



Innovation and monitoring - pillars for sustainable development of the Bioeconomy in Europe:

Balancing between Food, Feed, Biofuels and Biobased Products

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«Innovating for Sustainable Growth: A Bioeconomy for Europe»
Bioeconomy Strategy and Action Plan

Accompanying Staff Working Document

- Section A: Background to the Bioeconomy Strategy and Detailed Action Plan
- Section B: Estimating the impact of EU level research funding and better policy interaction in Bioeconomy

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Bio-economy's fundamentals

The goal of the bio-economy is "a more innovative and low-emissions economy, reconciling demands for sustainable agriculture and fisheries, food security, and the sustainable use of renewable biological resources for industrial purposes, while ensuring biodiversity and environmental protection"

The term "Bioeconomy" is defined as an "economy using biological resources from the land and sea, as well as waste, as inputs to food and feed, industrial and energy production. It also covers the use of bio-based processes for sustainable industries"

The bio-economy encompasses the sectors of agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. Its sectors and industries have strong innovation potential due to their use of a wide range of sciences, enabling and industrial technologies, along with local and tacit knowledge

Bio-economy's fundamentals

*The bio-economy's cross-cutting nature offers a unique opportunity to **comprehensively tackle inter-connected societal challenges** such as food security, natural resource scarcity, fossil resource dependence and climate change, **while achieving sustainable development** that implies also economic growth and job creation, in line with the main objectives of the Europe 2020 Strategy.*

Bio-economy tackles with:

1. the production of renewable biological resources, and
2. the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products (e.g. bio-based chemicals and plastics) and bioenergy

Provides and protects public goods ecosystems, such as clean air and water, fertile and functioning soils, landscapes, sustainable marine ecosystems and biodiversity, and addresses social needs.

Applies a wide array of sciences (e.g. life sciences, agronomy, ecology, forestry-, fisheries- and social sciences) and enabling and industrial technologies (e.g. biotechnology, nanotechnology and ICT), using local and tacit knowledge.

The Bioeconomy Strategy and Action Plan

INVESTMENTS IN RESEARCH, INNOVATION AND SKILLS

- Ensure substantial EU and national funding for bioeconomy and innovation
- Increase the share of multi-disciplinary and cross-sectoral research and innovation
- Promote the uptake and diffusion of innovation in bioeconomy sectors; create feedback mechanisms on regulation and policy
- Build the human capacity required to support growth and integration of bioeconomy sectors

REINFORCED POLICY INTERACTION AND STAKEHOLDER ENGAGEMENT

- Create a Bioeconomy Panel to enhancing synergies and coherence between policies; foster participation of researchers, end-users, policy-makers and civil society
- Establish a Bioeconomy Observatory and develop forward-looking and modelling tools
- Support the development of regional and national bioeconomy strategies
- Develop international cooperation to jointly address global challenges (e.g. food security, climate change)

ENHANCEMENT OF MARKETS AND COMPETITIVENESS IN BIOECONOMY SECTORS

- Provide the knowledge-base for sustainable intensification of primary production; improve understanding of biomass/biowaste availability and demand;
- Promote the setting up of networks for integrated and diversified biorefineries; establish a PPP for bio-based industries
- Support expansion of new markets; facilitate green procurement for bio-based products
- Develop science-based approaches to inform consumers about product properties

EU Institutions

Member States

Stakeholders

International
Organisations

Innovating for and Monitoring the Bioeconomy

DG RTD: A “Europe 2020 Strategy” initiative – Innovation Union, includes the creation of EIPs (European Innovation Partnerships)

Objective: Join-up resources to speed-up breakthrough innovations Tackling Europe’s major societal challenges, whilst creating new market potential for EU businesses

DG JRC:

- ***Research activities, related to bioeconomy and innovation impact, performed in various directorates of DG JRC***
- ***Contributions to the design and production of the Bioeconomy Observatory***

