Ministry of Foreign Affairs

The bio-economy in France

Structure, market opportunities and possibilities for collaborationTitel

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The bio-economy in France

Structure, market opportunities and possibilities for collaboration

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The Agricultural Counsellor (Landbouwraad) on behalf of
the Economic Cluster of the Embassy of the Netherlands in France
in cooperation with The Netherlands Enterprise Agency

Kingdom of the Netherlands

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Foreword

Here in front of you lies the sector study on bio-economy in France. Bio-economy, or bio-based economy, refers to the reuse and valorisation of rest streams from agriculture, forestry and fisheries and the construction of new chains for value creation and the development of this market. It is an indispensable element on the path towards further sustainable production processes and circular economy. Bio-economy is a sector which will continue to develop over the next decades, and as such, it is a real sector of the future. This is certainly the case for France, where a large number of companies and knowledge institutes is active in the bio-economy sector.

Bio-economy has a broad range of applications and there is a substantial field which is as of yet unexplored. There are always new developments. For instance, the focus has now shifted from the replacement of fossil fuels with bio-economy towards the use of fine chemicals, performance materials and high-end specialties, for industrial use as well as for consumer products. The focus here is on CO_2 emissions reduction, health, environment and the development of safe chemicals.

To map out the trends and developments in the field of bio-economy in France as well as the key stakeholders, the Economic Cluster of the Embassy of the Netherlands in France, in cooperation with the Netherlands Enterprise Agency (RVO), has asked MSG Sustainable Strategies to conduct a sector study to support Dutch companies and knowledge institutes.

This sector study will provide insights into the possibilities for business and bilateral cooperation in the field of (applied) research, technology and innovation in bio-economy. The report shows areas in which the Netherlands and France can complement and strengthen each other to favour the development of the bio-economy sector in the Netherlands, France and the rest of the European Union.

We sincerely hope that this study will encourage you and will offer you a few starting points to explore the French bio-economy market and to partake in it. We are here to support you with this!

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Contents

1 Introduction

There are good reasons for Dutch bio-based industries to look south beyond Belgium and explore opportunities in (Northern) France. The bio-economy in France is one of the largest in Europe, with a turnover of approximately 50 billion euros (excluding agriculture, forestry, fishery, food, beverages, and tobacco products) in 2016.[1] The French government has formulated strategies for the future of agriculture, the bio-economy, and the circular economy, as well as for adjacent fields such as the marine and forestry sectors. These policies provide firm directions for government focus in the coming years.

A knowledge institute like Wageningen University & Research (WUR) already has strong ties with the French INRA. The larger Dutch companies also find their way to France. In general, however, the opportunities that are present within the French bio-economy are underutilized, because:

1. There is no single bio-economy. It encompasses many different sectors and overlaps with several policy domains. It is therefore difficult to find the information one needs.
2. When it comes to international collaborations, the Dutch will often reach out to Germany and Belgium first. Stronger ties already exist, and these countries are perceived to be easier to do business with than France.

This sector study attempts to bridge the information gap, by giving insight into the French bio-economy landscape and identifying opportunities for markets and collaboration.

For practical and specific advice, interested parties are invited to contact the Agrofood team (PAR-LNV@minbuza.nl) and the Innovation team (PAR-IA@minbuza.nl) of the Embassy of the Netherlands in France.

General advice for doing business in France is given on this website: https://www.rvo.nl/onderwerpen/internationaal-ondernemen/landenoverzicht/frankrijk/dos-and-donts

1.1 Scope

The sector study is written primarily for Dutch SMEs. This report emphasizes the relatively new production routes within the bio-economy; value chains including advanced feedstocks, biorefineries, and products with a high added value (e.g. chemical specialties, performance materials) or where strong growth markets are foreseen (e.g. biogas).
For agricultural production, there is a clear geographical focus on Northern France, a 1-day trip from the Netherlands. The other parts of the value chain can be found throughout France.

1 Nova & BIC,
2019. https://biconsortium.eu/sites/biconsortium.eu/files/documents/European Bioeconomy in Figures 2008 - 2016_0.pdf

1.2 Method

This sector study provides insights from desk research and 19 interviews with representatives from business and innovation in the Netherlands and France. A list of consulted organizations is provided in chapter 8 of this report.

1.3 Reading guide

This sector report consists of two parts: the results of the study and a set of fact sheets. The study contains 7 chapters: after the introduction (Chapter 1), the structure of the bio-economy is discussed in Chapter 2. This chapter provides an overview of the bio-economy in France and its most relevant organizations. More details are given in the fact sheets. Chapter 3 highlights the French policies and some of its drivers that will shape the business landscape in the coming years. Chapter 4, then, briefly discusses the main financing options that exist for business and innovation projects in Europe and France. The next two chapters (5 and 6) look at the French bio-economy from the perspective of Dutch stakeholders and French stakeholders respectively. In Chapter 7 this is combined to analyse the market opportunities and the possibilities for collaboration. These opportunities are described in general terms with some guidance to resources for more specific match-making.

The fact sheets provide more details. After some general data on the French bio-economy, they consist of listings of competitiveness clusters (Pôles de Compétitivité), companies, knowledge institutes, web portals, and relevant R&D programmes.

2 Structure of the bio-economy in France

2.1 Introduction

In this report, bio-economy is defined as follows: "The bio-economy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products, and bioenergy. It includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. Its sectors have a strong innovation potential due to their use of a wide range of sciences (life sciences, agronomy, ecology, food science, and social sciences), enabling and industrial technologies (biotechnology, nanotechnology, information and communication technologies (ICT), and engineering), and local and tacit knowledge".

2.2 Importance of the bio-based economy in France

The bio-based economy sector is of crucial importance to France, as for many other countries.

In 2015, the turnover in the bio-economy sector for the EU-28 was €2,259 billion. The turn-over in the same year for France was €333 billion (14.7% of the EU turnover), and for the Netherlands €114 billion (5% of the EU turn-over). Food, beverages and tobacco represent more than half of France's bio-economy sector (measured in terms of turnover), and the agriculture presents just over 20% of the total bio-economy sector. Other important sectors are the bio-based chemicals, pharmaceuticals, and the plastics and rubber sector (7.5%).

The bio-economy sector is rapidly changing. New developments and new policies change both the turnover and share of specific sectors in the overall French bio-economy market.

For example, the French chemical industry has set itself the goal of doubling the volume of plant-based raw materials used by 2020 (Industry Strategic Committee). France, with its competencies and resources, should also seize the opportunity and become the leader in the supply of vegetable proteins on the domestic market and for export (30 projets pour une agriculture compétitive & respectueuse de l'environnement, 2015). France should aim towards 100% of plastics recycled by 2025, and to reduce greenhouse gas emissions: avoid the emission of 8 million additional tonnes of CO_2 each year thanks to plastic recycling (Roadmap for the circular economy, 2018).

2.3 Relevant French government bodies

The French bio-economy policy is developed by several French ministries: the Ministry of Economy and Finance, the Ministry of Higher Education, Scientific Research and Innovation, the Ministry of Territorial Cohesion, the Ministry for the Ecological and Inclusive Transition and the Ministry of Agriculture and Food.

The actual implementation of policies is done by agencies, such as ADEME (French environment and energy management agency) and AFB (French biodiversity agency); by fundamental research organisations (e.g. INRA) and by competitiveness clusters (e.g. Pôle IAR – Pôle de la Bioéconomie). These organisations are for example labelled as 'lead entities' for specific actions in the Bioeconomy strategy for France, 2018 - 2020 Action Plan.

2.4 French innovation landscape

Research is performed in knowledge institutes, competitiveness clusters, companies, and others.

2.4.1 Knowledge institutes

Knowledge institutes can be divided into 3 groups, as described below.

1. Public research establishments (EPST), such as
- INRA (National Institute for Agricultural Research) with different regional centres in France, including in the French overseas territories
- CNRS (National Centre for Scientific Research) with locations across France
- IRSTEA (National Research Institute of Science and Technology for Environment and Agriculture); please note that IRSTEA will merge with INRA as of 1 January 2020

2. Public industrial establishments (EPIC), such as
- CIRAD (Agricultural Research Centre for International Development)
- CEA (Alternative Energies and Atomic Energy Commission)

3. Grandes écoles: higher education establishments that are separate and parallel, but often connected to, the main framework of the French public university system. There are many grandes écoles in a vast field of studies. Some examples (not exhaustive) are:

- Schools of Agricultural and Life Sciences (ENSA) such as AgroParisTech, SupAgro (Montpellier) and ENSAT (Toulouse)
- Schools of chemistry, such as ESCPE (Lyon)
- Polytechnic Institutes, such as the ENSAIA, the National School of Agronomy and Food Sciences (Nancy)
- National Institute of Applied Sciences (INSA) with 6 partners throughout France

2.4.2 Competitiveness clusters

Competitiveness clusters (Pôles de Compétitivité) were created in 2005. The clusters aim to enhance the capacity of companies to innovate, to stimulate growth and to increase employment in promising markets. The clusters bring together a variety of members (small, medium and large enterprises, knowledge institutes and knowledge organisations) around a specific theme. Where originally the clusters were focused on a well-defined geographical area, many clusters nowadays focus on the entire country and even beyond.

There are currently 56 clusters. Relevant clusters in the field of bio-economy include:

- Pôle IAR – le pole de la bioéconomie, this is the leading French Bio-economy cluster (IAR stands for Industries & Agro-resources). It has 380 members from across the entire bio-based value chain, from upstream agricultural inputs to the marketing of finished products. Pôle IAR has a partnership with the innovation cluster Biobased Delta in the Netherlands.
- AXELERA, this is the cluster for Chemistry-Environment in the Auvergne-Rhône-Alpes region of France. It has more than 345 members (2016). A bio-economy approach is relevant for most of its activities.
- Mer Bretagne Atlantique and Méditerranée. These two clusters bring together 332 and 360 members respectively, and focus on the maritime sector. Pôle Mer Bretagne works together with WUR on marine algae.

A further search shows that other clusters include aspects of the bio-economy in part of their activities. This covers areas such as Aeronautics (Aerospace Valley: Toulouse / Bordeaux), ASTech (Paris Region: Paris), Energy (CAP Energies: Aix-en-Provence), DERBI (Perpignan); Transport (CARA: Lyon) and Cosmetics (Cosmetic Valley: Chartres). Many clusters are active in the Agriculture / Agri-alimentation area, and focus in total or partially on aspects of durability: Agri Sud-Ouest Innovation (Toulouse), Alimentation Bien-Être Naturalité (merger since October 2018 of TERRALIA and PASS (Avignon, Grasse and Lyon)), Aquimer (Boulogne-sur-Mer), Nutrition-Santé-Longévité (Lille), Vitagora (Dijon) and Valorial (Rennes).

2.4.3 Instituts Carnot

The Carnot label was designed in 2006, to develop research conducted by public laboratories in partnership with socio-economic players, primarily industry (from SMEs to large corporations), to serve the needs of these socio-economic players. The Carnot Label is granted to public research structures with proven, high-level research & innovation competencies dedicated to fostering innovation with industrial partners. Carnot Institutes are selected through a competitive call for applications.

There are currently 38 Carnot Institutes. Institutes working in the area of bio-economy include:

- 3BCAR - biotechnologies and green chemistry; it uses multidisciplinary approaches from biomass production, biorefinery to functional properties. The circular economy is considered by waste and byproducts valorization, cascading uses and eco-design
- Chimie Balard Cirimat Carnot Institute - green chemistry for energy, health, cosmetics and transport industries
- IFPEN Transports Energy Carnot Institute - energy efficiency in the transport sector, reducing environmental pollution and diversifying energy sources
- Innovation Chimie Carnot (I2C) - synthesis, analysis and formulation for the pharmaceutical industry, fine chemicals, food, bioresources, cosmetics, energy, and environmental sectors industries
- French National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA) - agricultural and environmental fields (please note that IRSTEA will merge with INRA per 1 January 2020).
- Plant2Pro Carnot Institute - varietal innovation, crop protection and biological control, agronomy, crop designs and precision farming, including digital applications
- PolyNat Carnot Institute - design of new biosourced functional and innovative materials and devices

2.4.4 Other networks

The ACDV (Association Chimie du Végétal) is a federation of 55 members representing the 'plant-based chemistry' sector. Its members include big industries (e.g. TOTAL and Arkema), through to SMEs and startups. It represents the sector to public authorities and administrators and plays a role in the development of the strategic, regulatory and institutional framework. This activity should help to support France's ambition to further develop its bio-economy and its circular economy.

USIPA (Union des Syndicats des Industries des Produits Amylacés et de leurs dérivés) is a federation of industries. It represents 8 private companies; four in the domain of starch manufacturing (Roquette, Tereos, ADM, and Cargill), and four in the area of caramel ingredients (Metarom, Nigay, Pectner and Sethness-Roquette).

IMPROVE – the first open European platform for research and development fully dedicated to the valorisation of proteins. Two other similar platforms in France are EXTRACTIS (plant biomass extraction and fractionation processes) and SAS PIVERT valorisation of biomass for products for plant nutrition and health).

2.4.5 Companies

In France, we find several large agricultural groups, cooperatives and federations, alongside major players in food and nutrition such as Roquette. Some global chemical industries, such as Solvay, are present in France and are developing biobased solutions. A limited overview, including some SMEs and start-ups, is provided in the fact sheets (companies), which also includes references to online listings.

3 French policies

The French national bio-economy policy follows from the EU and other relevant policies. In particular, it follows Europe's Bioeconomy Strategy (2012) and the 2018 update of the Bioeconomy Strategy. These policies aim to accelerate the deployment of a sustainable European bio-economy and to maximise its contribution towards the United Nations' 2030 Agenda and its Sustainable Development Goals (SDG's). The policies also aim to contribute to the Paris Agreement that was signed during the 2015 United Nations Climate Change Conference, COP21, which sets out a global action plan to avoid dangerous climate change.

Enhancing the bio-economy is a national priority for France. In 2017, France adopted its national Bioeconomy strategy, followed in 2018 by the adoption of its associated 2018 - 2020 Action Plan ("A bio-economy for France 2018 - 2020 Action Plan"). In this strategy, the bio-economy is defined as the whole range of activities linked to bioresource production, use, and processing. Bio-based products are defined as products deriving entirely or partially from bioresources.

The main goal of the proposed actions is to provide a sustainable response to the need for food and part of society's requirements for materials and energy, while at the same time preserving natural resources and guaranteeing the provision of high-quality environmental services. The actions should be efficient, resilient, circular and productive over the long term. Actions should focus on the general public where awareness of the benefits of the bio-economy should be increased. Actions should be rooted in local regions where it can contribute to creating local jobs and contribute to the development of economic value and jobs. Actions should recognise the leading role the bio-economy can play in value creation in France. The proposed actions aim to strengthen France's attractiveness and making it the bio-economy leader on European or even global levels. A summary of proposed concrete actions can be found in the Factsheets.

In addition to this overarching bio-economy strategy, there are several other national strategies, often focussing on specific economic sectors or specific objectives. Examples are:

- Plan protéines végétales pour la France 2014 - 2020 (2014): a Plan issues by the Ministry of Agriculture and Food. This plan is currently being updated following a national consultation of stakeholders.
- 'Made in France' des huiles et des protéines végétales 2018 - 2022 (2018): an action plan from Terres Univia, which is the sector representation of producers of oilseeds and protein crops, and that aims to further develop and use oilseed and protein crops.
- The agroecology project for France (2016): this project aims to shift agriculture towards the objective of combining economic, environmental and social performance. The objective for France is to become a world-leader in agroecology.
- The National low-carbon strategy (SNBC) (2018): Whereas France's greenhouse gas emissions per person are already among the lowest in the developed world, it wants to do more. The strategy outlines the approach to be adopted to reduce greenhouse gas emissions.

- The Roadmap for the circular economy (2018): France wants to step up its efforts to develop a circular economy, and create conditions for the collection of nearly 100% of recyclable waste. It aims to support the upgrading of French production and to position French companies among the European leaders in the circular economy.
- The "4 per 1000" programme (2015): this international initiative was launched by France at the 2015 United Nations Climate Change Conference (COP21) that was held in Paris. The initiative aims to demonstrate that agriculture, and in particular agricultural soils can play a crucial role where food security and climate change are concerned. The ambition of the initiative is to encourage stakeholders to transition towards a productive, highly resilient agriculture, based on the appropriate management of lands and soils, creating jobs and incomes hence ensuring sustainable development. WUR is a member of the 4p1000 consortium.
- The multiyear energy programme (PPE), (2018): the two main objectives are to reduce France's fossil fuel consumption and to ensure a clear, fair and sustainable energy transition for all. Greenhouse gas emissions coming from fossil fuel consumptions must be decreased, France should become less dependent on fluctuations in the price of oil and France should reduce its dependence on oil and gas producing countries.
- The national forest and wood programme 2016 - 2026 (PNFB): France, including the territories, has 16 million hectares of woodland. One of the four objectives of the PNFB relates to the role of woodland in absorbing carbon, thereby reducing greenhouse gases.
- The national strategy for the sea and coastal areas (2017): its goals include to ensure that the sea and coastline from mainland France and its coastal territories contribute to mitigating the amount of greenhouse gases in the atmosphere, developing the circular economy and to be less energy-dependent.

Although each of these strategies and policies is set up based on its specific background and with specific objectives, several characteristics stand out.

- The above-mentioned policies are all initiated on state-level, and there is a strong government-led implementation of the actions involved. Several Ministries are involved: the Ministries of Economy and Finance; Higher Education, Scientific Research and Innovation; Territorial Cohesion; Ecological and Inclusive Transition; and Agriculture and Food.
- Having said this, for most of the strategies and programmes, the role of the regions is important. Regions are the geographical places where the actions will be implemented, and they often have a role in administering and monitoring these activities. The French government supports the regions in implementing local policies for the benefit of the bio-economy and ensures a satisfactory link-up between national and regional strategies.
- In many of the policies, an important driver is to be or become self-sufficient / not or less dependent on other countries. As an example, France wants to be less dependent on soy import from the USA. The same principle applies to for example materials and energy.
- France aims to become the bio-economy leader on a European or even global level. France aims to integrate the bio-economy

in the future Common Agricultural Policy (CAP (2021 - 2027). This has already been validated by the European Commission.

