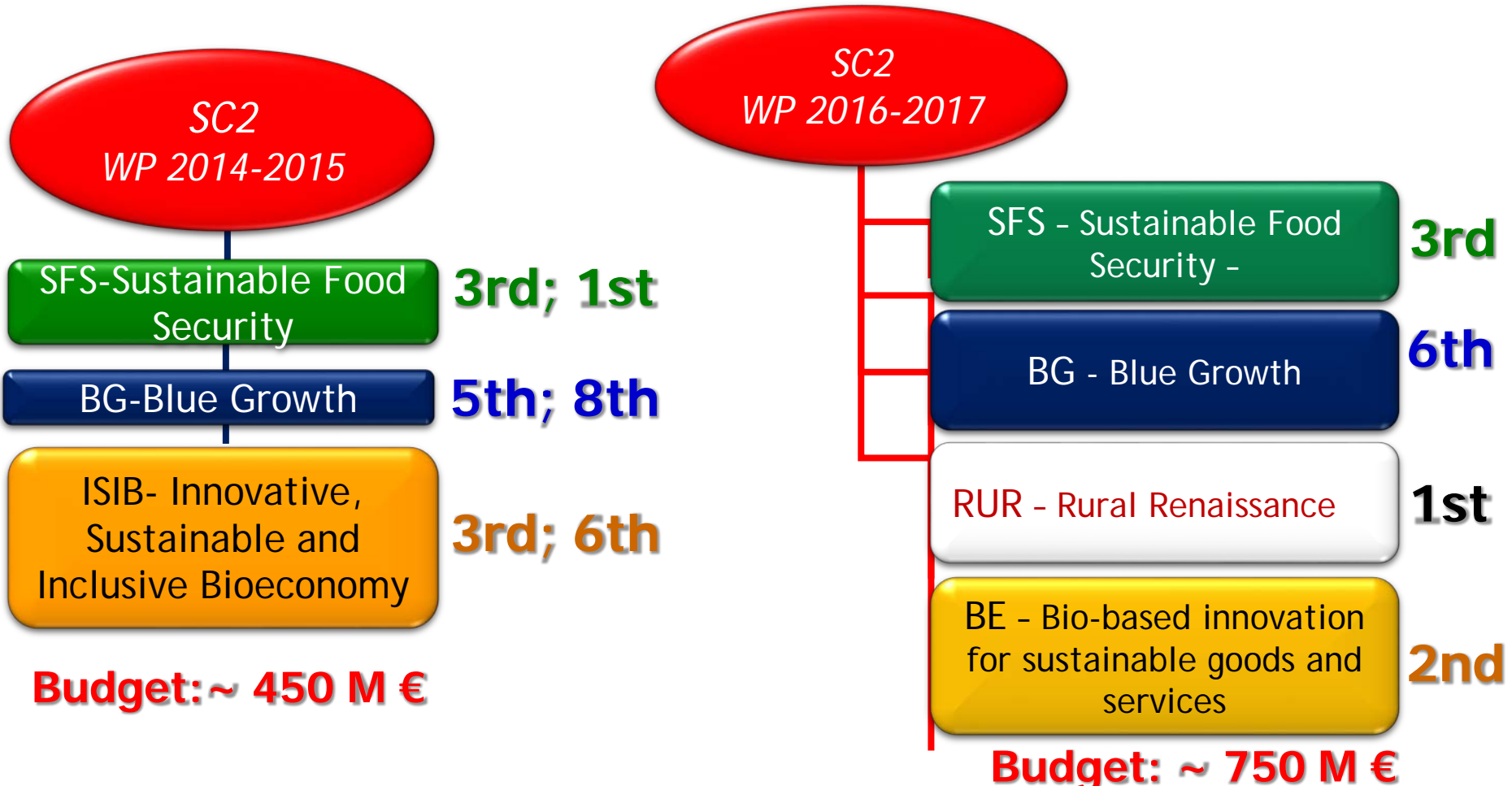


**Tackling
societal
challenges
for a better
society**

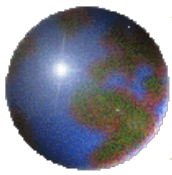
1. Health, demographic change and wellbeing (7.472 Bln)
2. Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy (3.851 Bln)
3. Secure, clean and efficient energy (5.931 Bln)
4. Smart, green and integrated transport (6.339 Bln)
5. Climate action, resource efficiency and raw materials (3.081 Bln)
6. Inclusive, innovative and reflective societies (1.310 Bln)
7. Secure societies (1.695 Bln)