DG RTD: Innovation Union

European Innovation Partnerships

Approach:

- Challenge-driven
 - ⇒ *address target within a specific societal challenge*
- Acting across whole research & innovation chain
 - ⇒ *bring together supply and demand, across sectors and borders*
 - ⇒ *foster communication among stakeholders and workable links between science and practice (from research to market)*
- Streamlining, simplifying and coordinating existing instruments and initiatives

The EIP is not a funding instrument, nor a programme instrument; it cannot take decisions in areas for which Member States and/or the EU are competent

Existing initiatives are keeping their own identity and lifecycle and can use the EIP as a platform for adjusting their own priorities and for contributing to its overall target

EC: Innovation Union

EIP “Agricultural Productivity and Sustainability”

COM (2012) 79

Areas of innovative actions:

- *Increased agricultural productivity, output, and resource efficiency*
- *Innovation in support of the bio-based economy*
- *Biodiversity, Ecosystem services, and soil functionality*
- *Innovative products and services for the integrated supply chain*
- *Food quality, food safety and healthy lifestyles*

A policy interaction model for the bioeconomy

Bioeconomy Panel – Flexible discussion platform

- Supports interactions for
- Advice on implementation of the Strategy
 - Suggestions for European joint actions and measures
 - Monitoring and evaluation of progress
- Involves actors from
- EC services (incl. RTD, AGRI, ENTR, ENV, MARE)
 - MS representatives from relevant ministries
 - Stakeholders representatives (industry associations; scientific community; farmers, foresters, fishermen; NGO)

Informed dialogue

Bioeconomy Stakeholders' Conference

Awareness raising and informed dialogue for:

- Researchers
- Stakeholders
- Policy makers
- Civil society

Support to monitoring and policy-making

Bioeconomy Observatory

- Capacity mapping
- Technology watch
- Bioeconomy policy outlook
- Market monitoring
- Forward looking activities

Expertise through ad-hoc hearings

- Existing working/advisory groups and committees (e.g. SCAR, AG for LMI on bio-based products)
- Stakeholders groups
- EIP; Publ-Publ Partnering; Publ-Priv Partnerships

1. Follows the evolution of bioeconomy markets and the impacts (socio-economic, scientific, technological, market and legislation) of policies, where such mechanisms do not yet exist, as well as research and innovation activities affecting the bioeconomy in Europe and beyond.

Supports existing databases and develop new databases and indicators for bioeconomy impacts analyses, EU and global models integrating economic both macro and sectors levels, environment, technological development and territorial dimensions.

Links the system to a global monitoring system to follow the world-wide developments and impacts of the bioeconomy, with a focus on strategic third countries partners and also to guide international co-operation strategies (including in Horizon 2020).

Reviews regularly the progress and delivery of EU and national/regional bio-economy strategies, including research and innovation by Horizon 2020.

2. Produces regular foresights and forecasts and updates of ex-ante impacts assessments for the bio-economy, contributing to policies' orientations as well as research and innovation directions.

3. Contributes to the mapping of EU, national and regional bio-economy policies, research and innovation capacities, activities and infrastructures, as well as public and private investments in research and innovation. Produce regularly: **Capacities Maps; Technology Maps; Policies Maps; Projects Maps**



Integration and use of socio-economic and environmental data, metadata and models for monitoring bio-economy's progress and impact

Monitoring – by a set of core indicators - the evolution of bioeconomy markets and (socio-economic, scientific, technological, market and regulation) impacts of policies, as well as research and innovation activities affecting the bioeconomy in Europe and beyond

Lab-to-market monitoring of S&T advances in bio-economy and identification of research –development-market chain 's mismatches:

- relevant scientific outcomes and patents*
- bioeconomy-related technology watch*
- market monitoring (emerging products, value chains and companies)*

Make available and facilitate effective access to and use of these data and information provided by the involved partners through a web portal and a clearinghouse for accessing data and information(e.g. standards, best practices, main tendencies etc.)