- France consists of mainland France and French-administered territories outside the European continent. The overseas territories include French Guiana in South America and several islands in the Atlantic, Pacific and Indian oceans. Besides forming a significant part of France's territory (over 90.000 km²), the overseas territories know different climates and geographical environments. The different policies listed above take the specific needs and 'opportunities' of the overseas territories into account.
- France has 11 million square kilometres of marine waters within three oceans under its jurisdiction, of which 97% are overseas. This makes France the second (after the USA) country with marine waters under its jurisdiction. Specific policies relate to sea and coastal areas.
- The policies take into account the strengths and weaknesses of the country. For example, France is a big producer of raw materials such as wheat, corn, potatoes, and peas. It also is a strong player in the production of plant-based proteins.

4 Financing opportunities

To implement the multitude of potential projects in the domain of the bio-based economy, funding is a key condition for all parties involved. Funding for projects where French and Dutch (and other) parties collaborate is available on the European level and French level. Funding from Dutch providers is not discussed in this study.

You can avail of support in accessing funding. RVO (Rijksdienst voor Ondernemend Nederland) provides information about European funding. For information about French funding, you can turn to the Embassy of the Netherlands in France. It is very difficult to obtain French funding for non-French organisations unless you have an establishment in France. Indirect access to funding can be obtained when you participate in and collaborate with a French partnership, such as projects supported by a Pôle de Compétitivité, or projects supported by a Carnot Institute. The European Investment Bank can also be consulted for advice on financing.[2]

4.1 European funding

Many projects where French and Dutch parties collaborate take place within larger European projects. For these projects, European funding from the EU Research and Innovation programme Horizon 2020 (H2020) and its successor from 2020 onwards, Horizon Europe (HEU), is most relevant. H2020 publishes calls for proposals for specific topics, to which European consortia can apply. Most of these calls are 'top-down' (i.e. the specific topic for the research and innovation projects is given), but there are some options for

2 https://www.eib.org/en/products/advising/innovfin-advisory/index.htm

'bottom-up' projects (i.e. the proposal writers are free to choose the topic of their proposal).
The new Horizon Europe (HEU) will include a 'Cluster 6' on 'Food, Bioeconomy, Natural Resources, Agriculture and Environment'. Actions under this Cluster will lead and support the switch to a competitive, more circular and bio-based, climate-neutral, resilient and environmentally friendly economy in compliance with the Paris Agreement on Climate Change and the United Nations Sustainable Development Goals. Although the budget for the different parts of HEU is not clear at this time, it is clear that HEU will be an important funding source for future collaboration projects.

The Biobased Industries Consortium (BIC), also known as the Bio-based Industries Joint Undertaking (BBI-JU) operates under H2020. This public-private partnership aims to invest € 3.7 billion in bio-based innovation between 2014 and 2020. At this moment there are two more calls planned. The continuation of BBI-JU after 2020 is under consideration. The BBI-JU recently launched a synergy label pilot to help broker the high-quality proposals that it has not awarded with finding regional funding.

Another source of European funding is the European Structural and Investment (ESI) Funds, which include the European Regional Development Fund (ERDF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). ESI provides funding to support the shift to a low-carbon economy, including renewable energy, green infrastructure. Funding from the EU must be co-financed by national public funding.

Eurostars is a European innovation programme and an initiative from EUREKA and the European Commission. It is a bottom-up programme: the consortium decides on the project topic. Eurostars focuses on research performing SMEs. For a Eurostars project, the consortium must exist of parties from at least 2 Eurostar countries. Both France and the Netherlands are Eurostar countries. Eurostars helps (small) companies to implement market-oriented technological development and aims to shorten the time-to-market from these new technologies and to reduce technical risks. Funding is provided via the national governments of each participating country in the consortium. The Dutch Ministry of Economic Affairs makes available a yearly budget of around € 18 million , to be divided over 2 calls for proposals.

Finding private capital for bio-based industries remains a challenge, particularly for projects scaling up from demonstration to pilot plant, and for bio-based industries moving from demonstration to first-of-a-kind industrial-scale projects. To address this, the European Investment Bank (EIB) is designing a € 100 million Circular Bioeconomy Investment Fund. The objective of the Fund is to contribute to filling the funding gaps faced by innovative Bioeconomy projects by providing them with access to finance, particularly in the form of debt, equity or quasi-equity.

4.2 French funding

The funding landscape in France is complex, with many funders on different levels and for projects on different topics and with different objectives. As said before, it is very difficult to obtain French funding directly. Indirect funding, through participation in partnerships, is possible.

The French National Research Agency (ANR) provides funding through calls for proposals in all scientific areas to universities, organisations, public research or companies (regardless of size). It also aims to promote European and international cooperation. ADEME provides funding for R&D and implementation projects in its thematic areas, including renewable energy, and circular economy and waste management. The Investment for the Future (PIA) programme provides funding through calls for proposals (administered by ADEME, Bpifrance or regional administration) or through investment funds (administered by Bpifrance). Funding is also provided by a plethora of regional administrations and foundations.

France has a very favourable WBSO-like scheme for companies, called Crédit Impôt Recherche (CIR). It is a (fairly generous) credit on research expenditure in the broad sense of the word. The research can take place within the company itself or it can be outsourced. The credit amounts to 30% of the R&D expenditure with a ceiling of 100 million euros, and 5% above that. Outsourcing can also be done to a foreign (European) organization, namely a company or knowledge institution. A Dutch company or knowledge institute can, therefore, carry out assignments for French clients for which this client can claim the CIR. For this, the Dutch organization must be on the list of accredited parties and otherwise request an accreditation. For more information: https://www.economie.gouv.fr/entreprises/credit-impot-recherche

5 Expectations of Dutch parties

Based on the insights of the Dutch experts that were interviewed for this study

5.1 General

Dutch experts have the following general observations:

- The French government offers strong support for the agricultural sector in general and the bio-economy in particular.
- In a European context, the bio-economy is increasingly seen as part of the circular economy. There is an interest to learn from experiences regarding cascading biomass streams and valorizing waste- or sidestreams.
- Agriculture and forestry will increasingly become more integrated.

5.2 Biomass sources

All chemical clusters in the Netherlands have a sustainable ambition that includes the use of biomass resources. Therefore, the chemical industry is looking for stable and well-defined biomass resources of sufficient volume and quality. These have to comply with an increasing number of sustainability criteria.

The Netherlands and (Northern) France grow similar crops: sugarbeet, potatoes, cereals. The expectation is that France would in the first place be an interesting supplier of agricultural products. Dutch parties have the impression that waste- and side-streams in France are not yet fully utilized. E.g., a particular interest in the possibilities of using pulp from sugar beet was expressed. It is expected that biomass sourcing from France could be cheaper. Both in France and the Netherlands, there is a growing interest in

seaweed as a sustainable crop with potential high-value product opportunities.

5.3 Technologies

The Dutch are good in research and innovation. The WUR is a leading university for agricultural research. In the Netherlands, there is a good infrastructure and support system for pilots and demos, but these seldom translate into commercialization. The expectation is that developments in France, e.g. in biorefineries, have progressed further or can scale-up more rapidly (see 6.3 for examples).

Both in France and the Netherlands there are strong sectors that could benefit from joint technology development:

- bio-stimulants and bio-fertilizers
- fermentation and enzymes

The following points are seen as strongly developed in France

- The French have a leading position in extracting and functionalizing plant proteins. In the Netherlands, this technology has been developed mainly for milk-proteins.
- France has a world-class position in cellulose technology with interaction with many knowledge institutes.

Dutch companies and organisations mentioned as specific strengths from the Netherlands:

- The Dutch have a lot of specific know-how in machine building, e.g. regarding biogas: design, operation.
- Plant breeding is an important enabling technology, where long-lasting collaborations exist to work on common goals. There is a lot of knowledge in this area in the Netherlands and several existing Dutch-French collaborations.

5.4 Potential French markets

France represents a large market for bioproducts. Dutch parties need scale to bring costs down and move away from petrochemical products. Large potential markets that might be of interest for Dutch parties include bio-based building materials, performance materials and composites for the automotive sector, and chemicals for the bioplastics sector.

A higher price or price premium might be paid for specialties like bio-aromatics for paints, coatings or green products in cosmetics. France also has a very strong position in the personal care market, where unique bio-based ingredients can find an application.

6 Characterization of the French bio-economy

Based on the insights of the French experts that were interviewed for this study

6.1 General

France's bio-economy policy underlines its current economic strengths (resources, existing R&D structure) and is built on France's current needs (for example, France wants to be/become less dependent on import of certain products). This combination leads to a focus on specific sources, technologies, and markets.

6.2 Biomass sources

Agriculture is a major source of raw materials for the bio-based economy. The main products include wheat, corn, potatoes, and peas.

Another sector that provides sources for the bio-based economy is the maritime sector. The Pôles de Compétitivité Mer Bretagne Atlantique, Mer Méditerrannée and Qualitropic (tropical bio-economy in La Réunion) bring together a large number of companies (both big and small) and knowledge-institutes, working in this sector. Their activities include the production of biomass sources: macro-seaweed and micro-seaweed.

In France, the forest economy covers a range of activities, from silviculture to logging, and from primary, mechanical wood processing to the manufacturing of basic wood products. While not as large as the agricultural sector, it contributes to a substantial portion of the French economy and provides for both biomaterials and bioenergy.

6.3 Technologies

France is a strong player in the area of plant-based proteins. France wants to be less dependent on needed import of soybeans and seeks alternative sources for vegetal proteins: e.g. peas, wheat, fava bean, and alfalfa (lucerne) crops. Products derived include native starches, modified starches, glucose syrups, dextroses, glucose-fructose syrups, maltodextrins, proteins, lipids, and fibres. Well-known platforms to assist companies, looking for plant-based molecules to replace e.g. chemical additives, are IMPROVE, SAS P.I.V.E.R.T. and EXTRACTIS. These (industrial) platforms assist companies from the 'testing phase to a final, ready-to-market product'.

Another strong French sector is the sector of industrial biotechnologies and green chemistry and pharmacology. Core competencies include the production of plant biomass with optimized properties and biomass splitting and biorefinery. This sector produces bio-carburants, bio-energies, bio-sourced molecules and bio-sourced materials (e.g. plastics).

Two companies have already built biochemistry installations. METEX, an industrial biochemical company specialising in the development and industrial application of green and sustainable fermentation processes, has recently received the green light to construct and operate a PDO/BA production plant. It will operate a plant for the bio-based production of 1,3 Propanediol (PDO) and butyric acid (BA), two natural molecules of natural origin with applications in the cosmetics, animal nutrition and health, and bio-based polymers industries (e.g. textiles). Another biorefinery is about to be set up by the start-up AFYREN. After successful pilots,

the biorefinery will focus on producing organic acids, made from by-products from the sugar industry. These organic acids can then be used in multiple applications, such as cosmetics, human food, animal feed, and fine chemicals. Both refineries will be based in the Chemenis platform in the French Moselle region.

France has advanced technologies to treat both macro-seaweed (= seaweed harvested in its natural habitat) and micro-seaweed (= algae grown in plants). Products are then used in a variety of markets, such as human and animal feed, cosmetics, pharmacology and health, bio-sourced materials, bio-methanisation, and bio-fuel.

6.4 Potential French markets

One can observe two complementary visions in Europe on how to add value to the value chain: one vision focuses on importing biomass / raw materials from abroad and further develop these in Europe. This approach is advantageous for the Netherlands, through, for example, its Rotterdam port. The second vision focuses on the development of bio-refineries 'in the field', which is advantageous for France as it has abundant agricultural sources.

The market for functional proteins for food (mainly functional ingredients, health nutrition, specific food for children, sportsmen and vegetarians) is growing. It should be noted in this respect that France wishes to become less dependent on imports, for example, the import of soybeans from the USA and that the production of alternative sources for vegetal proteins is further developed. Also mentioned is the meat substitution market as a growing market, with Europe being the largest retail market globally and with an average annual growth rate of 7%.

Potential markets in France include:

- Cosmetics - there is an increasing demand for 'natural cosmetics', made from bio-based molecules. Also, the regulatory framework with regards to biodegradability standards provides an advantage to plant-based cosmetics.
- Packaging (Paper and carton board) production - upcoming market.
- Animal feed - the market for animal feed is expected to grow due to a reduction of for example milk powder and potato production. Important markets include the aquaculture sector and the pet animal market.
- Automotive - new markets are wheat protein and gluten used as polymers (for production of thermo-moulded or thermo-injected plastics), and performance materials.
- Building and construction - the increased use of wood and performance materials is foreseen, as well as increased use of bio-materials.
- Detergency - important markets are household detergents (detergents, softeners, dishwashing and cleaning products).
- Coatings and paints, adhesives and resins - this is an upcoming market for bio-materials. This market grows due to the depletion of fossil fuel stocks and the evolution of regulatory frameworks in certain industrial sectors.
- Bioplastics - currently, starch and starch derivatives are the main sources for the production of bio-based plastics. Both France and the Netherlands signed the Plastic Pact, which will stimulate better recycling of plastics.
- Bio-control, bio-fertilizers, and bio-stimulants - made from bio-based molecules.
- Biofuels and biogas, energy to replace carbon and petrol as fuels.

7 Matching opportunities

7.1 General barriers and opportunities for collaboration

For businesses to grow, bilateral relations are possible with either an upstream partner (feedstock) or downstream partner (broadening the product portfolio). **Dutch and French companies are often specialised in and working on the same topic as well as on the same readiness for market position. This often makes them competitors, which in turn makes collaboration more difficult.**

Matching is only possible when parties have added value for each other in vertical integration. Topics, where the Netherlands and France have complementary expertise, are easier to set up and implement. This will be easier for mid- and long-term projects than for short-term projects.

Collaboration between research institutes and companies is perceived as easier, as well as collaboration between research institutes. Opportunities exist in collaboration within European projects, and within the exchange of experience, expertise and good practice. A good example is the Biorizon project. This project was initiated by Dutch (TNO, ECN part of TNO and the Green Chemistry Campus) and Belgian (VITO) partners, and is now part of Bio-based Delta. Its shared research centre Biorizon works on the technology development of renewable aromatics with partners from the industry, universities and applied research organisations. The Pôle de Compétitivité IAR is a member of the Biorizon community and has thus access to current knowledge and developments in the field of functionalised bio-based aromatics.

French organisations perceive the Dutch bio-economy players as often operating alone, and of not being organised in formal clusters that they are used to. Therefore, it can be difficult for French organisations to find Dutch collaborators. Specifically, expertise from SMEs can be difficult to find. As a consequence, French organisations seek the expertise they need in the French Pôles de Competitivité, with mostly French organisations and companies. Existing collaborations are often with consortia, such as Bio-based Delta (an innovation cluster) and TNO (research institute), or with large (and well-known) enterprises such as DSM or with other (rather academic) 'networks' such as Wageningen University & Research.

It has been observed that companies within the EU have similar expertise and thus compete for the same customers. A stronger effort and perhaps a different mentality is required to find more collaboration in complementarity. This will strengthen the competitiveness of European businesses in a global environment.

7.2 Potential areas for collaboration

A few possibilities for Dutch companies in France will be highlighted here. This list is not complete but can provide direction for the search for collaboration opportunities. Opportunities for collaborations or partnerships might be found:

- In areas that are small or absent in the Netherlands, but strong in France: forestry, the automotive sector or the personal care sector.
- In the aquaculture sector (oysters, seaweed, shells) and the fisheries sector. Both the Netherlands and France are active in

research and development of producing high-value products from seaweed. Many of the activities are in a pre-commercial phase and could benefit from joining forces.
- In sourcing renewable feedstocks. The discussions in the Netherlands over the sustainability of biomass will increase the demand for stable and well-defined biomass resources of sufficient volume and quality. Here, France could fill a gap.
- In the growing markets that have been identified in chapter 6 and where Dutch parties might have unique skills or knowledge: bio-based building materials, bio-aromatics as specialty chemicals, the biogas market.
- Building on existing French-Dutch collaborations in plant breeding. This is an important enabling technology for the growth of the bio-economy.

For knowledge and technology development, most opportunities can be found through European programmes, such as INTERREG or HORIZON (see chapter 4). Particularly for (fundamental) research, as this is not so close to the market. It has been mentioned that some French organisations find it difficult to participate in EU projects, so there is an opportunity for the Dutch to 'invite' them.

7.3 Matchmaking recommendations

Within the broad bio-based landscape, it is not possible, to identify in sufficient detail, the exact opportunities. This section provides some pointers for matchmaking:

- Pôles de Compétitivité such as IAR (and other PdC's) organize matchmaking events. These events are listed on their websites. If you wish to broaden your professional network in your research and/or innovation area with French parties, this is a good place to start. Some Pôles de Compétitivité also accept non-French organisations as members; it is worthwhile exploring this opportunity as well.
- Institut Carnot (3BCAR) mediates between knowledge seekers and knowledge providers. Carnot institutes do not provide funding for the collaboration, this is up to the partners. We advise that you contact the Institute in your field of expertise to see what they can do for you.
- A Dutch company or knowledge institute can carry out assignments for French clients for which this client can claim CIR (see chapter 4). Interested Dutch organization must be on the list of accredited parties or can request an accreditation.
- As indicated in chapter 4, many projects where French and Dutch parties collaborate take place within larger European projects. Although the success rate is not always encouraging, we do recommend that you try to submit proposals to H2020 and its successor HEU. Collaborations that start in a European framework may be the basis for ongoing bilateral collaboration.
- There is a cultural difference between France and the Netherlands, and this extends to 'doing business'. However, cultural differences should not be seen as impeding factors, but as factors that make the collaboration more interesting. Adapt to the French way of doing business, and they will adapt to yours.

