



BRIDGE

**Biobased and Renewable Industries for
Development and Growth in Europe**

**Strategic Innovation and Research Agenda
(SIRA)**

Executive Summary

Disclaimer:

This document reflects the ambitions and objectives of the members of the Biobased Industries Consortium (BIC) in March 2013, and is the basis for road mapping towards the BRIDGE calls for proposals. The BRIDGE SIRA will frequently be adjusted based on technology and market developments, results obtained and ambitions of new members entering the BIC.

The Biobased Industry Vision

The industry vision is that of a competitive, innovative and sustainable Europe leading the transition towards a **post-petroleum society** while decoupling **economic growth** from **resource depletion** and **environmental impact**.

In this vision, the Biobased Industries will optimize land use and food security through a sustainable, resource-efficient and largely waste-free utilisation of Europe's renewable raw materials for industrial processing into a wide array of biobased products:

- **Advanced transportation fuels¹**
- **Chemicals**
- **Materials**
- **Food ingredients and feed**
- **Energy**

In doing so, the Biobased Industry will play an important role in spurring **sustainable growth** and boosting Europe's competitiveness by re-industrialising and **revitalising rural areas**, thus providing tens of thousands of high-skilled research, development and production jobs over the next decade.

How to realise this Vision?

At the heart of this vision, the **development of biobased value chains** will be accelerated. **New biomass supply chains** will be developed to feed new **integrated biorefineries while existing biorefineries will be brought to a new level**: to secure feedstock availability and flexibility throughout the year, with multiple inputs and multiple outputs. These developments will gradually complement and replace product streams from fossil oil and provide innovative new products and solutions and markets. The Biobased Industries play a critical role in the realisation of this vision and are already making significant investments in biorefineries.

However, critical technological, political and market challenges remain before full-scale commercialisation of the innovations can succeed and innovative solutions are brought to the market. Another fundamental challenge is the innovation "Valley of Death", from research to market. These challenges cannot be overcome by individual companies or the industry alone.

The competitiveness will be increased by reversing the currently seen trend of significant biobased economy investments in regions outside Europe where framework conditions appear to be more attractive. A long term research and innovation agenda jointly funded by public and private players can help address this challenge. This will be done by developing new value chains, de-risking investment in **demonstration projects** of innovative processes and in building first-of-its-kind **flagship plants²**.

BRIDGE Public Private Partnership (PPP)

The PPP on Biobased Industries (BRIDGE PPP) is an integrated and fundamental tool under Horizon 2020 to realise the biobased industry vision. BRIDGE focuses on developing EU-based value chains and accelerating the transition to advanced feedstock for biorefineries: It will focus on:

- Building **new value chains** based on the development of sustainable biomass collection and supply systems with increased productivity, and improved utilisation of biomass feedstock (incl. co- and by-products), while unlocking utilisation and valorisation of waste and lignocellulosic biomass;
- Bringing **existing value chains to new levels**, through optimised uses of feedstock and industrial side-streams, and offering innovative added value products to the market, thus creating a market pull and reinforcing the competitiveness of EU agriculture and forest based industries;
- Bringing technology to maturity through **research and innovation**, and through upgrading and building **demonstration and flagship biorefineries** that will process the biomass into a range of **innovative biobased products**;

¹ Biofuel from waste, residue and non-food cellulosic material, RED Article 21(2). This means that any R&D, demonstration and flagships in the PPP dedicated to biofuel production will be based on waste, residue and non-food cellulosic feedstock.

² Flagship plants are the first units of value chains operating at an economically viable scale

BRIDGE fully recognises that biomass is not an unlimited resource. It must be utilised intelligently, to ensure that additional uses of biomass do not compromise **the ability to produce food in sufficient quality and quantity**. By doing so, the PPP will ensure availability of a sustainable and secure supply of biomass **both for food and feed applications as well as for chemicals, materials, fuels and energy**.

To enable supply of additional and sufficient biomass for a biobased economy, it is critical to increase the productivity and output of biomass from European forest and agricultural land in a sustainable way and to unlock the potential of the residues and side-streams and waste. BRIDGE focuses on optimising utilisation of existing feedstock (forest and agricultural biomass) and the development of new feedstock supply chains (e.g. forest residues, agricultural lignocellulosic residues or dedicated crops), as well as industrial side streams and organic municipal waste. Providing new markets for biomass producers strengthens rural economies, and allows further development and investment in the production system. Albeit essential for the future of the biobased economy, the advanced feedstock supplies are still underdeveloped and require significant infrastructure for mobilization and logistics. The goal of BRIDGE is to address those issues by 2020 through research, demonstration of technologies and flagship projects to build efficient and cost competitive supply chains and transformation units.

Cooperation towards new biobased value chains and markets

All developments will occur in parallel and will lead to technology and competence transfer between sectors. In the short term existing value chains will drive the product development, in particular for added value products. Without biobased product market development at an early stage, there will be no market pull in Europe for the biobased economy and thus significant delay in its deployment. As new supply chains develop to 2020 and become economically viable, the biobased economy feedstock will increasingly come from lignocellulosic supply.

The PPP builds upon the strong agricultural, agro-food, forestry and pulp & paper sectors and world-leading companies in the plant breeding, biotechnology, chemistry, energy and bioprocess engineering. It also capitalizes on the vast amount of R&D investments and results, both optimising and utilizing Europe's existing pilot and demonstration facilities, and realising the required leap forward towards advanced technologies utilizing waste and lignocellulosic feedstock. But not least, BRIDGE will leverage the combined and complementary knowledge and skills of academia, research organisations, SMEs³ and larger corporations to achieve its innovation objectives.

The Strategic Innovation and Research Agenda (SIRA)

The BRIDGE multi-annual SIRA translates the PPP ambitions into a coherent set of actions that will deliver tangible and increasingly ambitious results by 2020 and by 2030.

The SIRA includes a balanced combination of:

- **Value chain demonstration projects** aiming towards integration and deployment of technologies and R&D results into actual value chains and bringing technology close to commercial scale through upscaling in demonstration activities and flagship projects;
- **R&D projects** focused on filling the gaps in technological innovations: dedicated projects on the development of specific technologies and concepts needed to realise the value chains, and proving the principles in pilot installations;
- **Supporting projects**, addressing the cross-sectoral challenges and supporting the value chains to become reality.

The projects of the SIRA will be developed around 5 value chains, where specific deliverables will be demonstrated, ultimately leading to flagship projects.

1. From lignocellulosic feedstock to advanced biofuels, biobased chemicals and biomaterials: realising the feedstock and technology base for the next generation of fuels, chemicals and materials
2. The next generation forest-based value chains: utilisation of the full potential of forestry biomass by improved mobilisation and realisation of new added value products and markets
3. The next generation agro-based value chains: realising the highest sustainability and added value by improved agricultural production and new added value products and markets
4. Emergence of new value chains from (organic) waste: From waste problems to economic opportunities by realising sustainable technologies to convert waste into valuable products.
5. The integrated energy, pulp and chemicals biorefineries: Realising sustainable bio-energy production, by backwards integration with biorefinery operations isolating higher added value components.

To have competitive biobased products in the market in 2020, each step of the value chains needs to be competitive: the feedstock supply, the processing, as well as the product(s) and market (both in term of price and environmental performance). BRIDGE focuses on developing, optimizing and demonstrating this competitiveness throughout the five value chains.

³ The primary mode of participation by SMEs in PPP activities is expected to be as regular industry actors