Societal Challenge 2: IT participation in 2014-2016 WPs

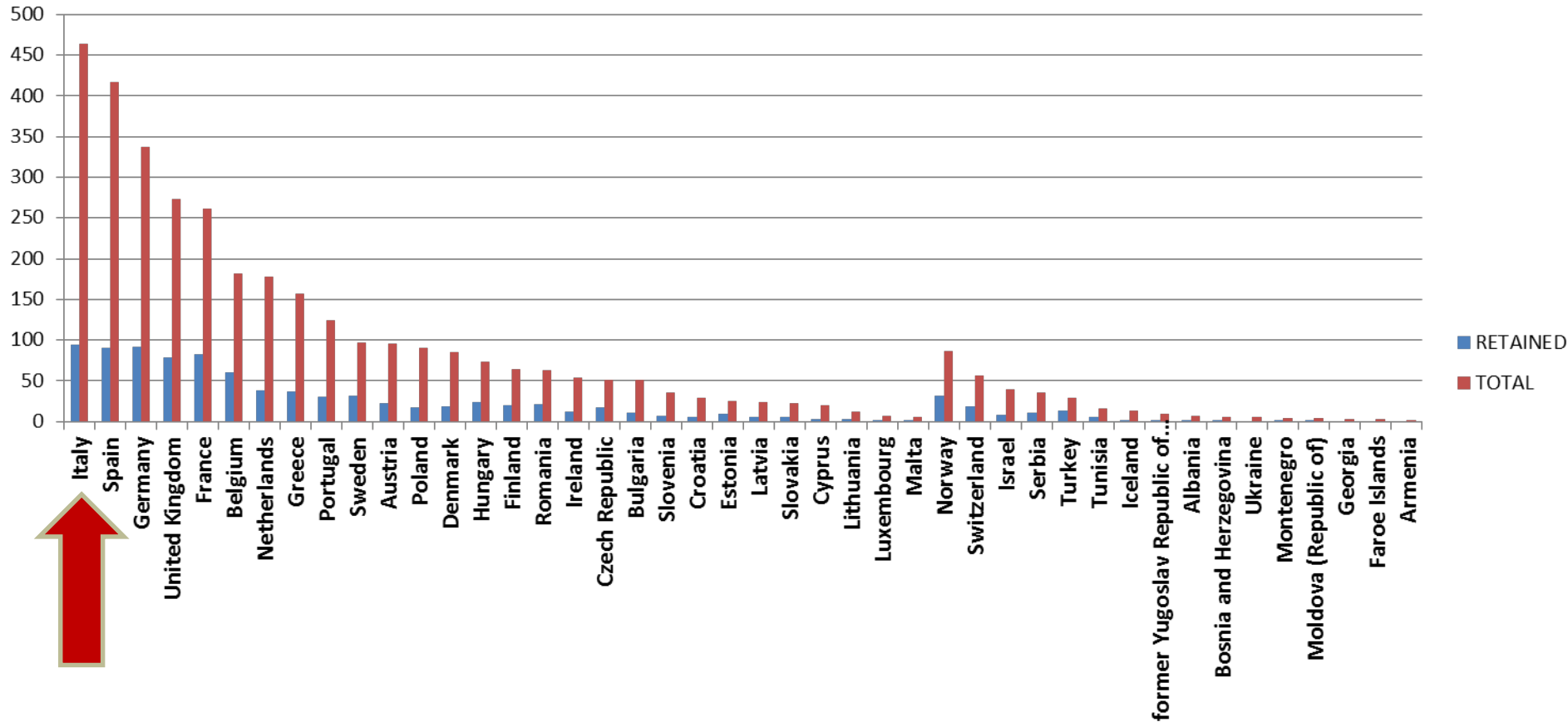


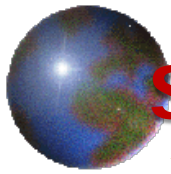
	2014	2015	2016
Success rate* (%)	18,2	17,2	32,4
Ranking	4th	3th	3th (2nd)
* N. applicants vs retained			



