EERA Bioenergy Position Paper

Unlocking the Full Potential of Bioenergy and Biobased Technologies in FP10: A strategic path to resource-efficient and sustainable climate neutrality, resilience, and industrial sovereignty

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1. Key messages

EERA Bioenergy calls for a robust and future-oriented FP10 that empowers sustainable bioenergy and biobased systems as cornerstones of Europe's energy transition, strategic autonomy, and circular economy. To fully realise the potential of the bio-based sector and improve upon Horizon Europe's foundations, FP10 must:

- Remove the artificial division and merge the usually combined energy and non-energy uses of biomass, and prioritise the role of biomass as a renewable carbon source.
- Support integrated value chains and networks, including biomass supply, process technologies, cascading and circularity as well as end-use, through inter- and transdisciplinary as well as cross-sectoral and cross-cluster collaboration.
- Support multiproduct technology approaches (such as biorefineries) and multifunctional products (like energy carriers or chemical intermediates) that are independent of their end use and as hybrids of biomass and other renewable sources.
- Support the valorisation of all biobased outputs (like by-products and side-streams such as digestate, aqueous side-streams, CO_2, ashes, heat).
- Support the creation of regional biohubs for raw materials, products and by-products taking into account also quality, carbon cycle length, and climate value.
- Enable longer project durations and multi-phase funding to support successful innovation pathways for more complex technologies.
- Facilitate agile and rapid deployment of project ideas to concrete projects, with shorter time-to-action mechanisms.
- Promote the creation and long-term retention of qualified employment in bioenergy and biobased innovation systems, ensuring that training efforts translate into sustainable career opportunities and that human capital is anchored in Europe's green and circular economy value chains.
- Engage in dialogue with EU institutions and stakeholders to explain, refine and collaboratively advance the proposals outlined in this position paper. EERA Bioenergy stands ready to contribute with its technical expertise and coordinated input from across Europe.

2. EERA Bioenergy at a Glance

EERA Bioenergy (EERA JP Bioenergy) is a Joint Programme of the European Energy Research Alliance representing over 40 leading research institutions in the field of bioenergy and biobased technologies. Since 2016, BIOPLAT (Spanish Technology and Innovation Platform on Biocircularity) has served as the Secretariat of the JP, coordinating its strategic input into EU R&I policy. The programme contributes to strengthening Europe's capacity to design, develop, and scale innovative biobased solutions aligned with the SET-Plan, Green Deal, REPowerEU, and Fit-for-55 objectives.

3. Strategic needs for bioenergy and biobased technologies R&I in FP10

3.1. Rethinking Project Timeframes: Matching Technology Complexity with Realistic Horizons

The current 3–5 year timeframe typical of EU-funded R&I projects may be suitable for rapidly deployable renewable technologies, such as those known from PV and wind. However, it proves insufficient for technology approaches of higher complexity and a strong need for industrial involvement to upscale and integrate, such as biorefinery approaches, e.g., advanced biofuels, biogenic gases, and biobased chemicals. These technologies involve complex physicochemical, biochemical, and thermochemical processes, as well as multi-step valorisation chains that include recycling, cascading, and circulating streams, with extensive upscaling requirements before reaching market readiness. Often, a feedstock supply chain component is involved that requires crop growth over a longer period of time. The same is true for different biobased products, and e.g. their combination with other renewables. These require extensive process validation, pilot scaling, and regulatory integration as well as standardisation.

To enable Europe to compete with global players such as China, India, Brazil, and the US, the EU must provide longer-term and continuous support for biobased innovation. We recommend:

- Introducing flexible long-term project schemes (e.g. 6–8–12 years) that allow sufficient time for complex innovation tracks, such as new cropping schemes, integrated biorefinery pathways or industrial-scale upscaling. These schemes should include intermediate milestones and performance-based continuation criteria, enabling the European Commission to reassess and reallocate funding if needed while ensuring long-term support for successful approaches, or

- Creating multi-phase funding mechanisms where successful outcomes of earlier phases (low TRLs) are rewarded with additional funding (continuity bonus in streamlined evaluation) for increased TRLs. This allows a continuous development, with a consortium fitting the TRL of the development.

This is crucial to ensure that Europe achieves strategic autonomy, reduces dependency on fossil imports, and drives industrialisation of its clean technologies.

3.2. Merging Clusters 5 and 6 and Breaking Down Artificial Divisions (No More Energy vs. Non-Energy Divide)

Current research structured under Horizon Europe places bioenergy and biofuels under Cluster 5 (Climate, Energy, Mobility) and biobased products under Cluster 6 (Food, Bioeconomy, Natural Resources). Recognising the important role of biomass as renewable carbon source, this artificial separation hinders the development of integrated, circular, and resource-efficient biorefineries, which can deliver both energy and non-energy products (high added value chemicals and biobased materials) from the same biomass feedstock, a key pillar in the development of this sector.

We argue for a cross-cluster approach that:

- Fosters synergies between energy and non-energy uses of biomass as a renewable carbon source.
- Encourages holistic project design for renewable refineries that maximise resource efficiency, achieve economic return through the coproduction of energy, fuels, chemicals, and materials, and mitigate greenhouse gas emissions.
- Supports a systems-thinking perspective to unlock multiproduct value chains.

We recommend:

- Launch joint calls between DG RTD, DG AGRI, DG ENER, and DG CLIMA.
- Design funding instruments that support systemic integration of energy, materials, and carbon flows.