8 Organisations consulted for this report

8.1 France

- INRA (Institut national de la recherche agronomique)
- Club des Bio-économistes
- Formule Verte
- Pôle de Compétitivité Mer Bretagne
- Pôle de Compétitivité Industries & Agro-Resources (IAR) – le pole de la bioéconomie
- IMPROVE
- Roquette
- USIPA
- Pôle de Compétitivité AXELERA
- Association Chimie du Végétal

8.2 The Netherlands

- TKI BBE
- Biobased Delta
- RVO
- Cosun
- LNV
- TNO
- Federatie Bio-economie Nederland
- VNCI

Contact details

For more information, contact the Embassy of the Netherlands in France
The Agrofood team: PAR-LNV@minbuza.nl
The Innovation team: PAR-IA@minbuza.nl

FACT SHEETS

The bio-economy in France

Structure, market opportunities and possibilities for collaboration

Commissioned by
The Agricultural Counsellor (Landbouwraad) on behalf of
the Economic Cluster of the Embassy of the Netherlands in France
in cooperation with The Netherlands Enterprise Agency

Kingdom of the Netherlands

Netherlands Enterprise Agency

Contents

Events

Main events in 2020

Date	Event	Website	Relevance
28-30 Jan	Industrie Grand Ouest, Nantes	https://www.industrie-nantes.com/	About 'industrie durable'
29-30 Jan	ReGen Europe, Nantes	https://www.regen-europe.com/en/	ReGen Europe is dedicated to capturing energy and by-products from biomass and waste resource streams.
29-30 Jan	BioGAz Europe , Nantes	https://www.biogaz-europe.com/en/	Reference international exhibition for green, renewable gas. The exhibition brings together the entire sector covering the feedstock supply chain and its pretreatment, the entire process of methanisation and digestate management to energy recovery, including co/tri-generation, upgrading and methanisation to biomethane and biognv fuels. Every year the exhibition takes place in a different city.
29-30 Jan	Bois Energie, Nantes	https://www.boisenergie.com/en/	Reference event for the industry and municipality wood energy sector in France and represents the largest gathering of stakeholders, with typically more than 125 exhibitors and represented companies from across 10 European countries present and 3000 professional visitors
3-5 Mar	JEC, Paris-Nord Villepinte	https://www.jec-world.events/	JEC World is the leading international composites show. A Dutch pavilion will be present.
27-30 Apr	28th European biomass conference and exhibition, Marseille	http://www.eubce.com/wp-content/uploads/2019/07/CALLFORPAPERS_2020.pdf	International conference tackling challenges ranging from biomass production, to biomass conversion to bioproducts, biofuels and to bioenergy, environmental, economic and social impacts of biomass utilization, to industrial implementation of technologies and to the political policies supporting a shift away from fossil fuels economies that has resulted in serious climate change impacts.

14-16 Apr	Forum Bois Construction (10th International Wood Construction Forum), Paris	https://www.forum-boisconstruction.com/index_E.php	Forum for the wood construction and architectural industry. Last year in Epinal/Nancy the forum focused specifically on the climate crisis. 2020 will also focus on climate and ecology. https://www.forum-boisconstruction.com/pdf_20/Communique_FBC_Grand_Palais2_020-juillet%202019.pdf
3-4 June	EXPO-BIOGAZ, Lille	www.expo-biogaz.com	Biogas, technologies, equipment.
Nov (pending, date tba)	Siñal 2020	http://www.sinal-exhibition.eu/en/	The Siñal exhibition is a yearly recurring meeting place for the bio-economy. It covers topics like agricultural materials, plant-based chemistry, bio-energy, smart agriculture and urban equipment.

Listings (international)

https://www.abc-salt.eu/bioenergy-events/

https://www.greenea.com/en/events/

http://biomass-events.com/

https://www.biopol-conf.org/

https://industryplanner.com/event/renewable-and-green-energy-2019/

https://sustainableenergy.euroscicon.com/

https://bbi-europe.eu/events

https://www.biogasworld.com/fr/evenements/

https://www.haffner-energy.com/events-rewards

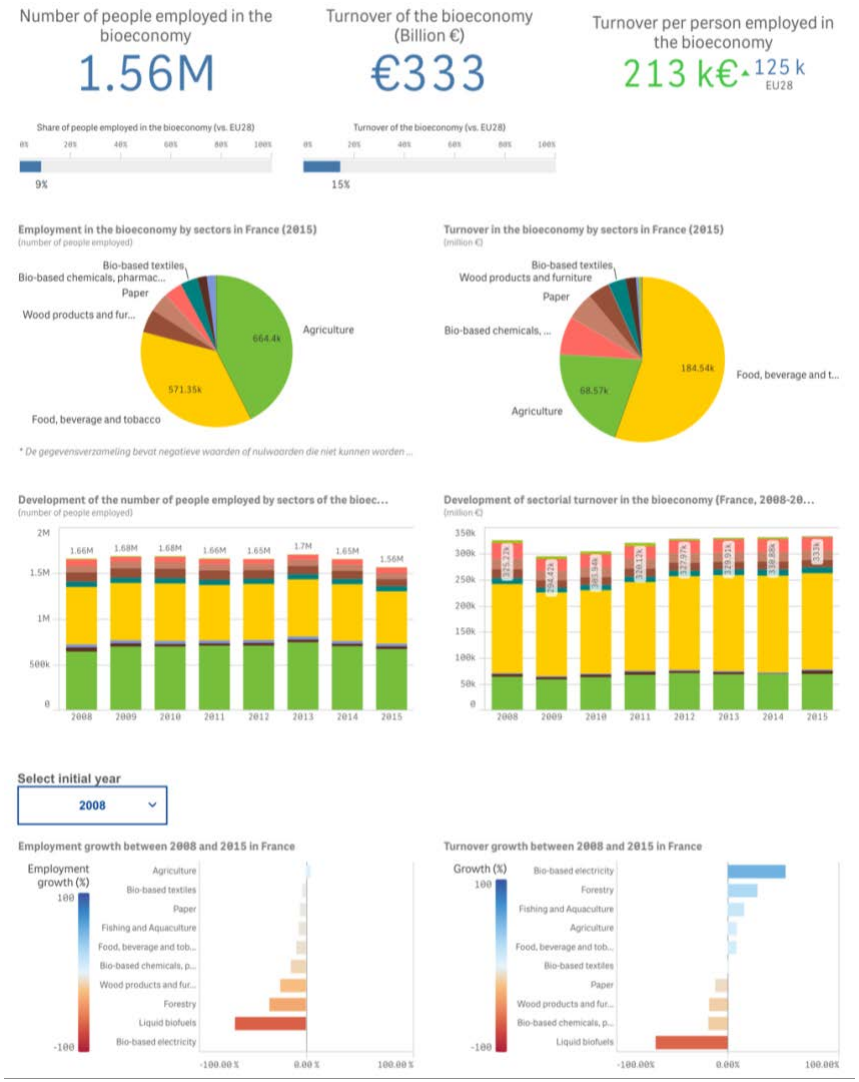
http://www.eubce.com/

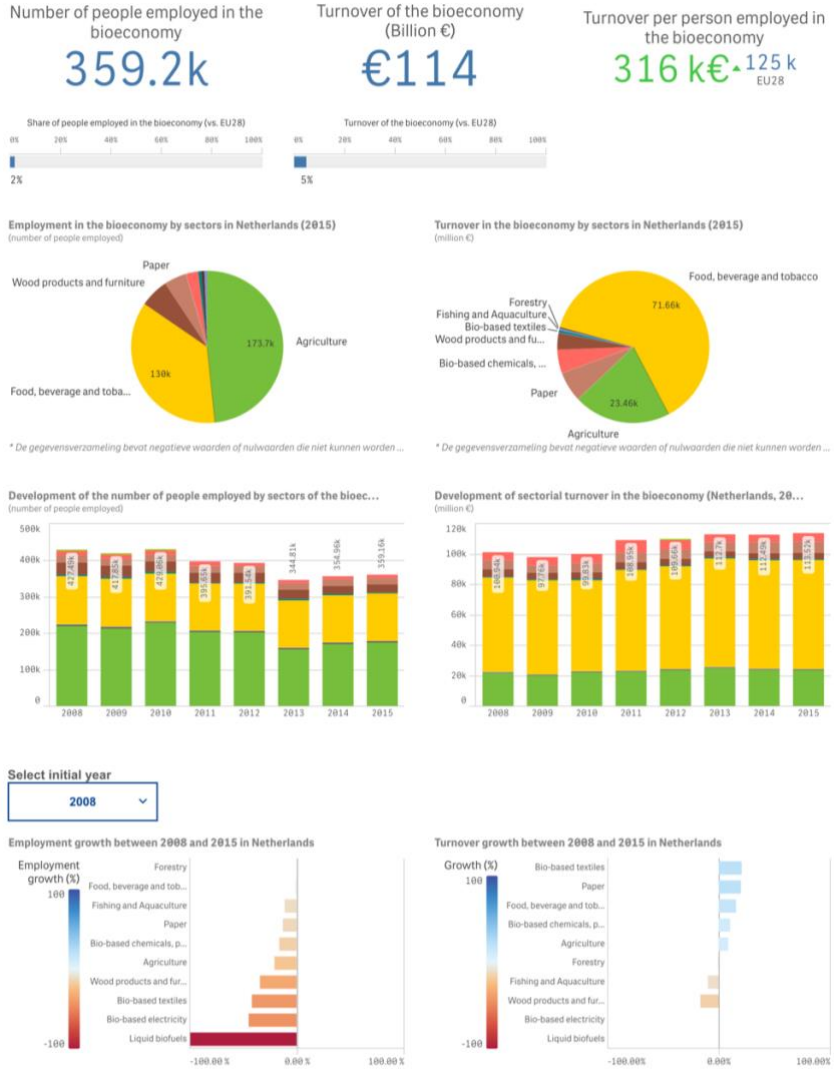
Facts and Figures

- A selection of indicators of the French bio-economy from the Data portal of agro-economics research – DataM: https://datam.jrc.ec.europa.eu/datam/
- Some general information on the R&D landscape of France from the H2020 dashboards: https://webgate.ec.europa.eu/dashboard/hub

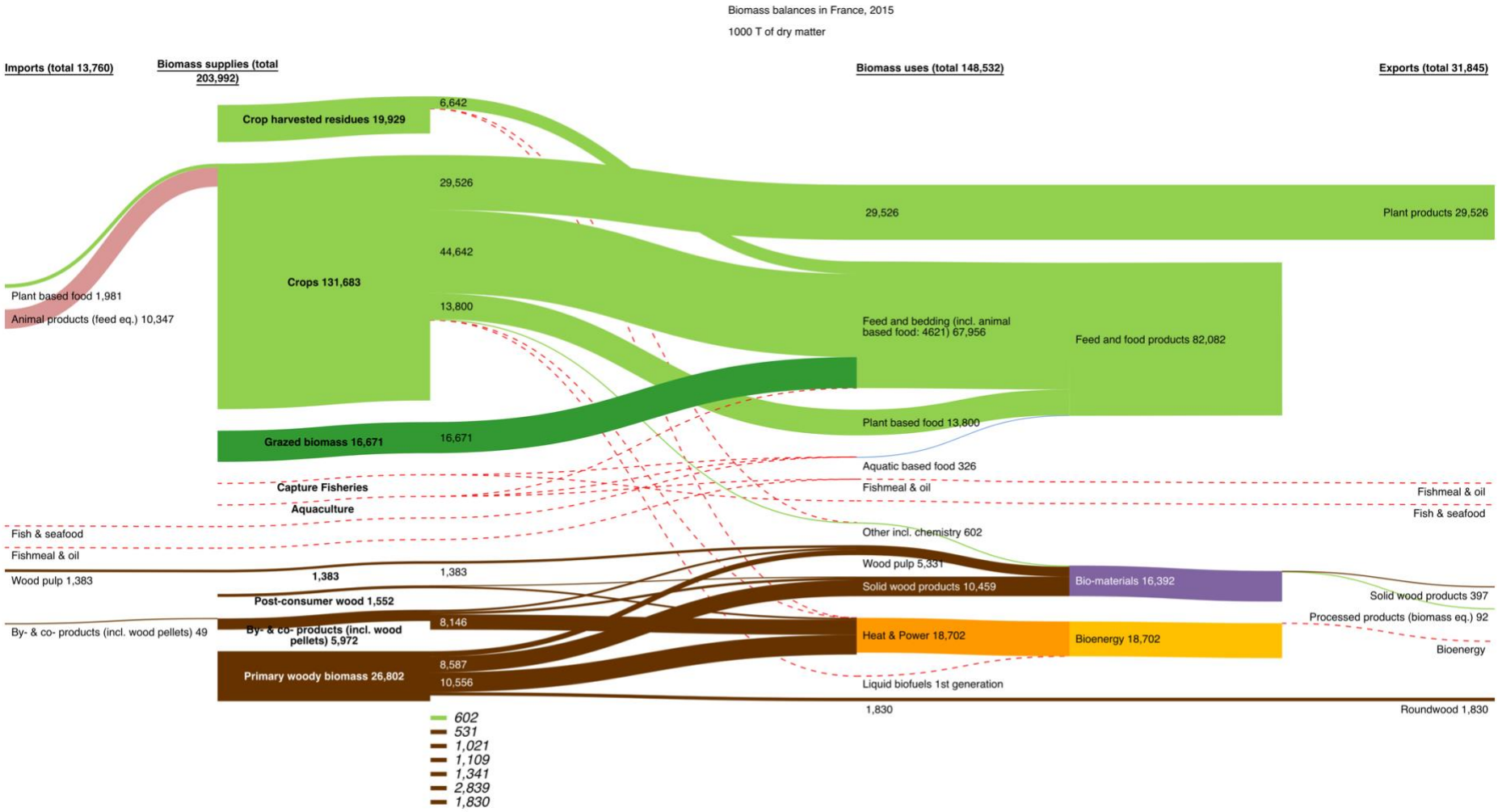
Bio-economy

Jobs and wealth in the bio-economy of France (left) and The Netherlands (right)





Material flows (France)

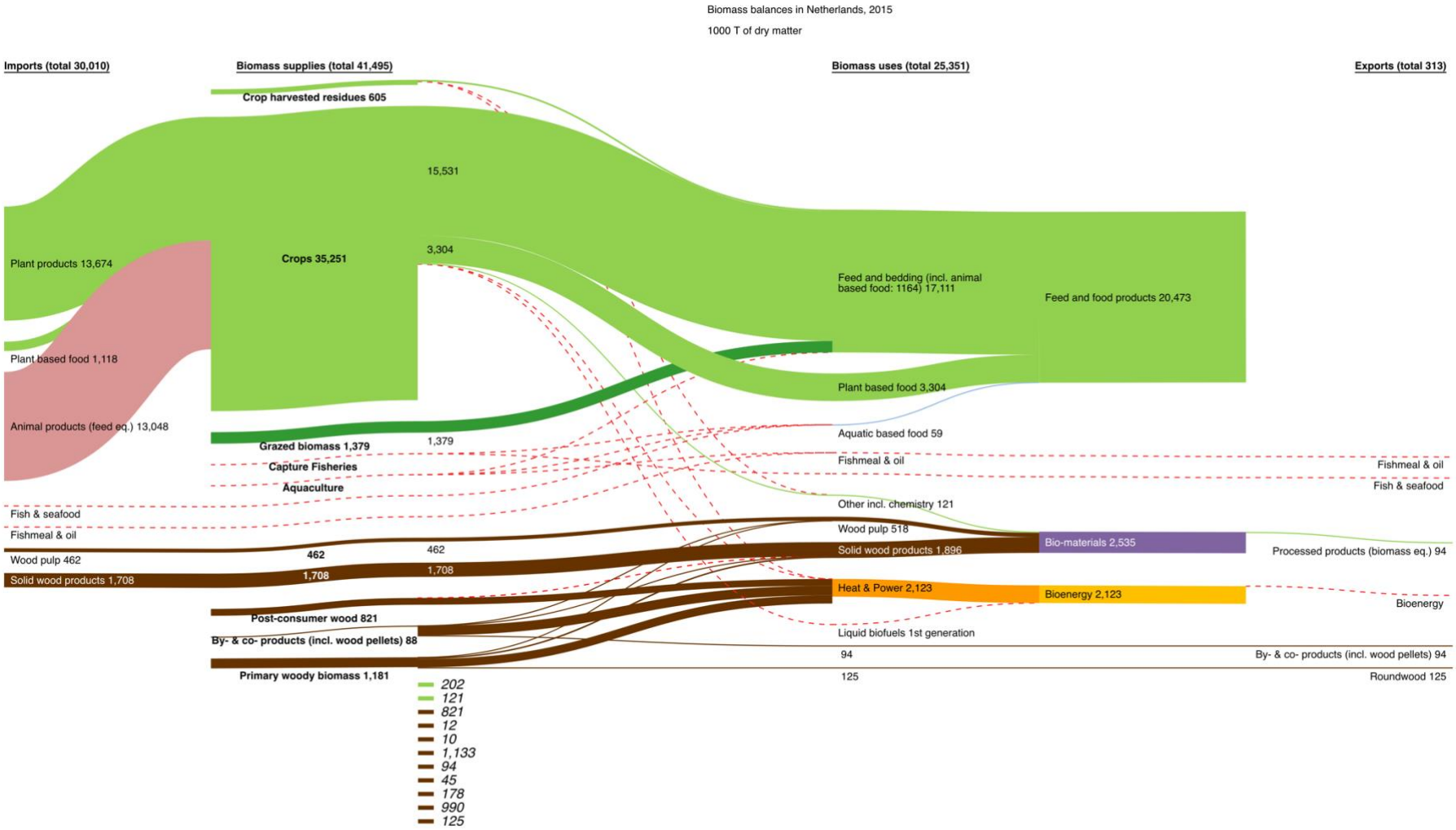


Source: data from the BIOMASS project, European Commission – Joint Research Center

Please note: Supply and use figures might not match due to estimation errors, stock changes, waste and/or loss of biomass or differences in the data sources used.