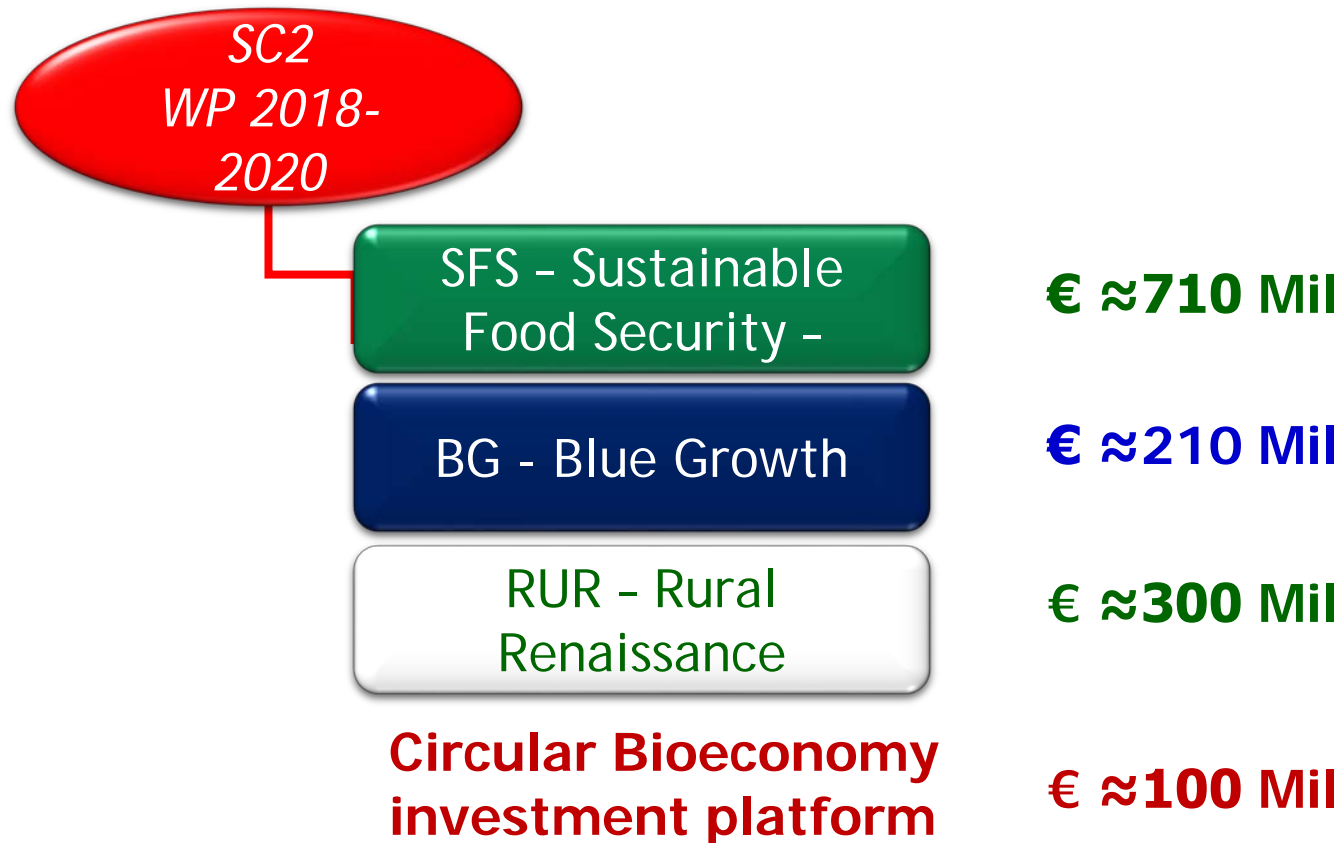
Societal Challenge 2: IT participation in 2017 WP