Mapping the EU, national and regional policies, research and innovation capacities, activities and infrastructures, as well as public and private investments in research and innovation pertaining to bio-economy

Elaborating Capacities, Technology, Policies and Projects Maps for the bio-economy

Produce regular foresights and forecasts, updates of ex-ante impacts assessments for the bio-economy, model-based scenario analyses (aiming at supporting policies, research and innovation directions)

Model-based scenarios testing

Lifecycle-based sustainability evaluation of new bio-technologies and bio-based products

DG JRC: brainstorming with stakeholders

Identify the scope of activities of the Bioeconomy Observatory.

- 1. Sectors included under the "bioeconomy"**
- 2. Data collected (incl. mapping of existing data and of missing data)**
- 3. Key indicators produced from data collection**
- 4. Key stakeholders active in the "bioeconomy"**

Ensuring greater science-based bio-economy policy coherence

Provide the knowledge-base related to the feedstock and demand of biomass across sectors, taking into account added value, sustainability, market development and environmental impact

Support for developing standards and methodologies for sustainability assessment of feedstock, intermediate outputs (feedstock crop, water, land, energy) and bio-based products (bio-based chemicals, materials and fuels), e.g. using life cycle assessments (LCAs), bio-based products' environmental footprints, etc

Public acceptance: Develop science-based approaches to inform consumers about product properties (e.g. nutritional benefits, production methods and environment sustainability) and economic and social implications of the bio-economy

Contributing to defining research and innovation pathways and policy-making directions

DG JRC: Research in support of the Bioeconomy

Examples

1. Institute for Environment and Sustainability

Spatial allocation and land functions modelling, using a biomass module and other blocks for natural resources demand and supply