Known data gaps are shown as dotted red lines. Gaps derive from missing or incorrectly reported data, data not assigned to a specific category or data that cannot be estimated.

Material flows (The Netherlands)

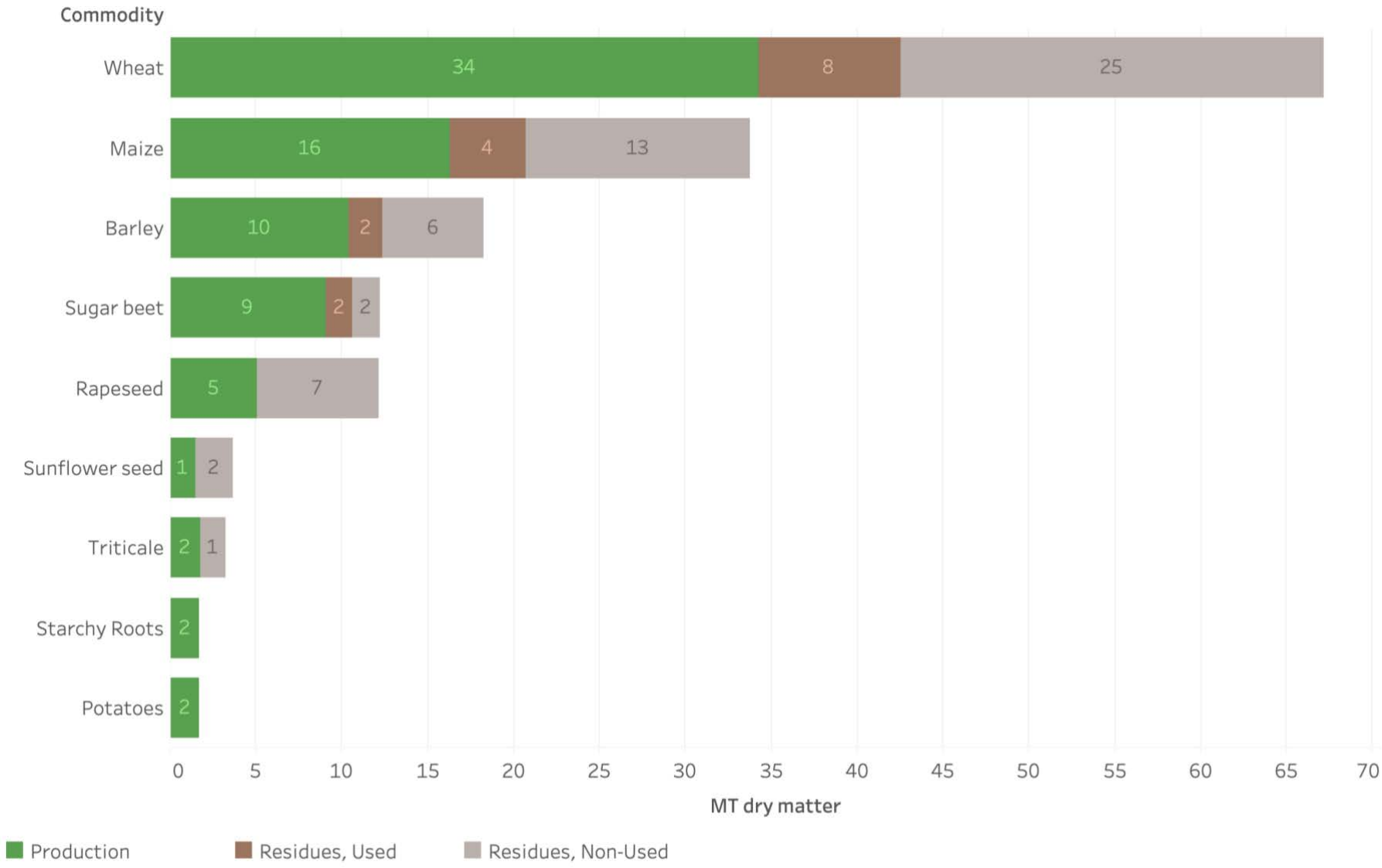


Source: data from the BIOMASS project, European Commission – Joint Research Center

Please note: Supply and use figures might not match due to estimation errors, stock changes, waste and/or loss of biomass or differences in the data sources used.

Known data gaps are shown as dotted red lines. Gaps derive from missing or incorrectly reported data, data not assigned to a specific category or data that cannot be estimated.

Major agricultural commodities (production and residues). France, 2014



https://datam.jrc.ec.europa.eu/datam/perm/od/jrc-datam-biomass-estimates

R&D landscape

France - R&D indicators

Innovation Performance

Strong Innovator

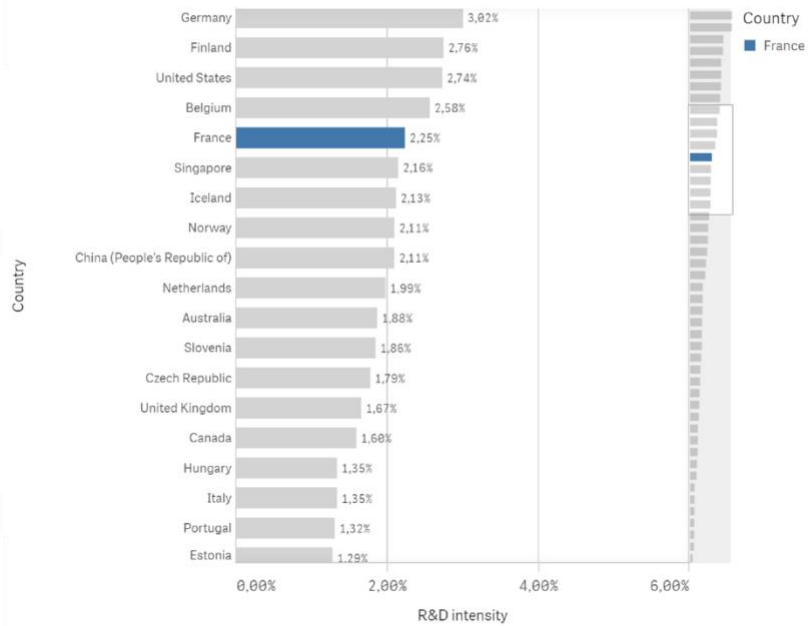
Innovation performance of the country according to the European Innovation Scoreboard 2018

R&D intensity	R&D Intensity ranking	EU contribution to R&I
2,3% (2,1% EU average)	7 on 28 (EU)	5,99B (947,3M ERDF and EAFRD)
R&D intensity (GERD as % of GDP)	*Ranking position of the country in its country group, calculated based on R&D Intensity*	*H2020 contribution to R&I in EUR and contribution from European Structural and*

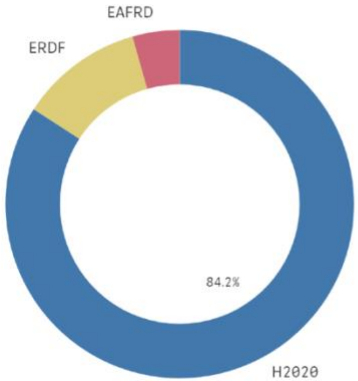
Researchers ratio	Researchers ratio ranking
4 178 (3687 EU average)	11th on 28 (EU)
Researchers (FTE) per million of population	*Ranking position of a country based on the number of researchers per million of population*

Knowledge-intensive employment	Patent applications rate	Top cited publications rate
39,3% (36,1% EU average)	4,2 (3,7 EU average)	11,3% (11,1% EU average)
Percentage of employment in Knowledge Intensive activities	*Patent applications per billion GDP in current Purchasing Power Standards (PPS in EUR)*	*Percentage of scientific publications within the 10% most cited scientific publications*

R&D indicators by country



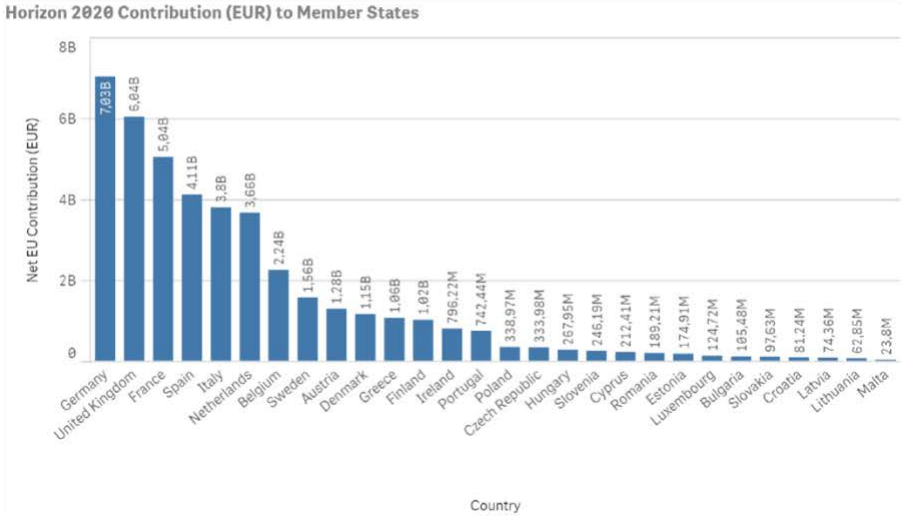
EU Contribution to R&I (EUR)

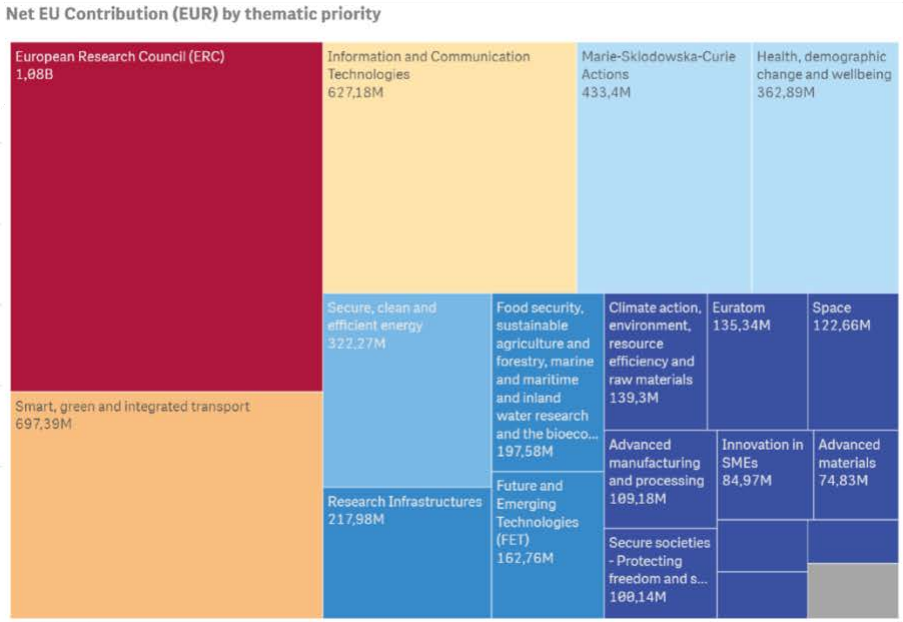


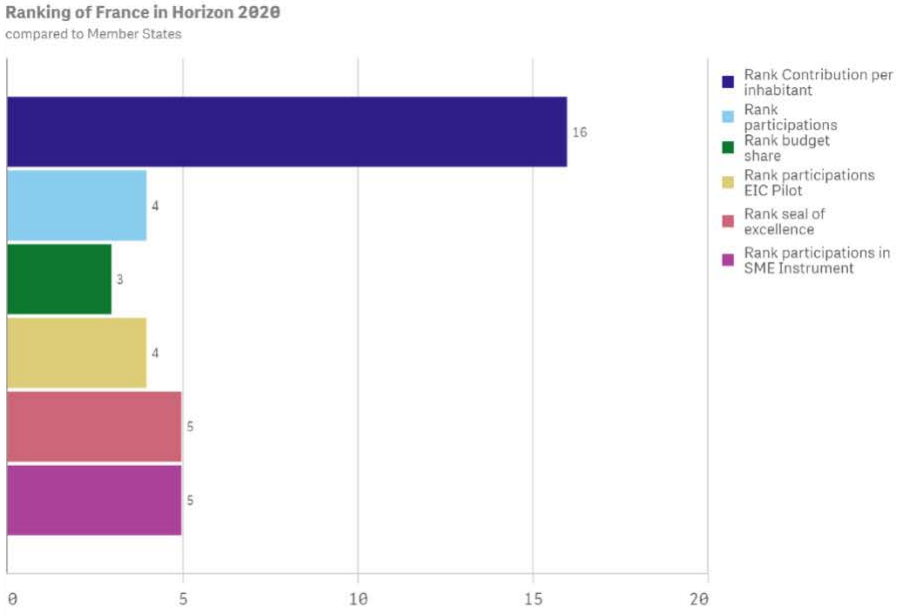
Socio-economic data comes from external sources and the refresh date depends on the source system, as follows:

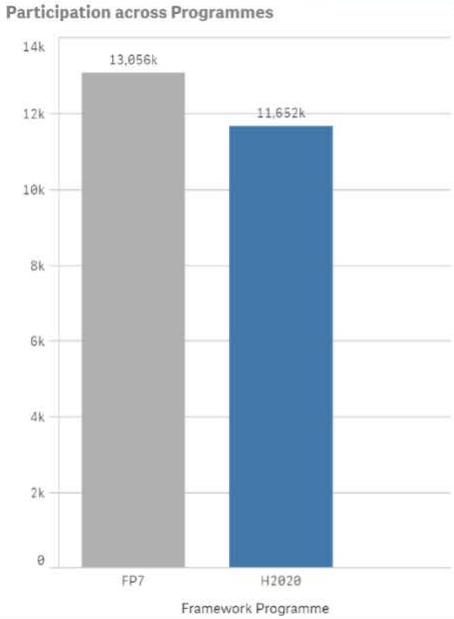
- **2018** for Innovation Scoreboard, ERDF, EAFRD
- **2017** for Population, RIA, EU Budget share

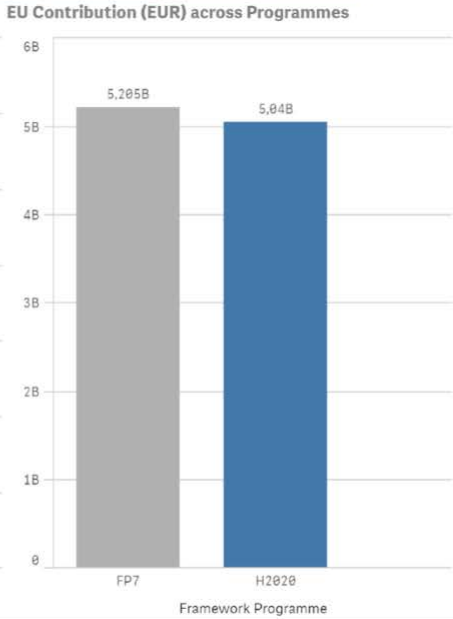
France – participation in Horizon2020 programmes



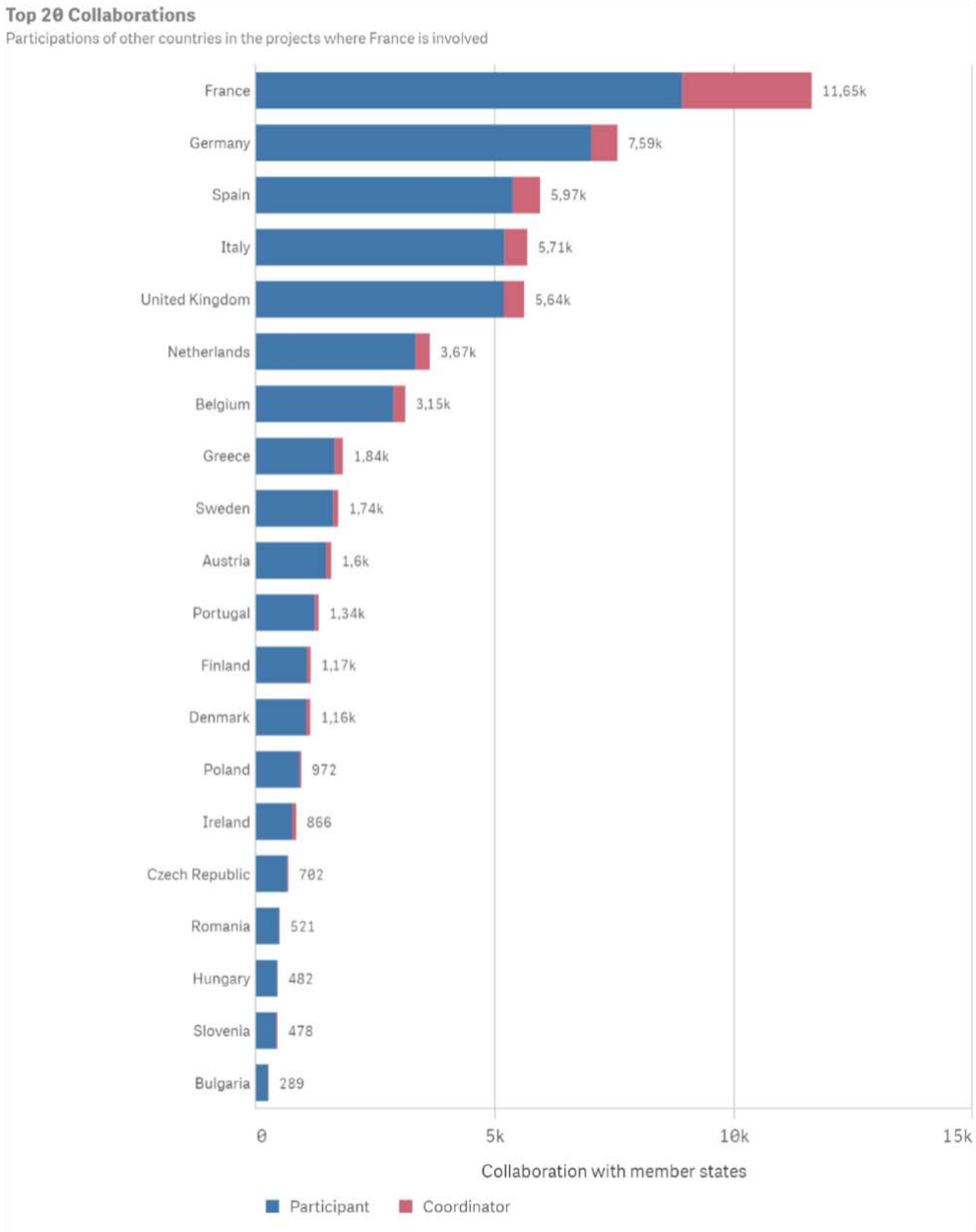








France – collaborations in Horizon2020



Portals

Listing of websites (portals, databases, magazines)

URL	Description	Relevance
https://ec.europa.eu/knowledge4policy/bioeconomy_en	Knowledge Centre for Bioeconomy	EU portal with news, events and publications. Key facts and figures are available by browsing one of the topics: biomass, economy, environment, policy, research and innovation
https://datam.jrc.ec.europa.eu/datam/public/pages/index.xhtml	Data portal of agro-economics research - DataM	EU data portal. Dashboards and downloads on the themes: agro-economics, bio-economy, climate change, food and nutrition security, and social accounting matrices.
https://observatoire-biomasse.franceagrimer.fr/app.php/	FranceAgriMer is the executive body of the French Ministry of Agriculture	Links to portals for 'forest resources' and 'agricultural, aquatic, agro-industrial resources, and wastes'
http://www.formule-verte.com/	Formule Verte is the only nationally specialized trade	

	journal on the bio-economy	
http://leclubdesbioeconomistes.com/	Association of people, companies and public and private organisations with the goal to raise awareness and inform about a sustainable bio-economy.	
http://www.agrobiobase.com/	Website in French and English dedicated to bio-based products and suppliers	Search engine for bio-based products, suppliers, articles and studies that allows suppliers to list their own bio-based product. The website is a service of the competitiveness cluster IAR, the French bio-economy cluster.
https://www.bioenergie-promotion.fr/	French magazine about energy from biomass	

Clusters (Pôles)

Economic development clusters were created in France in 2005 as a new way of responding to the increasing pressures of globalised competition. Their primary mission is to advance an alternative industrial policy. The clusters aim to enhance the capacity of companies to innovate, to stimulate growth and to increase employment in promising markets.

