Une économie biobasée durable pour l’Europe

AG VALBIOM 2018     Namur, 16 mai 2018

Philippe Mengal
BBI JU Executive Director
Bioeconomy: already a reality today

Fossil economy is just a brief moment in our history

Oil consumption

Living off the land

Living off the land...again!

1000 AD  2000 AD  3000 AD
(How) do we want to achieve it? Europe on the driver’s seat? Shape the Bioeconomy we want?

Source: Dr Mika Aalto – Opendays 2015
BBI value chains represent 3.7 million jobs* and € 698 bn turnover* but extremely fragmented between actors and across geographies

*Based on EUROSTAT figures 2015
The total European Bioeconomy, including the food, feed, beverages and primary sectors (agriculture and forestry) amounts to 2.26 trillion EUR turnover.
Turnover in the *Bio-Based Economy* in the EU-28 (2015): 698bn EUR

The bio-based industries (chemicals and plastics, pharmaceuticals, paper and paper products, forest-based industries, textile sector, biofuels and bioenergy) contribute with 674 billion EUR.
The total employment in the European Bioeconomy is 18.3 million employees with primary biomass production (agriculture and forestry) as the biggest contributor (56%).
Employment in the Bio-Based Economy in EU-28 (2015): 3.7m employees
Bio-based industries (BBI) value chains

Bio-based industries value chains are faced with several **challenges** and **risks**
Where we are coming from... value chains in silos

1. Lignocellulose
2. Forest based
3. Agro based
4. Organic waste
5. Aquatic biomass
Where we want to be...

1. Greater integration of stakeholders
2. Connections across value chains
3. New value chains
4. Benefit throughout the value chain
Major Trends in Bio-Based Industries

- **First wave:**
  Biotech processes to produce vitamins and amino acids, bioethanol as fuel, natural food ingredients → since 80ies, high growth, some complete shifts
- **Second wave:**
  First generation biodegradable bioplastics such as PLA, starch-based materials or PHA → since 90ies, significant growth
- **Third wave:**
  Drop-in bioplastics using bioethanol and glycerol as platforms leading to PE, PP, PET or Epoxides via ethylene, MEG,… → since few years, very high growth
- **New wave:**
  Development of biobased platform chemicals for polymer and non-polymer applications, especially ethylene, MEG, lactic acid, succinic acid, propane diol, epichlorohydrine, butanediol,…
- **Expected next waves:**
  Sourcing from non-food biomass (cellulosics, incl. paper), lignin-based chemistry, integrated biorefineries, catalyst chemistry (metathesis), thermo-chemistry and use of crackers (incl. C1 chemistry)
Several MS have adopted national Bioeconomy Strategies.

France joined in February 2017
Italy in March 2017
European public-private partnership (iPPP) was needed to:

• **De-risk** investments;
• **Organize** the value chains;
• Reach **critical mass** of this “emerging” sector
About BBI JU

- **Public-Private Partnership (PPP)** between European Commission & BIC supporting R&I for bio-based industries
- **BBI JU Budget**: €3.7 billion (25% EU - 75% BIC)
  → Fund R&I projects from technology development to full scale

**Multidisciplinary Programme office**
EU body - operates under Horizon 2020 rules

**BBI JU Mission**
Implement under Horizon 2020 rules, the Strategic Innovation and Research Agenda (SIRA) developed by the Bio-based Industry Consortium (BIC)
Develop sustainable and competitive bio-based industries in Europe, based on advanced biorefineries that source their biomass sustainably by:

1. **Demonstrating new technologies** to fill the gap in value chains
2. **Developing business models** integrating all economic actors along the value chain
3. **Set-up flagship biorefinery plants** deploying business models & technologies to keep investment in EU
Expected impact for Europe by 2030

- Replace 25% of oil-based chemicals
- 10 times more bio-based materials
- Increase biomass supply by 20%
- Increase by 25% mobilisation of unused sources
- Develop potential of agro-food “waste” & forestry residues
- Diversify and grow farmers’ revenues
- Create 700,000 jobs – 80% in rural areas
- Reduce EU’s dependency on import of fossil raw materials, protein (-50%) and P – K (-25%)
- Shift to bio-based economy → average 50% GHG emission reduction
BBI JU’s target for a sustainable bio-based industry thanks to focus on:

• LCAnalysis for each project
• Waste valorisation (industry, agriculture and municipalities)
• Reconversion of marginal lands and semi-arid areas
• Increase productivity of industrial multipurpose crops
• New feedstock supply chains: ligno-cellulosic residues from agriculture and forestry residues
• Protein, P & K recovery
• Reduction of fertilisers input while increasing crop yield
• Biodiversity – Water management – soil preservation
BBI JU funds collaborative industry driven actions