N. applicants vs retained

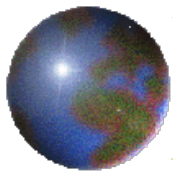




Societal Challenge 2: the new WP 2018-2020

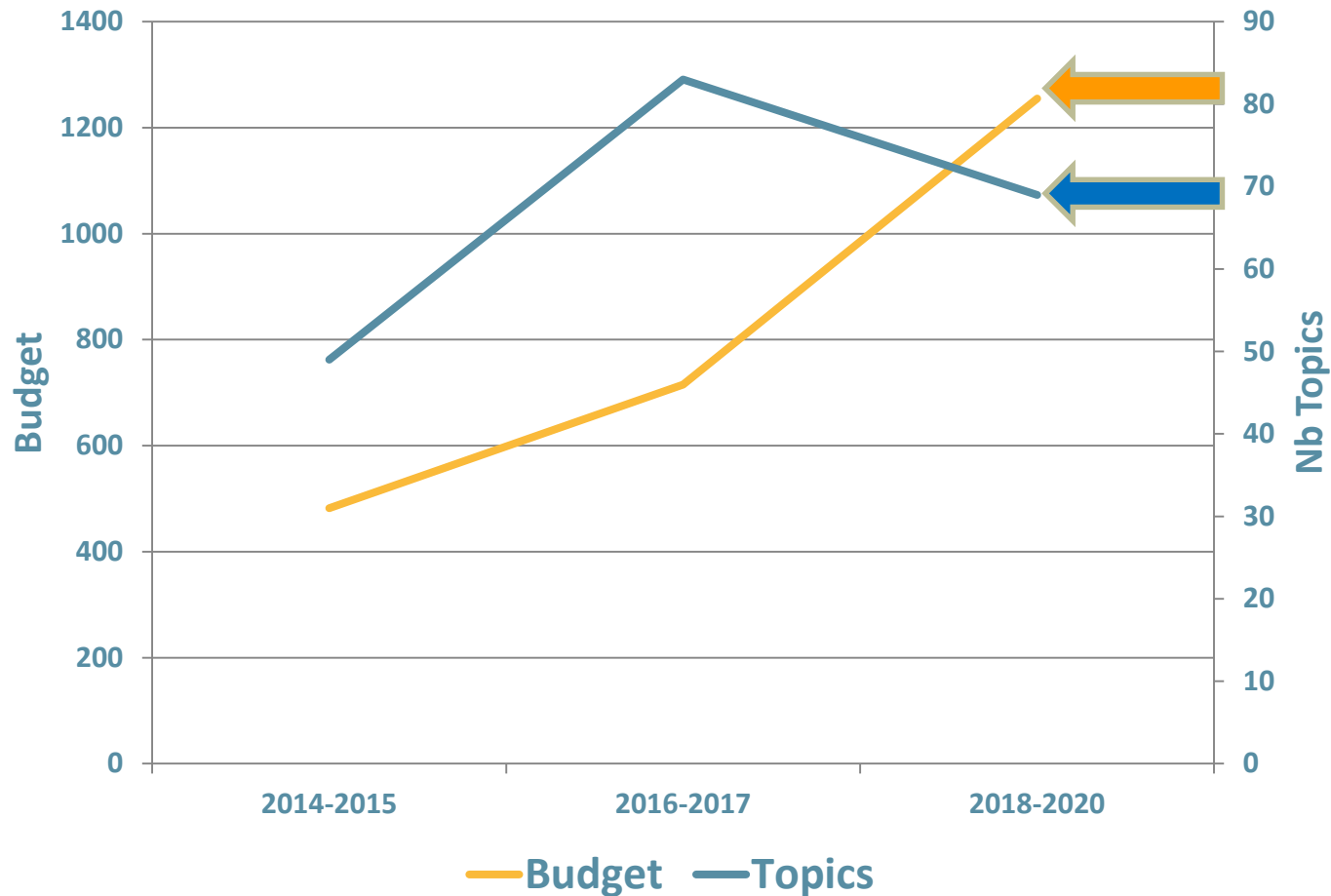


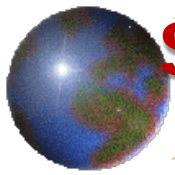
<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>