The primary criterion for a cluster to emerge is its ability to bring together large and small companies, research centres and laboratories and training and education establishments within a specific region and around a common theme.

A directory of the 56 clusters (pôles), is found here: https://competitivite.gouv.fr/en/clusters-255.html. You can search by keyword or locate the cluster on an interactive map.

Bio-economy

Pôle IAR (Industries & Agro Resources)

About	IAR is a leading French bio-economy cluster, recognised across Europe and internationally. It gathers over 380 members from across the entire bio-based value chain, from upstream agricultural inputs to the marketing of finished products. Members include agricultural cooperatives, research institutions and universities, companies of all sizes, public stakeholders etc.
Key figures	270+ accredited and financed projects; €1,7 billion in investments, 380+members; 60 events per year
Research prioritities/Target markets	The core of IAR's work is related to the bio-economy, focused on the following topics: ingredients for human food and animal feed, biomass resources, bio-molecules, bio-based materials and bio-energy. https://en.iar-pole.com/the-cluster/themes/
Partnerships	The IAR Cluster collaborates with partner organisations to support its work (innovation projects, investment, industrialisation and training) for its members. In addition, the Cluster is setting up partnerships with major international conferences, bringing them to its home regions (Hauts-de-France and Grand Est), for example the Protein Summit which was organised by IAR. IAR is a member of the Bio-based Industries Consortium (BIC) and was even the initiator of the BIC together with its Dutch partner Biobased Delta.
Website	https://en.iar-pole.com/

CEEBIOS: Centre Européen D'Excellence en Biomimétisme de Senlis

About	CEEBIOS is the French National Network of competencies in biomimicry, located in Senlis. Ceebios accelerates societal transition through biomimicry by federating a network of expert actors and by developing the resources necessary for the appropriation of the approach by the academic, institutional and private sectors.
Key figures	50 conferences per year; 4 working groups; 100 partners; 50 economic members
Missions	• Federate the network skills in biomimicry • Accompany the innovative projects • Contribute to training • Develop methodological tools methodological and data management • Contribute to development platforms and demonstrators • Communicate and influence
Website	https://ceebios.com/ (French)

Chemistry and materials

Euramaterial (merger of Matikem and Up-tex)

About	As of July 2019, Matikem and Up-tex merged to form the North-European cluster that acts as a cornerstone in the new processing material industries. Matikem is a French competitiveness cluster focused on the materials, chemicals, and green chemicals industries. Up-tex is active in textiles. The mission is to facilitate and accelerate the emergence of new R&D projects, to support collaborative innovation projects from the time they are set up until funding is obtained, and the market launch of new products, services or processes.
Key figures	Matikem: 92 members (48% companies, 40% research & training, 12 % other); 80 R&D projects supported and financed; 130 million raised to develop these projects; 273 million total project budget; 17 training courses with the Matikem label. Up-Tex: Nearly 82 M€ invested in R&D with 56 projects between 2016-2017
Fields of activity	The materials, chemicals and green chemicals industries are the primary areas of focus of Matikem, which supports economic & innovation development of companies in 2 fields (chemical industry and materials, biosourced materials), for 8 main industries (tableware, packaging, printing industry, plastics processing, agri-food industry, transport, construction, medical)
Partnerships	The pôle is partner in both national and international collaborations
Website	Until the launch of the Euramaterials website (https://euramaterials.eu/), the Matikem (https://en.matikem.com/) and Up-tex (https://uptex.innovationstextiles.fr/) remain active.

AXELERA (chimie et environnement)

About	Axelera, a cluster operating at the crossroads of the chemical, environmental, and energy sectors, supports innovation and international development initiatives to enhance the competitiveness of industrial companies. Based in Lyon, France, a global chemical-industry hub, Axelera has built a strong foundation across France's Auvergne-Rhône-Alpes region. In the strategic research area renewable raw materials, it focuses on the transformation of renewable resources, and, especially, bio-based resources and CO_2, into energy and materials.
Key figures (2016)	• 286 R&D projects certified by Axelera and funded since the cluster's inception • total funding obtained of €800 million • 7 businesses and other facilities have located to the region under Axelera-certified projects • 6 technology platforms have been certified by Axelera, including the Axel'One platform • 345 members
Strategic research areas	Axelera projects focus on R&D, innovation, and business development initiatives targeting five strategic research areas: 1. Renewable raw materials 2. Eco-efficient factories 3. Chemicals and materials for manufacturing industries 4. Recycling and recyclability 5. Preservation and restoration of natural and urban areas
Governance	Axelera is managed by a Bureau made up of six representatives of the cluster's founding members (ARKEMA, CNRS, ENGIE, IFP Energies nouvelles, SOLVAY, and SUEZ) and four representatives of small- to mid-sized member businesses and academics (CONDAT, ENOVEO, INEVO Technologies and University of Lyon). The Bureau is backed by a Board of Directors which consists of the three member colleges (education, research, and industry) and a Scientific Committee.
Website	https://www.axelera.org/

ELASTOPOLE

About	An inter-regional cluster with a national outlook and European ambitions, Elastopôle is the French competitiveness cluster in the rubbers and polymers sector.
Key figures	Members: big companies: 56; SME: 42; research: 8; training: 17; others partners: 9
Strategic research areas	Elastopôle has 6 strategic research areas, of which these two are the most relevant for the bio-economy sector: ● Raw materials, formulations and plant-based chemistry ● Sustainable development and eco-design
Partnerships	See https://www.elastopole.com/Elastopole-s-international-strategy for the international strategy
Website	https://www.elastopole.com/

PLASTIPOLIS

About	An innovation cluster for plastic materials and composites
Key figures	175 achieved or ongoing projects for 450 M€; 280 different companies are partners of projects (including 180 SMEs); 25 European projects
Strategic research areas	Research is focused on plastic material development. Relevant to the bio-economy sector is the theme biodegradable agri-food packaging.
Website	http://www.plastipolis.fr/?lang=en

Forestry

XYLOFUTUR (produits et matériaux des forêts cultivées)

About	Xylofutur is a competitiveness cluster, which aims to improve the competitiveness of players in the wood industry through innovation.
Key figures	223 members; 147 projects financed with 8,4 million public funding; 216 projects labelled with a budget of 404,4 million
Research priorities	Research and development take places in three main areas: ● Products from Solid Wood ● Products from Fibers and Chemistry ● Management and exploitation of Cultivated Forests http://xylofutur.fr/les-projets-2/
Partnerships	Partners range from funding organisations like Région Nouvelle-Aquitaine, to partnerships with Aquitaine Chimie Durable, Université de Bordeaux and national organisations like FBR (France Bois Régions). All partners can be found on http://xylofutur.fr/le-pole/nos-partenaires/
Website	http://xylofutur.fr/ (French)

Bioenergy: biogas and liquid biofuels

Tenerrdis

About	The Tenerrdis energy cluster, located in Auvergne-Rhône Alpes, supports sustainable economic growth and the creation of long-lasting jobs in the new energy technology industries and coordinates a network spanning industry, government, academia, and scientific research to address the challenges of the energy transition. It is active in 7 technological sectors, of which 'biomass and biogas' is one of them.
Key figures	91 members, 27 collaborative R&D projects and prototypes/demonstrator systems; 101 million total R&D spending
Research activities	In the area of biomass and biogas Tenerrdis is active in the following fields: • Raw materials for biogas/biomass: wood, organic byproducts, non-recyclable waste, solid recovered fuel (SRF) • Pretreatment processes • Combustion and gasification processes • Biogas production processes (methanization, inert waste storage facilities) • Gas purification processes • Injection of biomethane into utility networks • Biomass to biofuel, syngas, heat, and electricity
Partnerships	Several partners mentioned on their website, such as Ministère de la Transition Écologique et Solidaire, Grand Lyon, and Direction Générale des entreprises
Website	https://www.tenerrdis.fr/en/energy-fields/biomass-biogas/

Marine resources

Pôle Mer Bretagne Atlantique

About	The Mer Bretagne Atlantique is a competitiveness cluster with global objectives. The cluster has a clearly identified region: the maritime area covered by Bretagne-Pays de la Loire. Out of the six strategic areas, the Marine Biological Resources theme is most relevant for the bio-economy. It aims to unlock the economic potential of marine resources for future solutions in areas as diverse as foodstuffs, renewable energy, health and even cosmetics.
Key figures	354 members (39 large enterprises; 223 SMEs; 53 universities and grandes écoles)
Partnerships	The Pôle encourages the development of transnational, collaborative projects. At 11 million km_2, France's maritime Economic Exclusion Zone is the second largest in the world, offering outstanding assets to actors in the maritime sector. The Pôle Mer cluster provides SMEs with the support needed to export their products and know-how. It strives to ensure its members benefit from its international collaborations and its capacity to act at a European level. It is very much active in various EU H2020 or national programs, particularly in the field of marine (macro- & micro) algae. See: https://www.pole-mer-bretagne-atlantique.com/fr/component/search/?searchword=algues&searchphrase=all&limitstart=0 There is close collaboration between the Pôle Mer Bretagne and the Pôle Mer Méditerranée.
Website	https://www.pole-mer-bretagne-atlantique.com/en/marine-biological-resources

Pôle Mer Méditerranée

About	The Pôle Mer Méditerranée is a competitiveness cluster with global objectives. It aims to promote sustainable development of the maritime and coastal economy in the Mediterranean, Europe and the rest of the world.
Key figures	377 labelled projects shared innovative for a total amount of 931 M€ R&D; 287 projects are granted for a total amount of 321.55 M€; 22 structural projects (Shared innovative platforms, ITE, IRT, Labex, Equipex…) for an amount of 807M€; 422 members
Research activities & projects	https://en.polemermediterranee.com/Activity-Projects/Marine-Biological-Resources Research activity and projects takes place in 6 areas, of which amongst others Marine Biological Resources is the most relevant for the bio-economy. The three key action points for the Pôles Mer with regard to marine biological resources are: sustainable fisheries, sustainable aquaculture and blue biotechnology. Details: 44 projects funded, 64 labelled projects, 6 collaborative platforms and 145 million budget for labelled projects
Partnerships	https://en.polemermediterranee.com/Network/Partners/Financial-partners; https://en.polemermediterranee.com/Network/Partners/Other-partners
Website	https://en.polemermediterranee.com/

Companies

A selection based on the input from interviews with Dutch and French stakeholders. For a more complete listing, several sources can be consulted:

- Search the AgroBiobase for a product or supplier: http://www.agrobiobase.com/en/database
- Members of Association Chimie du Végétal (ACDV): https://www.chimieduvegetal.com/en/members/
- A map with the members of IAR Pôle Bioéconomique: https://www.iar-pole.com/les-adherents/
- A listing of members of Club Bio-plastiques: http://www.bioplastiques.org/les-membres/producteurs-de-resines, http://www.bioplastiques.org/les-membres/producteurs-de-produits-finis
- A map and listing of European Biorefineries (2017): http://news.bio-based.eu/map-of-224-european-biorefineries-published-by-bic-and-nova-institute/

Branch organisations

Association Chimie du Végétal (ACDV)

About	The Association Chimie du Végétal (ADCV) is a federation of 55 members representing the sector 'plant-based chemistry'. Its members include big industries (e.g. TOTAL and Arkema), through to PME and start-ups. It represents the sector vis-à-vis the public authorities, administrators, and plays a role in the development of the strategic, regulatory and institutional framework. This activity should help to support France's ambition to further develop its bio-economy, and its circular economy. Its role is to promote plant-based chemistry and support its economic development both in France and in Europe.
Sector	Plant-based chemistry
Key figures	• 23 000 direct jobs in France in plant-based chemistry (source: ADEME, May 2012) • 30 Mt of plant-based raw materials are used by this sector. They are harvested on 6 million hectares, or 0.4 % of the country's arable land area.
Partnerships	The ACDV brings together biotechnology companies, upstream industrial companies (agro-industrial companies and chemical manufacturers), "downstream" industrial companies (users of compounds obtained from biomass), competitive clusters and professional organisations. The fifty or so members of the association thus represent the whole value chain of the plant-based chemistry sector.
Website	https://www.chimieduvegetal.com/en/

Club Bio-Plastiques

About	The Bio-Plastics Club, created in 2006, represents all the players in the French bioplastics sector: biosourced resins and biodegradable resins. Organised by sector, from the origin of the raw materials to the end of life of the products, it brings together: • the AGPB (wheat growers), the AGPM (maize growers), the UNPT (potato growers): specialized French agricultural associations, • BASF, BIOTEC, LIMAGRAIN, NATUREWORKS and NOVAMONT: manufacturers of bioplastic resins, • the BARBIER Group, ESC-BAGHERRA and SPHERE: plastic packaging manufacturers, • VINÇOTTE. Its mission is the promotion and development of bioplastics in France and Europe
Sector	Bio-plastics
Key figures	38,000 tons of bioplastics products per year in France
Partnerships	Association Chimie du Végétal, Passion Céréales, Institut National de l'Économie Circulaire
Website	http://www.bioplastiques.org/ (French)

Platforms

Below the well-known platforms that assist companies looking for plant-based molecules in order to replace e.g. chemical additives are listed. These (industrial) platforms assist from the testing phase to a final, ready-to-market product.