RIA
Research and Innovation Actions

IA-DEMO
Innovation Actions - Demonstration

IA-FLAG
Innovation Actions - Flagship

TRL 1 TRL 2 TRL 3 TRL 4 TRL 5 TRL 6 TRL 7 TRL 8 TRL 9

Development and validation of technology Demo-scale production facility in Europe A first-of-a-kind application, large-scale production facility in Europe

CSA Coordination and Support Actions - no link to TRLs*

*TRL = Technology Readiness Levels
## Participation & funding rates per action

<table>
<thead>
<tr>
<th>Type of participant</th>
<th>RIA</th>
<th>IA Demo - Flag</th>
<th>CSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Industries</td>
<td>/</td>
<td>70%</td>
<td>/</td>
</tr>
<tr>
<td>SMEs</td>
<td>100%</td>
<td>70%</td>
<td>100%</td>
</tr>
<tr>
<td>Universities</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>RTOs – non profit, legal entities</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>3 – 5 years</th>
<th>4 – 5 years</th>
<th>1 – 3 years</th>
</tr>
</thead>
</table>

*RIA: Research and Innovation Action, IA: Innovation Action, CSA: Collaborative Solutions Action*
BBI JU objectives implementation

**Strategic level: SIRA**
Strategic Innovation and Research Agenda guiding document developed by BIC

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**Operational Level**
Annual Work Plan

- Call for proposals (RIAs, IAs, CSAs)
- Project management Reporting - monitoring

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Drafting – Approval – Supporting

Consultation
BBI JU Scientific Committee States Representatives Group

- Publication
- Evaluation
- GAP
SIRA 2017

**SO 1**
Foster Supply of sustainable biomass feedstock to feed both existing and new value chains
- Agri-based feedstock
- Forest-based feedstock
- Aquatic feedstock
- Bio-waste and CO2

**SO 2**
Optimise efficient processing for integrated biorefineries through R&D&I
- Pre-treatment
- Conversion of pre-treated feedstocks to biobased chemicals and materials
- Downstream processing
- System modelling

**SO 3**
Develop innovative bio-based products for identified market applications
- Drop-in bio-based products
- Bio-based products that outperform fossil-based counterparts
- New breakthrough chemicals
- Proteins and active ingredients

**SO 4**
Create and accelerate the market uptake of bio-based products and applications
- Policy & regulations, standardization
- Consumer awareness of the benefits of bio-based products
- Knowledge gathering and networking
Calls 2014-2017
Type of organisations in funded projects

- **82 running projects**
- **923 beneficiaries**
- **€ 794 m grant**

### Private for-profit entities (excluding Higher or Secondary Education Establishments)
- Call 2017: 62% 20% 12% 5%
- Call 2016: 58% 21% 14% 7%
- Call 2015: 62% 20% 13% 4%
- Call 2014: 65% 21% 9% 5%

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### Other
- Private not for profit entities
- International organisation (or international organisation of European interest)
- Natural person
- Entities without legal personality

### Public Organisation
## BBI JU project portfolio
### SO1 & SO4

**Calls 2014 + 2015 + 2016 + 2017**

<table>
<thead>
<tr>
<th>SO1: Feedstock</th>
<th>RIA</th>
<th>DEMO</th>
<th>Flagship</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agri-based</strong></td>
<td>Carbosurf, PROMINENT, LIBBIO, HYPERBIOCOAT, Zelcor, BIOrescue BioBarr, SSUCHY, CASPER, Pro-Enrich, Prolific, EXCornsEED</td>
<td>Pulp2Value, AgriMax, Funguschain, GreenProtein, LIPES, GRACE, LigniOx SUSFERT</td>
<td>FIRST2RUN, LIGNOFLAG AgriChemWhey, PEFerence</td>
</tr>
<tr>
<td><strong>Forest based</strong></td>
<td>SmartLi, Greenlight, PROVIDES, US4GREENCHEM NeoCel, LIBRE, TECH4EFFECT, EFFORTE, SHERPACK SusBind, WoodZymes</td>
<td>ValChem, BIOFOREVER, GreenSolRes, PULPACKTION, FRESH, Dendromass4Europe SYLFEED, EUCALIVA</td>
<td>BIOSKOH, EXILVA SWEETWOOD</td>
</tr>
<tr>
<td><strong>Bio-waste and CO2</strong></td>
<td>NewFert, AFTERLIFE, PERCAL, BARBARA</td>
<td>EMBRACED, URBIOFIN, DEMETER</td>
<td></td>
</tr>
<tr>
<td><strong>Aquatic Biomass</strong></td>
<td>MACROCASCADE, BIOSEA, ABACUS, MAGNIFICENT, VALEUMAG</td>
<td>SpiralG</td>
<td></td>
</tr>
<tr>
<td><strong>Different sources of biomass</strong></td>
<td>EnzOx2, InDIRECT, ReSolve, BIOSMART, ECOXY, REFUCOAT, POLYBIOSKIN VIPRISCAR, AQUABIOPROFIT, iFermenter, UNRAVEL</td>
<td>OPTISOCHEM, BIOMOTIVE EFFECTIVE ReInvent</td>
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### SO4: Facilitation of market uptake