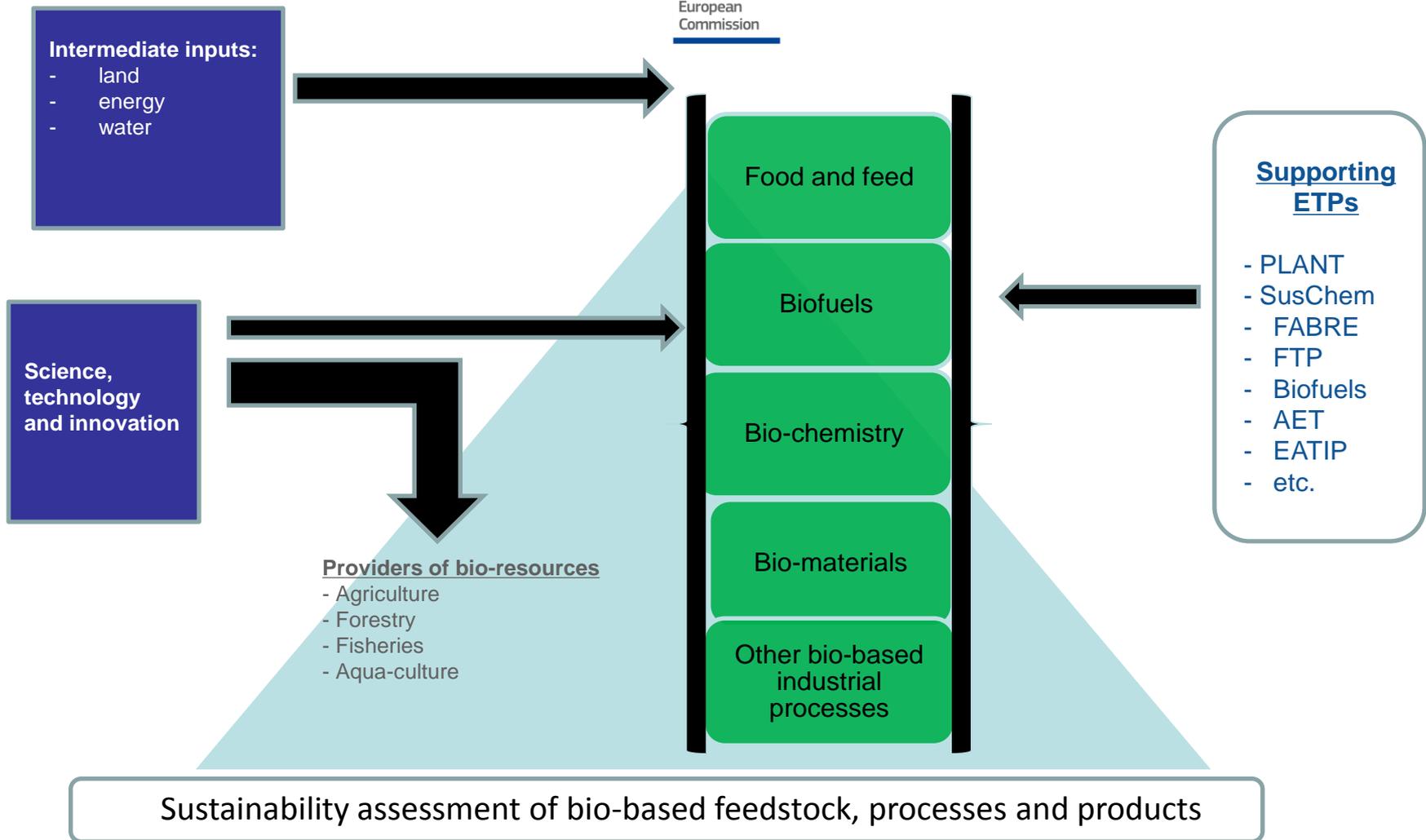
2. Institute for Energy and Transport

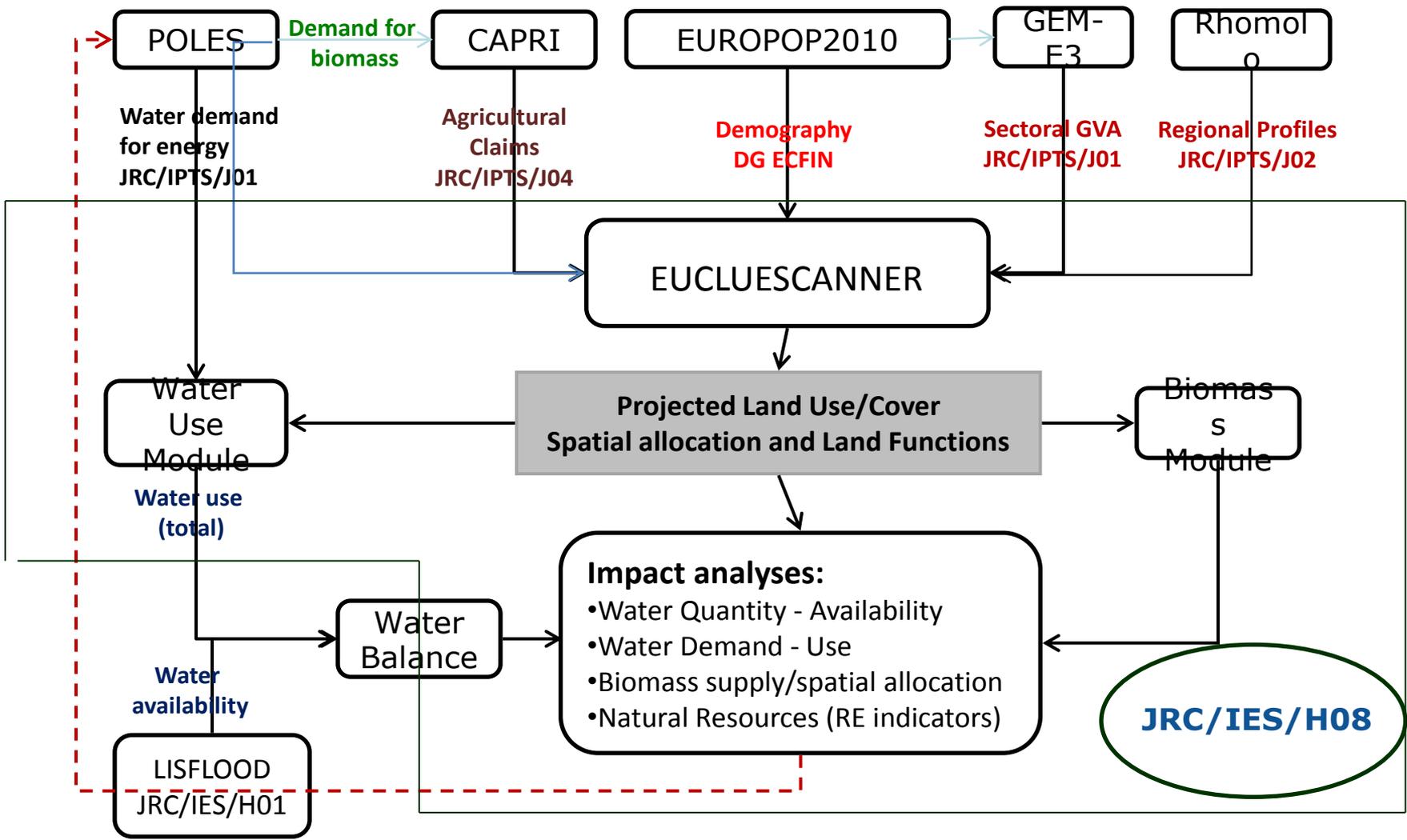
Demand and supply of various types of biofuels
Alternative biofuels