Extractis (formerly CVG, centre de valorisation des glucides)

About	Extractis is an Agro-Industrial Technical Institute specialized in plant biomass extraction, fractionation and chemistry and in innovative products/processes development. For 30 years, their 33 plant-based biorefinery experts have assisted more than 70 customers per year in France and abroad. This support is done in order to secure their innovation, development, products and processes problem.
Key figures	33 employees; 3 million turnover in 2016; more than 440 contracts per year for 70 different clients; 3500m$_2$ laboratories and workshops.
Expertise	Specialized in modern techniques of plant extraction: the combination of pre-extraction treatments (chemical or enzymatic catalysts, high pressure homogenization, microwaves, subcritical water, extrusion etc.) and state-of-the-art centrifugal or membrane separation technologies, the use of partition solvents or alternative solvents, adsorption by resins or electrodialysis.
Partnerships	Amongst others: ASRC, Pôle IAR, Haute de France, BPI France, EU, ITAI
Website	https://extractis.com/en/home-page/

IMPROVE

About	IMPROVE is an R&D service platform for the valorisation of plant proteins. Since recently, they also work with non-vegetable proteins such as algae and insects. IMPROVE supports the innovation of their clients, who externalise part of their R&D process (the IP stays with the clients), and has specific technologies and expertise, that clients can avail to: • Reduce time to market for new protein products • Enable breakthrough innovations following market's needs • Improve proteins products
Key figures	300 clients worldwide, including European clients
Target markets	Food, feed, cosmetics, agro/bio-based materials (markets for bio-based materials are new plastics, adhesives/resins, new materials and coatings/paints).
Partnerships	IAR, Groupe Caisse des Dépôts, Picardie La Région
Website	http://www.improve-innov.com/en

SAS PIVERT

About	SAS PIVERT is active in the field of the bio-economy. It was created in 2012 and is supported by the French government ('Programme Investissements d'Avenir'). The company develops and sells novel products and processes aiming at valorising the biomass in a sustainable way. Their ambition is to become a key player in the energy transition and the area of sustainable development through new usages of biomass and the incorporation of renewable carbon in the industry.
Expertise	Its business model includes technology transfer, services and the development of products for plant nutrition and health. Its activities are supported by a unique multidisciplinary platform, the BIOGIS Center located in Compiègne, France, specialized in the scale-up of processes based on chemistry and/or biotechnology.
Supports and networks	E.g. IAR, Reseau C.U.R.I.E., Région Hauts-de-France, Assocation Chimie du Végétal, ARC (Agglomération de la Région de Compiègne), UIC Picardie Champagne-Ardenne.
Website	https://sas-pivert.com/?lang=en

R&D and Technology providers

METEX (METabolic EXplorer)

About	METabolic EXplorer is using bacterial biochemistry to create alternatives to petrochemistry. METabolic EXplorer offers chemical manufacturers viable, long-term alternatives based on renewable resources. Biological chemical processes use renewable plant-based raw materials instead of fossil raw materials to make products that are produced with petrochemicals today. Their mission is to contribute to producing products essential to everyday life in new ways, without oil, without pollution, more efficiently, and more competitively.
Key figures end 2018	65 employees, €45,2 million shareholders' equity, +500 patents registered in 20 years
Bio-based technologies	• Animal nutrition and health (METEX has expertise in the development of complex amino acids) • Textiles (METEX has developed a competitive technology for the production of PDO by fermentation of raw glycerol from vegetable or recycled oils) • Polymers (METEX has developed a process for manufacturing MPG (1,2-propanediol) from cellulose sugars)
Partnerships	ValChem consortium; Bio-Based Industries Joint Undertaking
Website	https://www.metabolic-explorer.com

AXENS

About	Axens is a worldwide group that provides a complete range of solutions for the conversion of oil and biomass to cleaner fuels, for the production and purification of major petrochemical intermediates as well as for gas treatment and conversion options. Axens Solutions provides technologies for *producing high-quality* middle distillates (jet fuel and diesel) and gasoline, as well as *petrochemical intermediates* from biomass (renewable feedstock) or natural gas and coal (alternative feedstocks).
Bio-based technologies	• Atol, Technology for the most profitable production of polymer grade bio-ethylene by dehydration of renewable ethanol. • Etherification processes that allows the production of ETBE (Ethyl Tert-Butyl Ether), TAME (Tert-Amyl-Ethyl Ether), respectively from ethanol and isobutene or reactive isoamylenes. • Gasel, Technology Suite to enable the production of ultra-clean bio-liquid fuels (BTL), notably biojet fuel and biodiesel, through the Fischer-Tropsch conversion of synthesis gas (H2+CO) produced by the gasification of ligno-cellulosic biomass.
Website	https://www.axens.net/our-offer/by-market/renewables-alternatives.html

BioEnTech

About	BioEnTech offers its assistance to design and operate biogas plants. It is specialised in the monitoring, the analysis and the optimisation of biogas plants. BioEnTech has extensive expertise in analysis, modelling, instrumentation and monitoring of anaerobic digesters. They propose integrated monitoring solutions and on-line assistance for any biogas plant, regardless of the size, the technology and the nature of substrates. As experts of anaerobic digestion and bio-processes, they also realize studies to assess biological, environmental, economic and technical details of projects.
Partners	BioEnTech benefits from support and the advice of academic partners: the Laboratory of Environmental Biotechnology (LBE) of the French Institute for Agronomical Research (INRA) at Narbonne (France) and the Project Team BioCore of the French Institute for Research in Informatics and Control Science (INRIA) at Sophia-Antipolis (France). BioEnTech has also benefited from the support of different public organisations and is member of several company and innovation networks, e.g.: Club Biogaz de l'Association Technique Énergie Environnement, pôle IAR, Pôle de compétitivité DERBI, Transferts LR, BIOENERGIE SUD.
Website	http://www.bioentech.eu/en

Agricultural groups, cooperatives and federations

Groupe Avril (oilseeds)

About	Avril is a farmer initiative, set up to develop the French production of oilseeds (rapeseed, sunflower, olive, soybean, etc.) and protein crops (pea, field bean, lupin, etc.). Avril is a major industrial and financial group. Avril is specialized in processing oilseed grains and producing edible oils, Diester® biodiesel and oleochemicals. With a further 65 sites specialized in animal nutrition and expertise or human foods. An Avril subsidiary, Sofiprotéol intervenes financially throughout the oils and proteins sectors and in related sectors such as dairy processing. Sofiprotéol provides support through loans and minority stakes for companies of all sizes.
Key figures	Avril is active in 22 countries throughout the world. €6.2 billion turnover; 7.600 employees 100,000 rapeseed and sunflower producers and 26,000 livestock breeders. 54% of the rapeseed collection in France transformed 3.4 Mton/year animal feed production 1 billion liters/year edible oil production
Markets	• human foods (Avril Group is the largest producer of table oils in France) • animal nutrition (Avril produces and sells rapeseed and sunflower press cakes) • renewable energies (Avril produces under the brand Diester, 11 million tons of biodiesel; Avril invests in research to develop second-generation biofuels) • chemistry (Through the 1996 creation of Novance and the 2008 acquisition of Oleon, Avril has dominated the European market of oleochemistry)
Website	https://www.groupeavril.com/en ; https://en.wikipedia.org/wiki/Avril_Group

USIPA (starch)

About	USIPA (Union des Syndicats des Industries des Produits Amylacés et de leurs dérivés) is a federation. It represents 8 private companies. Four in the domain of starch manufacturing (Roquette, Tereos, ADM and Cargill), and four in the area of caramel ingredients (Metarom, Nigay, Pectner and Sethness-Roquette). These sites are mostly in the North-East of France. Products derived include native starches, modified starches, glucose syrups, dextroses, glucosefructose syrups, maltodextrins, proteins, lipids and fibers. These products are then integrated in products in the sectors of human nutrition, animal feed and industry. There is a growing need for proteins.
Sector	Starch manufacturing and caramel ingredients
Key figures	A total of 6 million tonnes of French raw materials is used by the members of USIPA: • Wheat: 2.8 million tonnes/year • Mais: 2.2 million tonnes/year • Potatoes and peas: 1 million tonnes / year (24.000 ha potatoes and 18.000 ha peas)
Markets	• Human food (including specific food for children, sportsmen, vegetarians) • Animal feed (high demand for cakes with corn oil) • Chemistry / pharmaceuticals (dextrose) • Cosmetics • Paper & board
Partnerships	• USIPA is member of Starch Europe https://starch.eu/ . • USIPA is member of Protein France: a French consortium of enterprises, founded in 2017, whose ambition is to bring together and catalyse the development of plant-based proteins, and to create added value in France while strengthening the protein security of France.
Website	https://www.usipa.fr/

Groupe Tereos (sugar)

About	A cooperative group, Tereos is a union of 12,000 farmers with recognised know-how in the processing of sugar beet, sugar cane, wheat, corn, potatoes, cassava and alfalfa.
Key figures	26,000 employees, €4.4 bn sales revenue, 18 countries
Bio-based products	Alcohol and ethanol, dietary fibres, fibres and germs for animal feed, starches and derivatives, proteins, sugar and sweeteners.
Markets	The Tereos product portfolio covers the markets of food, animal feed, green chemistry, pharmaceuticals and cosmetics, paper and cardboard, and energies.
Website	https://tereos.com/en/, https://www.tereos-starchsweeteners.com/

Vivescia (grains)

About	Vivescia is the leading French grain cooperative group. VIVESCIA Industries brings together the Group's companies specialised in cereal processing mostly for the food industry: malting, milling, maize processing, animal feed, adding value to vegetal products and biotechnologies.
Key figures	11,000 member farmers 3.7 million tons/year of grain collected €2.3 billion turnover (Vivescia industries)
Website	https://www.vivescia.com/en, https://www.vivescia.com/en/grain-road/vivescia-industries

Other groups and cooperatives

Soufflet Group	Soufflet is a French family-owned agri-food group. It operates in the barley, wheat and rice and pulses sectors. https://www.soufflet.com/en
Invivo Group	A French agricultural cooperative group, with 201 member cooperatives https://www.invivo-group.com/en
Cristal-Union	Cristal Union is an agro-industrial cooperative group which is among the leading European producers of sugar and alcohol https://www.cristal-union.fr/en/

Food and Nutrition

Roquette

About	Roquette is a global leader in plant-based ingredients and a pioneer of new plant-based proteins. It has a holistic approach with regards to the bio-economy: all raw materials (vegetal, forestry, maritime) are used to transform for all markets (energy, human use, industry use). Roquette produces bio-based succinic acid under the trademark Biosuccinium®. Until February 2019 this was done under the DSM-Roquette joint venture Reverdia. Effective 1 April 2019, the joint venture Reverdia was dissolved and the partners transferred the rights and obligations related to Reverdia's Biosuccinium® plant in Cassano, Italy to Roquette. Under a non-exclusive license from DSM, Roquette operates the plant and continues serving customers of Biosuccinium®.
Key figures	8600 employees, 25 industrial sites, €3,5 billion turnover
Target markets	BioPharma, Pharma & Nutraceuticals, Cosmetics, Food & Nutrition (fibers; maltodextrins, dextrose and syrups; organic acids; polyols; specialty proteins, specialty starches), Animal nutrition, Industrial markets (adhesives; bio-industries; construction; home care; intermediates for chemistry; paper & board; and performance materials).
Partnerships	Founding member of Protein France, active through Starch Europe (www.starch.eu), DSM for Biosuccinium.
Website	https://www.roquette.com

Ynsect

About	Ÿnsect, an insect farming start-up, was founded in 2011. It turns farmed insects into premium animal nutrition. With growing global demand for premium proteins, they produce ŸnMeal, a premium protein, as well as other quality insect ingredients such as ŸnOil and ŸnFrass fertilizer. Their mission is to be a leading global provider of sustainable, premium nutrition for all by tapping the natural goodness of insects at industrial scale.
Key figures	Ynsect has raised $125 million in Series C funding in the largest early-stage AgTech funding deal on record in Europe. This takes the company's total fundraising to over $160 million since it was founded in 2011.
Target markets	Aquaculture, pet nutrition, plant fertilizer
Partnerships	Ynsect has different types of partnerships: • Financial partners (e.g. Bpi france, climate-kic, ademe) • Institutional partners (e.g. Innovia, la ferme digitale, proteines france) • Research partners (e.g. Cnrs, inra, wageningen ur) • Project partners (zelcor) Ynsect is one of 50 insect farming members of the International Platform of Insects for Food and Feed (IPIFF), an EU-based association for the industry. Other insect farming companies in France include: Nextalim, Micronutris, Nextprotein, Innovafeed
Website	http://www.ynsect.com/en

Chemicals and materials

Solvay

About	Solvay is an advanced materials and specialty chemicals company, committed to developing chemistry that addresses key societal challenges. Amongst their solutions are bio-based solutions.
Key figures 2018	€10,3 billion net sales, 24,500 employees, active in 61 countries, 115 industrial sites, 21 major R&I centres
Bio-based products	Solvay produces bio-based products in the form of polymers and materials, surfactants, solvents, monomers and flavours under the following brand names: Augéo®, Jaguar® Line, Kalix®, Polycare® Split Therapy, Rhodapex®, Rhodoclean®, Rhovanil® Natural, and Technyl® eXten.
Target markets	Automotive & aerospace, resources & environment, consumer goods & healthcare, agro, feed & food, electrical & electronics, industrial applications, building & construction
Website	https://www.solvay.com/en

Arkema

About	Arkema is a global manufacturer in specialty chemicals and advanced materials, with 3 business segments – High Performance Materials, Industrial Specialties, and Coating Solutions – and globally recognized brands. Amongst their solutions are bio-based solutions such as biosourced materials.
Key figures 2018	20.010 employees, annual sales of €8.8billion, operates in close to 55 countries
Bio-based products	Arkema has a unique know-how in the chemistry of the castor plant, from which a wide range of high-performance long-chain biosourced polyamides are produced
Target markets	Construction, electronics and electrical, food industry and agrochemicals, health, hygiene, beauty, oil and gas, packaging and paper, renewable energies, sports, transportation, water and the environment
Partnerships	Arkema is participating in the COSMOS research project, supported by the European Union and launched in March 2015. Another major collaboration is Fimalins in France, an R&D collaborative project overseen by Arkema and launched in September 2012.Its aim is to develop the use of flax in the manufacture of composite materials for a variety of markets, including automotive.
Website	https://www.arkema.com/en/

Total

About	Total's ambition is to become a leader of sustainable biofuels and develop innovative bioplastics. They are involved in the two major biomass conversion pathways: thermochemical conversion and biotechnology. The bioproducts currently available on the market are mainly produced from vegetable oils and sugars. The conversion of resources such as lignocellulose (plant waste) or microalgae (microorganisms that can directly transform CO_2 and light into molecules of interest for their markets) is still in the R&D stage
Key figures	€500+ million spent on advanced biofuel R&D in the last ten years,4 million metric tons biofuel incorporated into gasoline and diesel in 2018, La Mède biorefinery in France has a capacity of 500,000 tonnes of HVO-type biofuels per year
Target markets	Biofuels and bioplastics
Partnerships	• There are R&D projects in partnership with for example Corbion, CEA, Qingdao Institute of Bioenergy and Bioprocess Technology and Wageningen University (European Magnificent project). • Total Corbion PLA, a 50/50 joint venture between Total and Corbion, opened a 75.000 ton p.a. PLA (Poly Lactic Acid) bioplastics plant in Rayong, Thailand on September 9, 2019. • Total is a partner in the BBI JU projects 'GreenProtein' (Revalorisation of vegetable processing industry remnants into high-value functional proteins and other food ingredients), 'MACROCASCADE' (Cascading Marine Macroalgal Biorefinery) and 'NeoCel' (Novel processes for sustainable cellulose-based materials) and 'MAGNIFICENT' (Microalgae As a Green source for Nutritional Ingredients for Food/Feed and Ingredients for Cosmetics by cost-Effective New Technologies).
Website	https://www.total.com/en/energy-expertise/exploration-production/committed-future-bioenergies

ENGIE

About	ENGIE is actively working to promote biogas (biomethane) and is positioned throughout the entire value chain of the biomethane sector: from project development, in close collaboration with farmers, to sales to end customers. For ENGIE, biomethane is an energy of the future that will play an essential role in Europe's energy mix
Key figures	€800 million over the next 5 years to develop green gases, 2030 target of 5twh of biomethane production
Target markets	Bioenergy
Website	https://www.engie.com/en/businesses/gas/biogas/

SEPPIC

About	SEPPIC is a subsidiary of the Air Liquide group in the Healthcare business. SEPPIC designs and markets specialty ingredients for health and beauty. Prized for its proximity and reliability, SEPPIC inspires its customers worldwide with a unique combination of scientific expertise in the fields of chemistry, formulation and objectification. This covers polymers, surfactants and emulsion technologies, biology, immunology, transformation of natural products. Seppic aims to bring environmental, social or health benefits to its innovation, for example through the criterium: the raw materials used to manufacture the product are sustainable, bio-based or obtained through one of the 12 principles of Green Chemistry
Key figures	700 employees in 14 countries, 6000 customers in 100 countries, 80 distributors, 4 production sites
Target markets	Beauty care, dietary supplements, pharmaceuticals, animal health, performance materials
Bio-based technologies	Innovations include: Macroalgae Cells for the Design of Beauty Care Active Ingredients; Dedifferentiated Plant Cells Technology; Amino Acids Acylation Technology. See https://www.seppic.com/inspirations/examples-innovations for more innovations.
Website	https://www.seppic.com/

Leaf by Lesaffre

About	Leaf is the business unit of Lesaffre (a global player in yeast and fermentation) dedicated to the worldwide sales and market development of value-added fermentation solutions for bioethanol and bio-based chemicals producers. Benefiting from Lesaffre R&D expertise in the field of genetics and fermentation, Leaf develops dedicated research programs on bioethanol and bio-based chemicals industries. Created in 2014, Leaf's mission is to reinforce Lesaffre's current market position on the conventional and cellulosic bioethanol markets. Leaf also develops economically viable solutions for bio-based chemicals producers. Amongst their solutions are industrial ethanol yeast, cellulosic ethanol, advanced fermentation services and toll manufacturing.
Partnerships	Leaf has industrial partnerships, and collaborates with universities, institutes and technical centres. Technical collaborations are held with the University of Minnesota, NCERC (National Corn to Ethanol Research Center), Institut Meurice, and TISTR (Thailand Institute of Scientific & Technological Research)
Website	https://lesaffreadvancedfermentations.com/

BASF Agri-Production	BASF Agri-Production is divided into three major production sites in Genay in the Rhône, Gravelines in the North and Elbeuf in Seine-Maritime. BASF Agri-Production specializes in the production of plant protection products, also called "crop protection products" (herbicides, insecticides and acaricides, fungicides, growth regulators and seed treatment). https://www.basf.com/fr/fr/who-we-are/Strategie-et-Organisation-France/Societes-en-france/BASF-AgriProduction.html
Lactips	Lactips produces water soluble and biodegradable thermoplastic pellets based on milk protein. The company has recently awarded a contract to BASF for the marketing of its water-soluble, bio-based and fully biodegradable material. http://lactips.com/en/home-lactips-en/
Global Bioenergies	Global Bioenergies was founded in 2008 with a unique goal – to develop a process converting renewable resources (sugar, crops, agricultural and forestry waste) into isobutene, one of the main petroleum derivatives. https://www.global-bioenergies.com/?lang=en
Wheatoleo	Wheatoleo is a French company that develops innovative surfactants for the detergent, industrial, and plant protection markets. http://www.wheatoleo.com/en
Pili	Pili develops technology for biofabrication of renewable dyes for the textile industry. They hope to have products on the market by 2020. https://www.pili.bio/
Biolie	Founded in 2012, the company BIOLIE is specialized in White Biotechnology and has developed a clean solvent-free enzyme-assisted aqueous extraction technology of oils and vegetal actives. https://www.biolie.fr/en/home.html
Carbios	Carbios, a green chemistry company in industrial development stage with a focus on discovering and developing enzymatic bioprocesses to reinvent the lifecycle of plastics. https://carbios.fr/en/