SC2 WP2018-2020: more budget and less topics, more projects funded

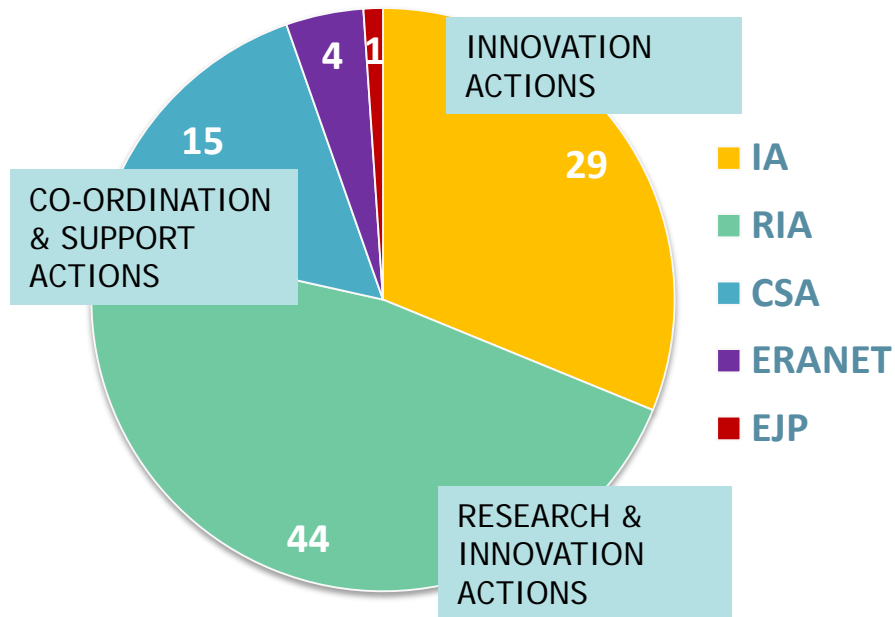
Evolution of SC2 calls budget and topic counts



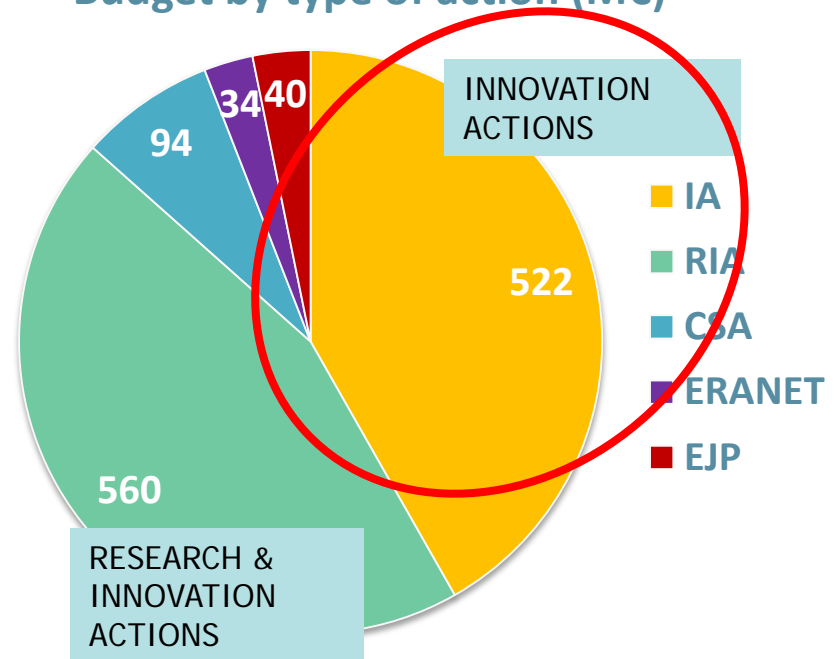


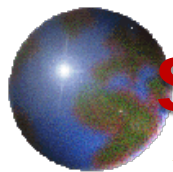
SC2 WP2018-2020: close to market actions vs investment in new knowledge

Number of actions by type of action



Budget by type of action (M€)





Sustainable Food Security topics (2018-2019)

From functional ecosystems to healthy food

- Biodiversity in action
- Microbiome
- Integrated health approaches
- IPM
- Healthy beekeeping
- Animal welfare
- Anti-microbials and animal production
- African Swine fever
- Personalised nutrition
- Plant breeding
- Healthy sust. food
- Alternative proteins