3.3. Europe as a Single Market for Biomass, Innovation and Technologies

The biomass value chain must be understood and governed at the **EU scale**, not within fragmented national frameworks. We advocate for:

- Recognising Europe as a single market for biomass resources, technologies, and R&I activities.
- Facilitating cross-border biomass supply chains to match regional surpluses with industrial demands, promoting open biomass trading systems and digital traceability frameworks.
- Supporting the development and digitalisation of tools to implement sustainability criteria efficiently, such as biomass tracking systems, certification schemes, and LCA-based decision support platforms.

- Increasing EU-wide data mining and structured data compilations on biomass availability, process-related characteristics, and technology suitability to accelerate the development of AI applications for system optimisation.

- Developing & validating digital tools/digital twins for advancing current bioenergy technologies and for innovating new technologies (e.g. chemical looping combustion of biomass, MILD combustion of biomass).

This would unlock economies of scale, enable resource complementarity, and accelerate the industrial deployment of biobased systems across the Union, while also supporting resilience.

3.4. Prioritising Biomass and Bioproduct Supply and Commoditisation

Despite its strategic importance, the supply and logistics of biomass as feedstocks and bioproducts have received little attention in recent framework programmes. This undermines efforts to make biobased technologies competitive with others, whose global markets are commodity-driven and highly standardised.

To correct this, we call for:

- Specific topics on provisioning, treatment, standardisation, and logistics for biomass and biobased products that are not traded as commodities so far.

- Development of common quality standards and commoditisation pathways for European biomass (e.g. digestate, forest residues, straw, aquatic biomass) and biobased products, including side streams.

- Support for the implementation and interoperability of robust sustainability certification schemes, aligned with RED III, to reinforce traceability and facilitate cross-border trade and market acceptance.

- Support for digital and AI-based solutions for biomass-biobased products, flow monitoring, and market optimisation.

Only by making biomass and biobased products a reliable, traceable, and tradeable resource can Europe ensure its full integration into clean energy and circular economy value chains.

3.5. Valorisation of Biogenic Outputs and Regional Biohubs

Biogenic outputs such as waste heat, biogenic CO_2, aqueous side-streams, chars and ashes, and digestate often remain underutilised despite offering substantial circular and economic value. These by-products represent untapped streams for renewable energy recovery, nutrient cycling, carbon capture and reuse, and heat valorisation within industrial clusters.

To maximise its valorisation and unlock regional (currently unused) potentials, we propose:

- Launch funding lines for projects that demonstrate the cascading uses of biomass coproducts across energy and material sectors, as well as consider circulating aspects.

- Prioritise the development of regional biohubs, which aggregate biobased stream inputs and outputs, enable co-location of biobased industries, and serve as strategic nodes of circular economy infrastructure.

- Support the integration of biogenic CO_2 into e.g. synthetic fuel and product production, greenhouse valorisation, or mineralisation processes.

- Promote the valorisation of digestate in soil amendment and nutrient recovery applications under harmonised safety and environmental frameworks.

3.6. Integrated Systems for Energy and Climate Impact

Biobased technologies must be evaluated beyond their immediate output type. Their systemic value lies in contributing to defossilisation, enhancing energy system flexibility, enabling seasonal storage, and reinforcing industrial and societal resilience. The current framework underrepresents these contributions by categorising technologies mainly by end use.

We suggest:

- Integrate additional system-level KPIs — such as net GHG mitigation potential, resource circularity, and contribution to energy resilience — alongside existing indicators like TRL, FRL, and GHG abatement. When relevant, assess the biogenic carbon residence time (i.e., carbon loop length) to distinguish between short- and long-cycle biomass resources.

- Incentivise projects that combine energy production with grid services, such as demand response, thermal balancing, or off-grid energy backup.

- Promote integrated systems where biobased processes provide both primary outputs (e.g., biobased products like fuels or chemicals) and secondary services (e.g., carbon capture, storage, grid stability, circularity).

- Embed climate and resilience co-benefits into project evaluation criteria under FP10.

4. Operational Innovations for FP10

4.1. Agile Project Launch Mechanisms

Current R&I processes are too slow, with a 12+ month timeline from topic to project, which is incompatible with the fast-changing innovation landscapes and policies.

We believe it could be sped up by e.g.:

- Pilot "hackathons for ideas" and rolling calls. This means that from a large group, a short selection is invited to develop their proposal after one or a few days. Limiting the number of submissions, reducing costs at both the national and EU levels (which are usually financed by funding as well), and improving success rates.

- Allow short pre-consortia expressions of interest to trigger faster evaluations.

4.2. Cross-sectoral and cluster Engagement

A lack of coordinated input between DGs leads to fragmented and siloed topics.

We propose:

- Institutionalise cross-DG working groups (e.g. RTD-ENER-AGRI-CLIMA) for integrated call drafting.

- Include soil, circularity and land-use experts from the outset.

5. Conclusion

FP10 represents a unique opportunity to place bioenergy and biobased systems at the heart of Europe's twin transitions. EERA Bioenergy is committed to contributing its expertise and vision to shape a more integrated, industrial, and resilient bioeconomy through ambitious, efficient and well-structured research and innovation frameworks.

In addition to strengthening technological leadership and climate action, FP10 must also contribute to the creation and long-term retention of high-quality employment. Bioenergy and biobased innovation systems have the potential to provide stable and future-proof jobs, particularly in rural and industrial regions.

To ensure a just and resilient transition, FP10 should explicitly support innovation pathways and project models that help absorb, retain, and develop qualified workers, securing the human capital needed to sustain Europe's bioeconomy and reducing the risk of talent loss to other sectors or regions — particularly in light of increasing competition from automation and AI.

EERA Bioenergy is open to discuss and explain further the ideas mentioned in this position paper.