Evertree	Industrial solutions and materials with cost competitive, plant-based chemicals that offer the same or better performance than petroleum-based chemicals. The first plant-based products have been successfully used in full-scale wood composite panel production. http://www.evertree-technologies.com/en/
Futuramat	The innovative technologies driving FuturaMat forward originate from labs of Valagro, a leading R&D facility focusing on using natural resources. FuturaMat has created a portfolio of compounds and products that provide quality alternatives to traditional plastics. https://futuramat.com/our-company/?lang=en

Biorefinery

AFYREN

About	AFYREN® is specialized in microbiology and bioprocess engineering to valorise non-food biomass into bioenergy and green chemistry. The process consists of two phases: In the biological phase 'building-blocks' are produced via the use of natural and non-GMO microbial community in a 'drop-in' approach. The second step (green chemistry) will then be used to transform the 'building-blocks' and leads to a large panel of high-value molecules, interesting for chemistry, biofuels, cosmetics and pharmaceutical industries.
Key figures	€60 million of financing secured in 2019 to move into its industrial development phase.
Target markets	AFRYEN is able to target markets that require very high standards of quality: from cosmetics to flavors and fragrances, human and animal nutrition and fine chemicals.
Partnerships	La Région Auvergne-Rhône-Alpes, Axelera, BPIFrance, l'Europe s'Engage en Auvergne, IAR, le Village, Innovation 2030, SOFICMAC Régions
Website	https://afyren.com/en

Knowledge institutes

INRA

About	INRA is one of the biggest agricultural research organisations in the world. It is active in a wide variety of fields to address issues related to nutrition, agriculture and the environment, which are now framed in the wider context of the bio-economy and food systems.
Key figures (2017)	Annual budget: €850.89 million Funding: 77% Ministry of Research People: community of 13.000 (permanent staff: 7.903; full time researchers: 1.849) Organisation: 1 head office and 17 regional research centres.
Research priorities	Within the context of #BioRes, three targets for the complementary use of biomass have been formulated: • Development of green and white biotechnologies • Biotechnological tools and processes for creating adapted resources • Design of bioeconomic systems
Partnerships	INRA has various MoU's and LOI's with Wageningen University & Research (WUR) During the period 2014 - 2017, INRA co-authored 766 publications in peer reviewed journals with the Netherlands, therefore the Netherlands is ranked as the 8th highest partner country for INRA. More than half of the publications is co-authored with the WUR.
Website	Institute website: http://institut.inra.fr/en Strategic orientations through to 2025: http://2025.inra.fr/en/

3BCAR - Carnot Institute

About	The Carnot network is a company-oriented R&D network supporting partners in development from laboratory research to pilot scale (TRL 6). The 3BCAR Institute (Bioenergy, Biomolecules and Biomaterials from Renewable Carbon) mobilizes two key levers for bio-economy emergence: Biotechnologies and Green chemistry; gathering multidisciplinary approaches from biomass production, biorefinery until functional properties.	
Key figures	Annual budget: €81.2 million (Global budget) Funding: €26.7 million from partnerships with industry People: permanent staff: 1.082 FTE	
Target markets	• Biomass production (crops, microalgaes) and plant biotechnologies • Biorefinery • Industrial biotechnologies • Green chemistry: lubricants, surfactants, solvents • Fine chemistry: cosmetic and biologically active molecules • Bioenergies: biofuel, biogas	• Bio-based materials • Ferments and enzymes • Environment and waste valorisation • Agro-industry • Territories management
Partnerships	Parent institutions include INRA, CNRS and ITERG. Carnot institutes researchers are linked with the international scientific community. They also lead numerous R&D contracts with foreign companies.	
Website	https://www.instituts-carnot.eu/en/carnot-institute/3bcar More info (French): https://3bcar.fr/qui-sommes-nous/documents-et-informations-utiles/	

ARD (Agro-Industrie Recherches et Développements)

About	ARD is a privately financed knowledge institute, specialising in industrial biotechnologies, plant chemistry and fractionation. Many agro-industrial stakeholders have joined forces with ARD to support innovation and invest in white biotechnologies. These include several companies with deep roots in the Champagne Ardenne region, such as Vivescia Industries, Cristal Union, Crédit Agricole du Nord Est, LRD (a union of alfalfa cooperatives), CRD (a union of grain cooperatives), and Unigrain. Based at the heart of France's Grand-Est region, ARD is expanding nationally and internationally on many high-potential markets thanks to partnerships and a commitment to social responsibility.
Key figures	85 employees; €12 million turnover; 80 patents filed in 20 years, 6400 m_2 pilot and industrial demonstration area, 2800m_2 laboratory area; 300 jobs created for 10 years at the Pomacle site
Areas of expertise	Biotechnology (industrial biotechnology and bio inputs), plant extraction, green chemistry https://www.a-r-d.fr/en/domaines-dexpertise
Clients	• Wheatoléo, a subsidiary of ARD, which has been producing green surfactants (made with pentoses and fatty acids), since 2008, which are now used in many applications such as detergents and plant health products. • BioAmber, (a former joint venture of DNP Green Technology and ARD), the first company to have developed a technology for the commercial-scale production of bio-based succinic acid. • Amyris, an American biotechnology company with a global reach • Total Corbion, a former Dutch agro-industrial group taken over by Total
Partnerships	https://www.a-r-d.fr/en/our-partners ; Grand Est, EU, GrandReims, BPI France, IA, UIC, Chimie du Végétal, TWB, Vegepolys, IBMA, Fondation Jacques de Bohan, CEBB, Centrale Supélec, AgroPartisTech, Neoma Business school, Université de Reims, Futurol Prochethol 2G Also, ARD is an active member of the IAR competitive cluster (see section Innovation Clusters)
Website	https://www.a-r-d.fr/en

CIRAD

About	CIRAD, the French Agricultural Research Centre for International Development, is an organisation working for the sustainable development of tropical and Mediterranean regions. It is a public establishment (EPIC) under the joint authority of the Ministry of Higher Education, Research and Innovation and the Ministry for Europe and Foreign Affairs. In France, it provides the national and global scientific communities with extensive research and training facilities, primarily in Montpellier and the French overseas regions.
Key figures	Budget €200 million; 1650 employees, including 800 researchers
Research objectives	food security, climate change, natural resource management, reduction of inequalities and poverty alleviation.
Partnerships	CIRAD has a network of partners on three continents, and of regional offices, from which it works with more than 100 countries. Its long-term partnership strategy centres on platforms in partnership for research and training (dPs), associating 200 organisations in the global South, to which 200 of its researchers are assigned (50% in Africa, 25% in Asia and 25% in South America). CIRAD is a member of several French consortiums: Agreenium/IAVFF, Montpellier University of Excellence (MUSE I-SITE) and national research alliances: AllEnvi, Aviesan and ANCRE. CIRAD is also project leader, in cooperation with WUR, in a so-called R&D program for (sub-Saharan) Africa: LEAP4FNSSA. The main objective is to provide a tool for European and African institutions to engage in a Sustainable Partnership Platform for research and innovation on Food and Nutrition Security, and Sustainable Agriculture (FNSSA). https://www.leap4fnssa.eu
Website	https://www.cirad.fr/en

IFP Energies Nouvelles

About	IFP Energies nouvelles (IFPEN) is a major research and training player in the fields of energy, transport and the environment. From research to industry, technological innovation is central to all its activities. As part of the public-interest mission with which it has been tasked by the public authorities, IFPEN focuses on: • Providing solutions to take up the challenges facing society in terms of energy and the climate, promoting the transition towards sustainable mobility and the emergence of a more diversified energy mix; • Creating wealth and jobs by supporting French and European economic activity, and the competitiveness of related industrial sectors. • An integral part of IFPEN, its graduate engineering school - IFP school - prepares future generations to take up these challenges.
Areas of expertise	Areas of expertise include: • Sustainable mobility • Renewable energies (bio-economy themes are biofuels, biogas and biomethane and bio-based chemistry) • Responsible oil and gas • Climate and environment
Website	https://www.ifpenergiesnouvelles.com/

CEA

About	The French Alternative Energies and Atomic Energy Commission (CEA) is a key player in research, development and innovation. The CEA is established in nine centres spread throughout France. It works in partnership with many other research bodies, local authorities and universities. Within this context, the CEA is a stakeholder in a series of national alliances set up to coordinate French research in energy (ANCRE), life sciences and health (AVIESAN), digital science and technology (ALLISTENE), environmental sciences (AllEnvi) and human and social sciences (ATHENA). Across its research activities bio-economy themes can be found, for example 2nd and 3rd generation biofuels http://www.cea.fr/english/Pages/research-areas/renewable-energies.aspx and biotechnology for health http://www.cea.fr/english/Pages/research-areas/technological-research-for-industry.aspx
Key figures (2016)	9 research centres; 4.1 billion budget; 51 joint research units; 422 ongoing European projects; 1601 technicians, researchers and staff
Research priorities/target markets	Key player in research, development and innovation in four main areas: • defence and security, • low carbon energies (nuclear and renewable energies), • technological research for industry, • fundamental research in the physical sciences and life sciences.
Partnerships	The CEA is active internationally in a variety of areas. As a multidisciplinary scientific and technological research organisation, it develops European and international collaborative programmes. It also performs sovereign missions entrusted to it by the State. It supports the deployment of French companies internationally. Finally, it works within the framework of the European Community.
Website	http://www.cea.fr/english

CNRS

About	The National Centre for Scientific Research is an interdisciplinary public research organisation under the administrative supervision of the French Ministry of Higher Education and Research. It is the only French organisation for multidisciplinary research, a key player in international research, as well as a recognised innovator. Within the CNRS Research Office (DGDS), the CNRS Institutes are the structures that implement the institution's scientific policy and oversee as well as coordinate the activities of laboratories. The ten CNRS Institutes cover more or less extensive scientific fields, share projects, and promote cooperation between disciplines. The Institute of Chemistry (INC) for example researches: • Chemistry of and for the living (exploration and development of new models and tools for pharmacology, biotechnology, medicine, cosmetics, the agri-food and agrochemical industries) • Green chemistry and sustainable development (creating new and cheaper chemical reactions that are also more effective, selective, and secure http://www.cnrs.fr/en/research
Key figures	3.3 billion budget: 77% of resources come from public service subsidies, and 23% from CNRS-generated income (research contracts, funding from calls for proposals, provision of services, etc.); 33000 people dedicated to research; 1144 research laboratories in France and abroad
Partnerships	CNRS has multiple forms of cooperation. From academic to industrial partnerships http://www.cnrs.fr/en/establishing-partnerships
Website	http://www.cnrs.fr/index.php/en

CTP

About	The Centre Technique du Papier is an Industrial Technical Centre, i.e. a French state-approved company whose strategic missions are: Promoting the development of the production and converting industry of Pulp, Paper and Board, in order to improve its high performances, its productivity, its competitiveness, in the due respect of the sustainable development requirements.
Key figures	121 employees; budget of 11,2 million
Partnerships	The Centre Technique du Papier is related to various partners: • French and international representatives, • Industrial and Technical Centres (French industrial organisations), • European and international Research Centres, • University or Institutional partners, • Continuous education network, • Etc.
Website	http://www.webctp.com/gb/

ITERG

About	ITERG is involved in the development of the fats and related products industries: fats, vegetable oils and co-products of oils, vegetable proteins and minor compounds derived from these products. ITERG provides companies with skills and infrastructures for Production, Research and Expertise. It contributes to the creation of value and the competitiveness of the industrial fabric, from upstream to downstream.
Key figures	A team of 75 people
Technology	• A platform of physico-chemical, sensory and biological chemical analysis laboratories • Oleochemical platform associated with OLEAD technology platform
Partnerships	Part of Institut Carnot LISA
Website	http://iterg.com/index.php/fr/home/

IRSTEA (National Institute for Environmental and Agricultural Science and Research)

About	For more than 30 years, Irstea has conducted environmental research focusing on water, environmental technologies and land development. On a "finalized" research model, its mission is to respond to the environmental and societal challenges of today and tomorrow. One of its research activities focuses on the bio-economy. From 1 January 2020, IRSTEA will merge with INRA. For the moment, it is not clear what their new name will be.
Key figures	1533 employees
Research priorities	• Natural, health and environmental risks • Bio-economy and Circular Economy of Bioresources and Effluents: Technologies for Actors • Adaptive resource management in territories under constraint of global change • Biodiversity: dynamics and management of ecosystems and ecosystem services.
Website	https://www.irstea.fr/en (partly in French)

CNRT Matériaux Caen

About	CNRT Matériaux (National Center for Technological Research) has as its main vocation to develop partnership research operations in the field of materials and chemistry, relying on the expertise of the fundamental research laboratories associated with it. Its objective is to produce, implement and apply scientific and technological knowledge responding to industrial, economic and societal issues. Its mission is to strengthen a high-level technological research partnership between public research and industry and the specific areas of functional and structural materials, be they organic, inorganic or composite. It also contributes to the development of the scientific potential in Normandy in areas such as transport (automotive, aerospace, nautical), electronics, energy, construction, health, food, cosmetics, mechanics and the environment.
Key figures	5 research laboratories; 2 laboratories of excellence; 15 yearly collaboration contracts
Website	http://www.cnrt.ensicaen.fr/ website in French

ADEME (French Environment & Energy Management Agency)

About	ADEME (an 'nterministerial agency) is active in the implementation of public policy in the areas of the environment, energy and sustainable development. ADEME provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action. As part of this work the agency helps finance projects, from research to implementation, in its areas of action. It also includes project in the bio-economy.
Research and innovation	ADEME's support of research, development and innovation falls under the objectives of the public policies that promote energy and the environment and especially those relating to energy transition. As a goal-setting agency, ADEME is responsible for guiding, scheduling and coordinating research in its areas of action: energy and climate; sustainable consumption, waste and material management; sustainable land management and preservation and remediation of environments (soil and air).
Website	https://www.ademe.fr/en

RMT Biomasse & Territioires

About	The RMT Biomasse & Territioires brings together, through an agreement, actors from different R & D and training organisations concerned with biomass involved in all stages of biomass research and development, from the territory to the factory. It is piloted by the Regional Chamber of Agriculture of Hauts-de-France. It aims to consolidate, capitalize and disseminate the knowledge already acquired, define priority areas of investigation, according to the needs of ongoing biomass projects, and build specific joint R & D projects. It maintains and strengthens a multidisciplinary network of 70 actors at the national level since 2008.
Partnerships	Among its associated partners are: • The resource centers, the transfer centers, the heads of the networks, the Cooperative Development Institutes and organisations which bring the vision of the field, make up the needs in order to set up operational actions • Institutional investors who consult RMT on national strategies and make it possible to frame the work of the network in line with the national challenges and objectives • Teaching and research that feed the network with the work and theses results and scientifically validates field feedback.
Website	https://www.biomasse-territoire.info/rmt-biomasse/ (French)

R&D programmes

- These fact sheets highlight the R&D programmes that have been suggested by the interviewees.
- Support from the Netherlands for applicants of European subsidies and finance, is given by RVO:
    - The bio-economy programmes within Horizon2020, including calls from the public-private-partnership Bio-Based Industries Joint Undertaking (BBI-JU): https://www.rvo.nl/subsidies-regelingen/horizon-2020/pijlers-horizon-2020/bio-economie
    - Support for Interreg (2014-2020): https://www.rvo.nl/subsidies-regelingen/interreg-2014-2020 (Dutch)
- Existing projects within Horizon2020 projects can be explored:
    - Horizon2020 dashboards: https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard Direct access to the interactive dashboards: https://webgate.ec.europa.eu/dashboard/hub
    - Mapping of the collaboration networks: https://cordis.europa.eu/datalab/datalab.php

European research programmes

Bio-based Industries Consortium

About	BIC is a non-profit organisation set up in Brussels in 2013. BIC represents the private sector in a Public-Private Partnership (PPP) with the European Commission, also known as the Bio-Based Industries Joint Undertaking (BBI JU). It is host to a unique mix of sectors including agriculture, agro-food, technology providers, forest-based sector, chemicals and energy.
Budget	BIC aims to invest € 3.7 billion in bio-based innovation between 2014 and 2020.
Funded by	• EU contribution (Horizon 2020): €975 million • Bio-based Industries Consortium: €2.7 billion
Period	2014-2020
Goals	The Strategic Innovation and Research Agenda (SIRA) is based on 4 pillars: • foster supply of sustainable biomass feedstock to feed both existing and new value chains; • optimise efficient processing for integrated biorefineries through research, development and innovation (R&D&I); • develop innovative bio-based products for identified market applications; and • create and accelerate the market-uptake of bio-based products and applications. Annual work plans (AWP) translate the strategic orientations into calls for proposals, grouped by TRL level: https://www.bbi-europe.eu/sites/default/files/awp2018.pdf
Partners	BIC has over 100 full members. A listing is available: https://biconsortium.eu/membership/full-members. SMEs are represented in clusters.
Website	https://biconsortium.eu/ , www.bbi-europe.eu

Eurostars

About	Eurostars supports international innovative projects led by research and development- performing small- and medium-sized enterprises (R&D-performing SMEs). With its bottom-up approach, Eurostars supports the development of rapidly marketable innovative products, processes and services that help improve the daily lives of people around the world.
Budget	• Eurostars is backed by €861 million of national funding from its countries. • It is further supported by €287 million of EU funds, for a total of €1.14 billion.
Funded by	Eurostars is a joint programme between EUREKA and the European Commission, co-funded from the national budgets of 36 Eurostars Participating States and Partner Countries and by the European Union through Horizon 2020.
Period	2014-2020
Website	https://www.eurostars-eureka.eu/