The study report is available at:

<http://iet.jrc.ec.europa.eu/about-jec>

JEC Consortium centralised mail address: infoJEC@jrc.ec.europa.eu





DG JRC/ IET: JEC Biofuels Programme

Develop a consensus demand and supply picture of biofuel types and availability needed to meet the 2020 Renewable Energy Directive target

→ *European Energy and Transport industries' research organisations involved on equal footing*

Review and analyse data and projections for 2008-2020

- Biodiesel, ethanol, etc., including conventional and advanced products
- Consider domestic production and imports
- Include most recent updates on WTW energy and GHG implications

Analyse possible biofuel implementation scenarios within the 2010-2020 regulatory framework and beyond.

Next Decade for Fuel Alternatives



- Renewables in transport fuels mandated to 10% (energy basis) by 2020
- Conventional biofuels widely available but with sustainability concerns
- Slower than expected pace of development for advanced biofuels
- Pace/priorities differ across Member States, potentially leading to fuel diversity
- CEN specifications are struggling to keep pace with legislative mandates

	Biofuel Type	Demand Outlook (Scenarios)	Demand Outlook (Scenarios & parameter variation)
Conventional Biofuels	Bio-ethanol from fermentation	Up to 8.5 Mtoe	Up to 12 Mtoe
	FAME (and FAEE)	Up to 17.5 Mtoe	Up to 19 Mtoe
Advanced Biofuels	Bio-ethanol from lignocellulose	0.6 Mtoe	1.3 Mtoe
	Hydrogenated Natural Oils (HVO)	3.0 Mtoe	4.5 Mtoe
	Biomass to Liquids (BTL)	0.25 Mtoe	0.5 Mtoe
Other Renewables	Biogas	Up to 0.7 Mtoe	Up to 1.0 Mtoe
	Electric from renewables	Up to 0.5 Mtoe	Up to 1.0 Mtoe

Questions: will these quantities be available for European use...

- From domestic production / from imports?
- From sustainable sources meeting GHG reduction targets?
- At what costs?



THANK YOU!

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