13 topics – 281 M€

Environment/ Climate-smart Food production and consumption

- Climate-smart farming
- EJP soils
- Integrated water management
- Citizen-driven food system approaches in cities
- Valorising urban biowaste

5 topics – 59 M€

Building capacities

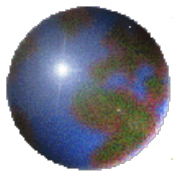
- Food cloud
- Monitoring R&I investments
- GenRes & pre-breeding
- Plant-variety testing
- Agri-Aqua labs
- ERANETs

6 topics – 76M€

Targeted international cooperation

- Microbiome coordination and IBF
- EU-Africa
 - ✓ Support FNSSA implementation
 - ✓ Food systems
 - ✓ Sustainable intensification
- EU-China
 - ✓ Food safety controls
 - ✓ Soils management
 - ✓ Fertilisers from biogas digestate

7 topics – 67 M€



Rural Renaissance topics (2018-2019)

Dynamics & policies

- **Modern policies from long-term visions & societal engagement:**
 - ✓ Science-policy-society hub
 - ✓ Generation renewal
 - ✓ Mountain value chains and climate change
- **Socio-economic impacts of digitisation**
- **Contracts for effective agro-environment delivery inc:**
 - Land tenure
 - Result-based policies
 - Collective delivery
- **Analytical tools and models**
 - ✓ New models for policy
 - ✓ Modelling trade

4 topics – 60 M€

Food & non-food Value chains

- **Closing nutrient cycles:**
 - ✓ Properties and impacts of biofertilisers
 - ✓ Bio-based fertilisers from manure
 - ✓ Bio-based fertilisers from other by products
- **Regional and local bio-based economies**
- **Circular bio-based business models for rural communities**
- **Sustainable wood value chains**
 - ✓ Building with wood
 - ✓ Resilient forest systems

4 topics – 57 M€

Taking advantage of the digital revolution

- **Digital innovation hubs for agriculture**
- **Preparing advisors for the digital age**
- **Digital solutions and e-tools to modernise the CAP**

3 topics – 37 M€

+ UNDER LEIT-ICT call

- **Agricultural cross-cutting integration platforms**

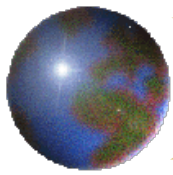
1 ICT topics – 15 M€

*RUR+ICT:
4 topics – 52 M€*

Innovation and human capital

- **Thematic networks compiling knowledge ready for practice**
- **Fuelling the potential of advisors for innovation**

2 topics – 27 M€



Blue Growth topics (2018-2019)

Climate-Ocean

- Sustainable harvesting of marine biological resources
- Coordination of marine and maritime research and innovation in the Black Sea

Food and nutrition

- Sustainable European aquaculture 4.0: nutrition and breeding

De-risking Investments

- Multi-use of the marine space, offshore and near-shore: pilot demonstrators

Land-Sea Connection

- Sustainable solutions for bio-based plastics on land and sea

International cooperation

- All Atlantic Ocean Research Alliance Flagship
- The Future of Seas and Oceans
- Towards a Baltic and North Sea research and innovation programme

- Blue Bioeconomy PPP (ERANET)

9 topics, 166.5 M€

A Public-Private Partnership on Bio-Based Industries

Realising the European Bio-economy Potential

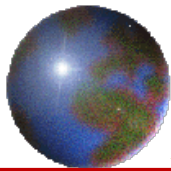


Supported by

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

 Bio-based Industries
Consortium





The BBI JU: structure and priorities

Public partner
27% of
investment



€3.7
billion

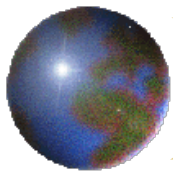


Private partner
73% of investment

A structured approach via 5 **Value Chains** (VC)...