H2020 - Societal Challenges

About	Horizon 2020 reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere. A challenge-based approach will bring together resources and knowledge across different fields, technologies and disciplines. This will cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds and support for public procurement and market uptake. Funding on topics related to the bio-based economy can be found in the following challenges: • challenge 1: Health, demographic change and wellbeing • challenge 2: Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bio-economy. The Work Programme 2018 - 2020 includes calls on Blue Growth, Rural Renaissance (with topics organising sustainable food and non-food value chains under changing conditions and other actions (mainly different types of meetings on the topic of bio-economy). • challenge 3: Secure, clean and efficient energy • challenge 4: Smart, green and integrated transport • challenge 5: Climate action, environment, resource efficiency and raw materials. The Work Programme for 2018 - 2020 focuses on moving to a more resource efficient and climate-resilient economy, including circular economy.
Budget	€30.000 million
Funded by	European Commission
Period	2014 - 2020
Website	https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

H2020 - Excellent Science

About	The Excellent Science pillar has main four specific objectives: • The European Research Council (ERC) will provide attractive and flexible funding to enable talented and creative individual researchers and their teams to pursue the most promising avenues at the frontier of science, on the basis of Union-wide competition. • Marie Skłodowska-Curie Actions will provide excellent and innovative research training as well as attractive career and knowledge-exchange opportunities through cross-border and cross-sector mobility of researchers to best prepare them to face current and future societal challenges. • Research infrastructure (including e-infrastructures) will develop European research infrastructure for 2020 and beyond, foster their innovation potential and human capital, and complement this with the related Union policy and international cooperation. • These activities are largely 'bottom-up' and investigator-driven, meaning that proposals on topics of the bio-based economy can be submitted. This way, the European scientific community will play a strong role in determining the avenues of research followed under the programme.
Budget	€25 billion
Funded by	European Commission
Period	2014 - 2020
Goals	Activities under this Pillar aim to reinforce and extend the excellence of the Union's science base and to consolidate the European Research Area in order to make the Union's research and innovation system more competitive on a global scale.
Website	https://ec.europa.eu/programmes/horizon2020/en/h2020-section/excellent-science

H2020 - Industrial leadership - Leadership in enabling & industrial technologies (LEITs), including KET

About	Key Enabling Technologies (KET) are investments and technologies that will allow European industries to retain competitiveness and capitalise on new markets. It also focuses on challenges such as the need for energy and resources to be efficient. Relevant KET topics are: • Biotechnology applies scientific and engineering principles on living organisms. On one hand, it serves to improve industrial processes and on the other hand, it allows the competitive, sustainable and innovative production of materials, chemicals and fuels. In this way, biotechnology supports European industries with its scientific, technological and innovation base. • Sustainable development is key for the manufacturing sector in Europe. We need to invest in new engineering leading to flexible manufacturing, clean processes, and improved production processes, to increase the competitiveness of its industry in a sustainable and energy-efficient way.
Budget	€ 13.557 million for LEIT
Funded by	European Commission
Period	2014 - 2020
Website	https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges

LIFE - Climate action sub-programme

About	The LIFE programme is the EU's funding instrument for the environment and climate action created in 1992. It includes 2 sub-programmes. The Environment sub-programme provides funds for nature conservation and biodiversity, environment and resource efficiency, environmental governance and information. The Climate action sub-programme provides funds for climate change mitigation, climate change adaptation, climate governance and information.
Budget	€3.4 billion. Projects receive a co-funding of up to 55%.
Funded by	European Commission
Period	2014 - 2020
Goals	LIFE co-finances projects in the environmental sector in particular in the areas of air, chemicals, green and circular economy, industrial accidents, marine and coastal management, noise, soil, waste, water, and the urban environment. The programme provides action grants for pilot and demonstration projects to develop, test and demonstrate policy or management approaches. It also covers the development and demonstration of innovative technologies, implementation, monitoring and evaluation of EU environmental policy and law, as well as best practices and solutions. The European Commission is particularly looking for technologies and solutions that are ready to be implemented in close-to-market conditions, at industrial or commercial scale, during the project duration. You can decide if you want to run a project on your own, or if you prefer to join forces with partners from your own or another country.
Website	https://ec.europa.eu/easme/en/section/life/life-environment-sub-programme

INTERREG

About	Interreg is one of the key instruments of the European Union (EU) supporting cooperation across borders through project funding. Its aim is to jointly tackle common challenges and find shared solutions in fields such as health, environment, research, education, transport, sustainable energy and more. Interreg is one of the two goals of the EU Cohesion Policy in the 2014-2020 period. Interreg V (the current Interreg programme) funds cross border projects (cooperation between regions from at least two different Member States lying directly on the borders or adjacent to them), transnational projects (also known as Interreg B, involves regions from several countries of the EU forming bigger areas where it aims to promote better cooperation and regional development within the Union by a joint approach to tackle common issues) and and interregional projects (also known as Interreg C, involves programmes covering "pan-European" vast areas).
Budget	€ 10.1 billion
Funded by	the European Regional Development Fund (ERDF)
Period	2014 - 2020
Goals	Interreg supports the EU Cohesion policy: it promotes economic and social cohesion, and aims to reduce disparities between the various regions and the backwardness of the least-favoured regions. The idea is that cohesion policy should also promote more balanced, more sustainable 'territorial development' – a broader concept than regional policy.
Website	https://www.rvo.nl/subsidies-regelingen/interreg-2014-2020 (Dutch)

Long-term research programmes for non-food

'Biomass for Future' (BFF) at INRA 2012-2020

About	The BFF project is led by the Jean-Pierre Bourdin Institute (IJPB) at the INRA centre in Versailles-Grignon, one of the largest European research institutes in the field of animal and plant biology. The goal is to design and implement an infrastructure to support the production and industrial use of miscanthus and sorghum biomass in the pioneering communities.
Coordinator	INRA
Funded by	Biomass For the Future (BFF) is one of the 8 winning projects chosen in the second call for Biotechnology and Bioresources projects in the Health and Biotechnology excellence category of the Investments in the Future
Partners	22 partners (9 public laboratories, 1 technical institute, 10 SMEs and large groups working in biotechnology, agronomy, seed, construction composites and materials, and 2 urban municipalities)
Website	https://www.inra-transfert.fr/en/actualites/102-8-projets/308-bff-biomass-for-the-future

AKER

About	The AKER programme aims to improve the competitiveness of sugar beet in France in an international context that is marked by increasing global demand and the predominance of sugar cane. It focuses on research, development and training, and aims to double the annual increase of sugar beet yield from 2% to 4% and contribute to the development of sugar beet as a crop and industry reference. The 8-year AKER programme forms part of the 'Programme d'Investissements d'Avenir' launched by the French Authorities as part of the 'Agence Nationale de la Recherche'.
Budget	€ 18.5 million
Funded by	supported by 11 public and private partners in the French beet-sugar-alcohol sector.
Period	2012-2020 and beyond
Website	http://www.aker-betterave.fr/en/

Overview of bio-based Horizon2020 projects

Selection of H2020 projects.

Source: https://webgate.ec.europa.eu/dashboard/hub

(Search terms: Country EQUALS "France"; Type of Action: CONTAINS "Bio-based")

Project Title	Project Acronym	H2020 EU Contribution	CORDIS link	Topic description
Flagship demonstration of industrial scale production of nutrient Resources from Mealworms to develop a bioeconomY New Generation	FARMYNG	€ 17.915.212	http://cordis.europa.eu/project/id/837750	Large-scale production of proteins for food and feed applications from alternative, sustainable sources. The company Ynsect launched this project.
OPTimized conversion of residual wheat straw to bio-ISObutene for bio based CHEMicals	OPTISOCHEM	€ 5.314.587	http://cordis.europa.eu/project/id/744330	Optimise technical production routes to bio-based chemicals in bio- or chemo-catalytic processes
ValChem - Value added Chemical building blocks and lignin from wood	ValChem	€ 3.493.097	http://cordis.europa.eu/project/id/669065	Chemical building blocks and value-added materials through integrated processing of wood
From forest to feed: enable the wood industry to bridge the protein gap	SYLFEED	€ 2.770.141	http://cordis.europa.eu/project/id/745591	New sources of proteins for animal feed from co-products to address the EU protein gap
Zero Waste Ligno-Cellulosic Biorefineries by Integrated Lignin Valorisation	Zelcor	€ 2.090.150	http://cordis.europa.eu/project/id/720303	Conversion of lignin-rich streams from biorefineries
Sustainable structural and multifunctional biocomposites from hybrid natural fibres and bio-based polymers	SSUCHY	€ 2.040.290	http://cordis.europa.eu/project/id/744349	Biopolymers with advanced functionalities for high performance applications
Algae for a biomass applied to the production of added value compounds	ABACUS	€ 2.021.171	http://cordis.europa.eu/project/id/745668	Exploiting algae and other aquatic biomass for production of molecules for pharma, nutraceuticals, food additives and cosmetic applications

Production and deploying of high purity lignin and affordable platform chemicals through wood-based sugars	SWEETWOODS	€ 1.778.470	http://cordis.europa.eu/project/id/792061	Integrated 'zero waste' biorefinery utilising all fractions of the feedstock for production of chemicals and materials
Production of phycocyanin from the spirulina arthrospira sp. Revisiting the sourcing, extraction and co-valorization of the whole algae in the frame of an industrial biorefinery concept	SpiralG	€ 1.684.463	http://cordis.europa.eu/project/id/792257	Integrated multi-valorisation of algae into advanced materials and high added-value additives
Process developments for a recyclable and compostable all-cellulose multilayer material for packaging	CelluWiz	€ 1.512.250	http://cordis.europa.eu/project/id/838056	Develop bio-based packaging products that are biodegradable/ compostable and/or recyclable
GRowing Advanced industrial Crops on marginal lands for biorEfineries	GRACE	€ 1.509.989	http://cordis.europa.eu/project/id/745012	Improvement and adaptation of industrial crop varieties and novel sources of biomass to diversify biomass feedstock for biorefineries
Bio-based recyclable, reshapable and repairable (3R) fibre-reinforced EpOXY composites for automotive and construction sectors.	ECOXY	€ 1.301.225	http://cordis.europa.eu/project/id/744311	Biopolymers with advanced functionalities for high performance applications
Extremozymes for wood-based building blocks: From pulp mill to board and insulation products	WoodZymes	€ 983.106	http://cordis.europa.eu/project/id/792070	Exploiting extremophiles and extremozymes to broaden the processing conditions to convert biomass into high-value building blocks
Microalgae As a Green source for Nutritional Ingredients for Food/Feed and Ingredients for Cosmetics by cost-Effective New Technologies	MAGNIFICENT	€ 847.704	http://cordis.europa.eu/project/id/745754	Exploiting algae and other aquatic biomass for production of molecules for pharma, nutraceuticals, food additives and cosmetic applications
Bio-based smart packaging for enhanced preservation of food quality.	BIOSMART	€ 847.301	http://cordis.europa.eu/project/id/745762	Advanced biomaterials for smart food packaging
Unlocking the potential of Sustainable BiodegradabLe Packaging	USABLE PACKAGING	€ 782.157	http://cordis.europa.eu/project/id/836884	Develop bio-based packaging products that are biodegradable/ compostable and/or recyclable
Lignin oxidation technology for versatile lignin dispersants	LigniOx	€ 684.688	http://cordis.europa.eu/project/id/745246	Valorisation of lignin and other side-streams to increase efficiency of

				biorefineries and increase sustainability of the whole value chain
Innovative structured polysaccharides-based materials for recyclable and biodegradable flexible packaging	SHERPACK	€ 642.195	http://cordis.europa.eu/project/id/745718	Advanced biomaterials for smart food packaging
Revalorisation of vegetable processing industry remnants into high-value functional proteins and other food ingredients	GreenProtein	€ 629.604	http://cordis.europa.eu/project/id/720728	Valorisation of agricultural residues and side streams from the agro-food industry
Sustainable multifunctional fertilizer – combining bio-coatings, probiotics and struvite for phosphorus and iron supply	SUSFERT	€ 628.294	http://cordis.europa.eu/project/id/792021	Innovative bio-based fertilising products to increase the sustainability of fertilising practices in agriculture
High performance functional bio-based polymers for skin-contact products in biomedical, cosmetic and sanitary industry	POLYBIOSKIN	€ 610.801	http://cordis.europa.eu/project/id/745839	Biopolymers with advanced functionalities for high performance applications
Conversion of diluted mixed urban bio-wastes into sustainable materials and products in flexible purple photobiorefineries	DEEP PURPLE	€ 499.815	http://cordis.europa.eu/project/id/837998	Find solutions to dilution, pollution and content diversity challenges to turn mixed urban bio-waste (1) into sustainable feedstock for the bio-based industry
BIO-based products from FORestry via Economically Viable European Routes	BIOFOREVER	€ 489.499	http://cordis.europa.eu/project/id/720710	Lignocellulosic feedstocks into chemical building blocks and high added value products
Efficient forestry by precision planning and management for sustainable environment and cost-competitive bio-based industry	EFFORTE	€ 430.696	http://cordis.europa.eu/project/id/720712	Practices increasing effectiveness of forest management
AQUAculture and Agriculture BIOmass side stream PROteins and bioactives for Feed, FITness and health promoting nutritional supplements	AQUABIOPROFIT	€ 429.750	http://cordis.europa.eu/project/id/790956	Proteins and other bioactive ingredients from side streams and residues
Validation of an industrial process to manufacture isosorbide bis(methyl carbonate) at pilot level	VIPRISCAR	€ 406.000	http://cordis.europa.eu/project/id/790440	Novel secondary bio-based chemicals without significant fossil-based counterparts but with high application potential
UNique Refinery Approach to Valorise European Lignocellulosics	UNRAVEL	€ 403.889	http://cordis.europa.eu/project/id/792004	Innovative technologies for the pre-treatment and separation of

				lignocellulosic feedstock and complex composition streams into valuable fractions while maintaining key characteristics
Demonstration of an integrated innovative biorefinery for the transformation of Municipal Solid Waste (MSW) into new BioBased products (URBIOFIN)	URBIOFIN	€ 402.816	http://cordis.europa.eu/project/id/745785	Valorisation of the organic content of Municipal Solid Waste and contributing to the renewable circular economy
BIOSKOH's Innovation Stepping Stones for a novel European Second Generation BioEconomy	BIOSKOH	€ 360.301	http://cordis.europa.eu/project/id/709557	From lignocellulosic feedstock to advanced bio-based chemicals, materials or ethanol
PROcesses for Value added fibres by Innovative Deep Eutectic Solvents	PROVIDES	€ 349.625	http://cordis.europa.eu/project/id/668970	New sustainable pulping technologies
Development of novel functional proteins and bioactive ingredients from rapeseed, olive, tomato and citrus fruit side streams for applications in food, cosmetics, pet food and adhesives	Pro-Enrich	€ 287.500	http://cordis.europa.eu/project/id/792050	Proteins and other bioactive ingredients from side streams and residues
Optimal utilization of seafood side-streams through the design of new holistic process lines	WASEABI	€ 274.500	http://cordis.europa.eu/project/id/837726	Resolve logistical, infrastructural and technological challenges to valorise residual and side streams from aquaculture, fisheries and the aquatic biomass processing industries
Valuable Products from Algae Using New Magnetic Cultivation and Extraction Techniques	VALUEMAG	€ 256.250	http://cordis.europa.eu/project/id/745695	Exploiting algae and other aquatic biomass for production of molecules for pharma, nutraceuticals, food additives and cosmetic applications
Nutrient recovery from biobased Waste for Fertilizer production	NewFert	€ 202.716	http://cordis.europa.eu/project/id/668128	Nutrient recovery from biobased waste streams and residues
Green chemicals and technologies for the wood-to-textile value chain	GRETE	€ 200.288	http://cordis.europa.eu/project/id/837527	Apply emerging breakthrough technologies to improve existing value chains
Direct and indirect biorefinery technologies for conversion of organic side-streams into multiple marketable products	InDIRECT	€ 175.000	http://cordis.europa.eu/project/id/720715	Innovative efficient biorefinery technologies

Production of functional innovative ingredients from paper and agro-food side-streams through sustainable and efficient tailor-made biotechnological processes for food, feed, pharma and cosmetics	INGREEN	€ 161.863	http://cordis.europa.eu/project/id/838120	Produce sustainable and cost-efficient high-performance functional ingredients from alternative sources
Integrated cascades of PROcesses for the extraction and valorisation of proteins and bioactive molecules from Legumes, Fungi and Coffee agro-industrial side streams	Prolific	€ 150.238	http://cordis.europa.eu/project/id/790157	Proteins and other bioactive ingredients from side streams and residues
First-of-its-kind, large-scale, lowest-cost, zero-waste biorefinery for the production of proteins for food and feed application from low cost sustainable feedstocks.	PLENITUDE	€ 142.660	http://cordis.europa.eu/project/id/838104	Large-scale production of proteins for food and feed applications from alternative, sustainable sources
Flagship demonstration of an integrated plant towards large scale supply and market assessment of MFC	EXILVA	€ 130.375	http://cordis.europa.eu/project/id/709746	Valorisation of cellulose into new added value products
Advanced Eco-designed Fibres and Films for large consumer products from biobased polyamides and polyesters in a circular EConomy perspecTIVE	EFFECTIVE	€ 84.132	http://cordis.europa.eu/project/id/792195	Advanced bio-based fibres and materials for large-volume applications
FRESH - Fully bio based and bio degradable ready meal packaging	FRESH	€ 0	http://cordis.europa.eu/project/id/720739	Innovative cellulose-based composite packaging solutions
Life Integrated Process for the Enzymatic Splitting of triglycerides	LIPES	€ 0	http://cordis.europa.eu/project/id/720743	High purity bio-based intermediates and end products from vegetable oils and fats
From bio-based feedstocks via di-acids to multiple advanced bio-based materials with a preference for polyethylene furanoate	PEFerence	€ 0	http://cordis.europa.eu/project/id/744409	Converting bio-based feedstocks via chemical building blocks into advanced materials for market applications
New processes for the fermentative production of glycolipid biosurfactants and sialylated carbohydrates	CARBOSURF	€ 0	http://cordis.europa.eu/project/id/669003	Fermentation processes to obtain biosurfactants and specialty carbohydrates from agricultural and agro-industrial streams

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