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<tr>
<th></th>
<th>CSA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy, regulations &amp; standardization</strong></td>
<td>STAR4BBI</td>
</tr>
<tr>
<td><strong>Consumer awareness of the benefits of the bio-based products</strong></td>
<td>BioCannDo, BIOWAYS BIOBRIDGES</td>
</tr>
<tr>
<td><strong>Knowledge gathering and networking</strong></td>
<td>BIOPEN, Pilots4U, RoadToBio ICT-BIOCHAIN</td>
</tr>
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</table>
BBI JU project portfolio: geographical coverage of DEMOs and FLAGHIPS

Analysis of geographic coverage of other types of action ongoing.
SME participation in BBI JU Call 2014-2017

% SME in retained proposals in Calls 2014 – 2017

62% Non-SME
38% SME

% SMEs funding Calls 2014 – 2017

73% Non-SME
27% SME
SME beneficiaries
Geographical distribution

- Wide geographical coverage: majority of MS have SMEs participation
- Intense mobilisation in Western Europe: DE, BE, FR, AT, CH, NL, UK as well as in certain countries in the Mediterranean Region
BBI JU achievements

• BBI is achieving its objectives with two main effects*:
  1. Structuring effect
  2. Mobilizing effect
• Increasing mobilisation in BBI calls
• Optimal Value Chains coverage
• Demonstration and Flagships
• New types of collaboration
• High % of SME participation
• Growing BBI JU awareness (also outside EU)
• The industry invest massively 2014: €2bn → 2017: €5bn
• Europe back on the map

(*) More information: BBI JU interim evaluation report
Future priorities

- Farmer organisations participation
- Municipal bio-waste
- BBI JU widening participation strategy
- More emphasis on aquatic biomass
- Increase «brand owners» participation
- Better communication value for EU citizens
- Engage more with young scientists
- More digitalisation

→ Adjusted SIRA June 2017
→ Bioeconomy strategy update
→ New missions for HORIZON EUROPE (FP9)
PULP2VALUE

Demonstration project
Coordinator - Royal Cosun - Netherlands

Sugar beet pulp

- Personal care (cellulose)
- Detergents & paints (cellulose)
- Food and Flavors (arabinose)
- Cosmetics (galacturonic acid)

Biogas

350KT
€200M
7 Value Chains
Reduced GHG

May 2016
First 2 Run
Flagship project
Coordinator - Novamont - Italy

July 2015

- New value chains
- Reuse of defunct Industrial site

Marginal land
Brownfield

Organic acids
- Polymers bioplastic
- Lubricants
- Cosmetics

Valorize co-products
- Energy
- Feed
EXILVA
Flagship industrial project
Coordinator - Borregaard Norway

- **Nanocellulose at industrial scale** - Microfibrilated cellulose (MFC)
- **Sector**: Home and personal care, adhesives, agrochemicals, detergents, coatings

**Challenges:**
- Processing of wood into MFC
- Operation of world‘s first MFC industrial plant (2000 tons/year)

May 2016
EXILVA
Flagship industrial project
Coordinator - Borregaard Norway

- Challenges:
  - Characterization of MFC and understanding its behavior
  - Developing standards for MFC for customers and regulators
  - Sustainable production - LCA including sLCA (reduced CO₂)

- Benefits: Sustainable biobased materials, added value to biomass producer and creation of skilled jobs
ReInvent
Demonstration project
Coordinator - FIAT Research Center – Italy
Replace petroleum based polyurethane (PUR) insulation products used in construction and automotive

CONSTRUCTION

Final products: composite bridge decks, spraying building insulations and insulating sandwich structures

New functionalities: lightweight, flame retardancy, noise insulation, hydrophobicity and thermostability, antifungal and anti-rotting

AUTOMOTIVE

Final products: Seat covers, dashboards, headseats

New functionalities: fatigue resistance, softness at low temperatures, flame retardancy, noise insulation, hydrophobicity and thermostability, antifungal and anti-rotting
AgriChemWhey
Flagship industrial project
Coordinator - Glanbia Ireland

Dairy Side streams to biobased chemicals and polymers

Markets
Food and Feed ingredients, cosmetics, Bioplastics

Challenge
Industrial scale biotechnology using a variable side stream

Benefit
Farmer co-op innovation
Creating a new value chain
Industrial symbiosis
Join us!

Register on our web site

Contact us
- info@bbi.europa.eu
- www.bbi-europe.eu

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- @BBI2020
Merci