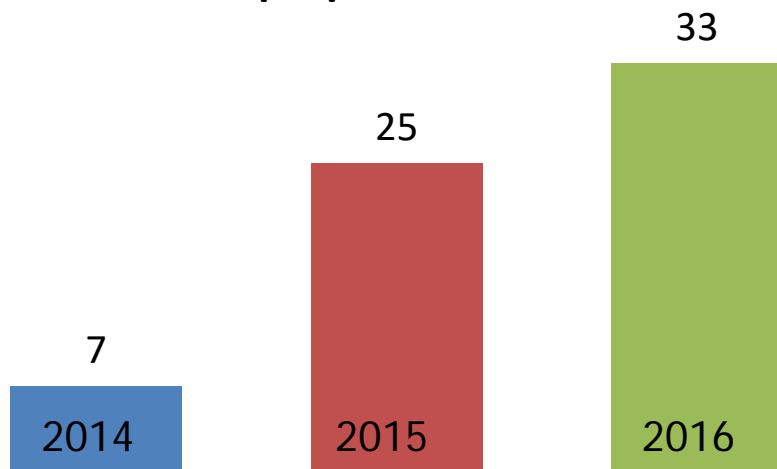
- ❏ VC 1: From *lignocellulosic* feedstock to advanced biofuels, bio-based chemicals & biomaterials
- ❏ VC 2: Next generation *forest*-based value chains
- ❏ VC 3: Next generation *agro*-based value chains
- ❏ VC 4: New value chains from (organic) *waste*
- ❏ VC 5: *Integrated* energy, pulp and chemicals biorefineries and a marine bioresource exploitation value chain is coming...

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



IT participation in BBI JU calls 2014-16

IT in proposals retained



ITALY
(submission)

2014 - **5th**

2015 - **2nd**

2016 - **1st**

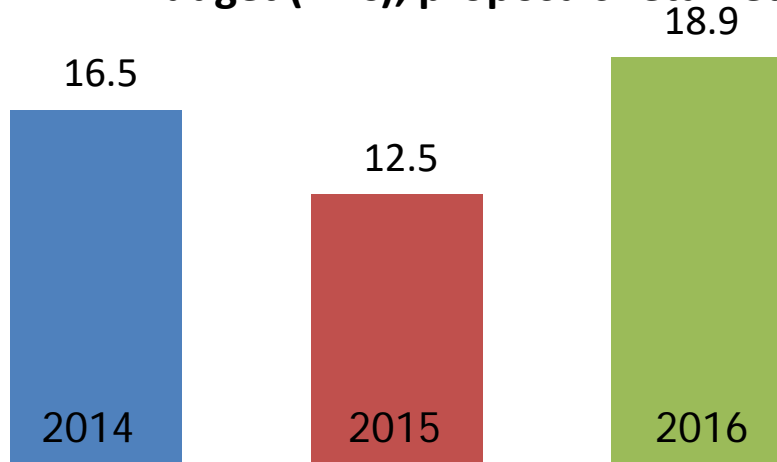
ITALY
(retained)

2014 - **5th**

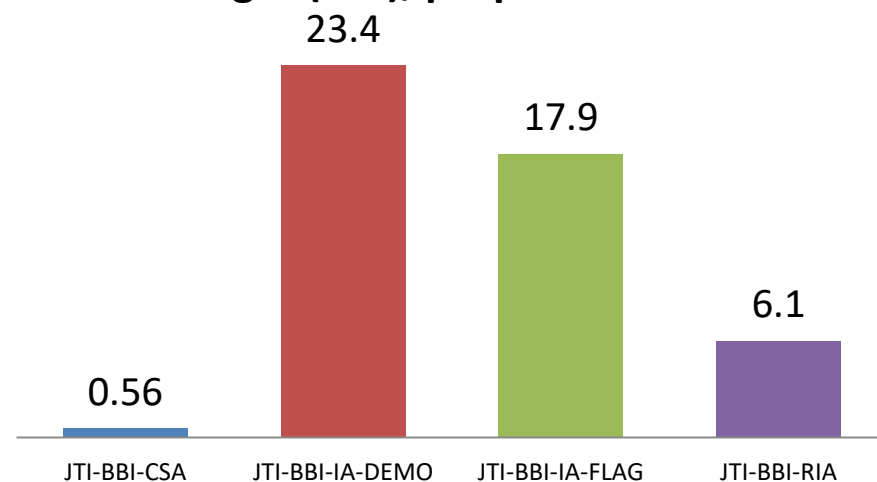
2015 - **4th**

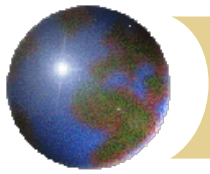
2016 - **2nd**

IT Budget (M €), proposals retained



IT Budget (M€), proposals retained





BBI JU WP 2018: main insights (a)

BBI JU WP2018 WILL BE PUBLISHED on APRIL 11, 2018

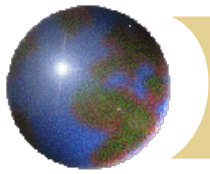
<https://www.bbi-europe.eu/participate/call-proposals-2018>

Strategic Orientation 1: Foster supply of sustainable biomass feedstock to feed both existing and new value chains

BBI 2018. SO1.D1 – Improve the logistical and pre-processing steps of locally sourced biomass to serve as feedstock for the bio-based industry

BBI 2018. SO1.R1 – Resolve logistical, infrastructural and technological challenges to valorise residual and side streams from aquaculture, fisheries and the aquatic biomass processing industries

BBI 2018. SO1.D2 – Find solutions to dilution, pollution and content diversity challenges to turn mixed urban bio-waste into sustainable feedstock for the bio-based industry



BBI JU WP 2018: main insights (b)

Strategic Orientation 2: Optimise efficient processing for integrated biorefineries through R&D&I

BBI 2018. SO2.R2 – Develop techniques and systems to improve the performance of biocatalysts

BBI 2018. SO2.R3 – Introduce new technologies to make pulping operations more resource-efficient

BBI 2018 SO2.R4 – Apply advanced biotechnologies to convert biomass that contains inhibitors into high value-added chemicals and materials

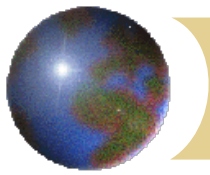
BBI 2018 SO2.R5 – Develop innovative single-step processes for conversion of a biomass feedstock into multiple readily usable intermediate streams

BBI 2018 SO2.R6 – Apply emerging breakthrough technologies to improve existing value chains

BBI 2018 SO2.R7 – Electrochemical processes for bio-based monomers and polymers

BBI 2018. SO2.D3 – Valorise sugars from the cellulosic and/or hemicellulosic fractions of lignocellulosic biomass

BBI 2018. SO2.R8 – Develop adequate computational systems for modelling the design, start-up, scaling-up and continuous improvement of bioprocesses involving microorganisms



BBI JU WP 2018: main insights (c)

Strategic Orientation 3: Develop innovative bio-based products for identified market applications

BBI 2018. SO3.R9 – Develop functional molecules for bio-based coatings outperforming existing products and meeting market requirements

BBI 2018. SO3.R10 – Develop bio-based packaging products that are biodegradable/ compostable and/or recyclable

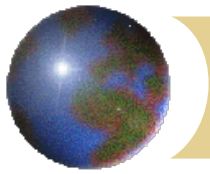
BBI 2018. SO3.R11 – Develop technologies and systems to produce bio-based aromatics that outperform fossil-based counterparts

BBI 2018. SO3.D4 – Produce biopesticides or bio-based fertilisers as components of sustainable agricultural management plans

BBI 2018. SO3.F1 – Produce on a large scale competitive bio-based building blocks, polymers and materials that outperform existing alternatives in identified market applications

BBI 2018. SO3.D5 – Produce sustainable and cost-efficient high-performance functional ingredients from alternative sources

BBI 2018. SO3.F2 – Large-scale production of proteins for food and feed applications from alternative, sustainable sources



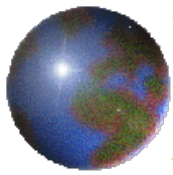
BBI JU WP 2018: main insights (d)

Strategic Orientation 4: Create and accelerate the market-uptake of bio-based products and applications

BBI 2018. SO4.S1 – Benefit from previous and current work to create a coherent and stimulating 'environment' for a sustainable bio-based industry in Europe

BBI 2018. SO4.S2 – Expand the bio-based industry across Europe

BBI 2018. SO4.S3 – Identify opportunities to promote careers, education and research activities in the European bio-based industry



The European and Italian Bioeconomy

Thank You!

