



## BioMates

### D4.7 - Policy Recommendations



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Submitting party: Imperial College  
Responsible author: Rocio Diaz-Chavez; Yara Evans

Reviewers: Stella Bezergianni; Volker Heil; Ann-Christine Johansson;  
David Kubicka; Ludek Meca; Leonard Raymakers; Ulrich Pfisterer

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# Strengthening the Policy Arena for BioMates



**BioMates**



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## 1. The BioMates Project

The BioMates project combines novel technologies for the cost-effective conversion of residues and second-generation biomass (straw and miscanthus and forestry residues) into high-quality bio-based intermediates (BioMates) that can be co-processed with petroleum streams to produce a hybrid fuel ready for use as transportation fuel (Figure 1). BioMates thus comprise renewable and reliable co-feedstocks. BioMates main conversion processes are AFP and single-stage mild catalytic hydro-processing (mild-HDT). Whilst AFP is expected to take place next to feedstock production, the mild-HDT would take place within or next to the refinery to make efficient use of excess energy and energy carriers (such as hydrogen). Hence, the BioMates concept aims to enable the production of biogenic intermediates acceptable as a feedstock for co-processing alongside fossil mineral-oil in crude processing refineries. This way, the BioMates concept will help reduce fossil energy demand, as well as capital and operational costs, since it will partially rely on underlying refinery conversion capacity to increase the bio-content in final transportation fuels. Therefore, through use of fuels with biogenic content that help reduce GHG emissions, the BioMates concept stands to make an important contribution to making transportation systems sustainable, increasing energy security, and promoting economic development (see <http://www.biomates.eu>).

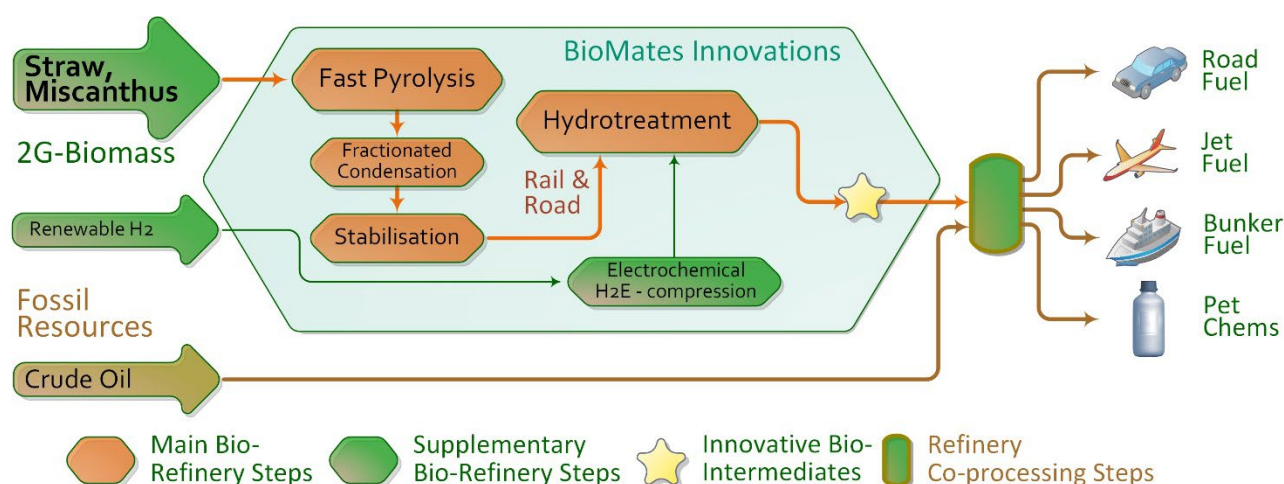


Figure 1: The BioMates-concept

- Centre for Research & Technology Hellas / CERTH - Chemical Process & Energy Resources Institute / CPERI, Greece (Project Coordination) - <http://www.cperi.certh.gr>
- Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Germany - [www.umsicht.fraunhofer.de](http://www.umsicht.fraunhofer.de)
- University of Chemistry and Technology Prague UCTP, Czech Republic - <http://www.vscht.cz>
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- RISE Energy Technology Center / RISE- [www.ri.se](http://www.ri.se)



## 2. Key Policy Issues for BioMates

The BioMates project is being developed under Horizon2020 as part of the European Union (EU) strategy for the bioeconomy which aims to foster innovation in the biorefinery sector and its integration with existing industrial value chains. However, the successful and sustainable implementation of the BioMates concept is contingent on the policy context within which it will operate. This document discusses policy issues for BioMates - which are also more widely relevant to the biofuels sector and the bioeconomy- and puts forward recommendations to address them.

### 2.1. Fostering an enabling policy framework

In the EU, an extensive policy framework has been developed over the last two decades encompassing myriad instruments, some of which have played more of an enabling role for the development of biorefineries, and the bioeconomy more widely, whilst others have worked to circumscribe their potential. In 2019, the EU embraced the European Green Deal, a new overarching strategy aimed at making Europe the first climate-neutral continent by 2050, as part of its commitments to the 2015 Paris Agreement (EC/CEU, 2021a). The European Climate Law, which came into force in July 2021, enshrines in binding legislation the Green Deals' goal to achieve climate neutrality. To achieve that, the European Commission adopted a package of proposals ('Fitfor55') to overhaul the EU's climate, energy, land use, transport and taxation policy instruments, setting an intermediate target for reducing net GHG emissions by at least 55% by 2030 relative to 1990 levels (EC/CEU, 2021b). The present state of flux that characterises the EU policy arena raises important issues for the successful implementation of the BioMates concept.

Amongst the slew of policy instruments that are being revised, the Renewable Energy Directive (RED) and the Fuel Quality Directive (FQD), are key instruments for driving the increased use of renewable energy in the EU. As binding instruments, they set out a common legal framework that EU member states must transpose into their national legislation for compliance. Specifically, they establish the quality parameters for the sale of diverse types of fuels across the region and set out GHG reduction targets for 2030. Through the FQD, for instance, member states impose on fuel suppliers the obligation to reduce GHG emissions per unit of energy fuel and energy supplied. However, although the initial deadline for this transposition expired at the end of December 2020, several EU Member States have yet to carry it out and so compliance by their fuel suppliers is not enforceable (EUR-LEX, 2021a). It is expected that the transposition will be fully achieved in 2022. The RED (which had already been revised in 2018) defines an overall renewable energetic target for various sectors, including transportation, which each member state must meet by 2030 (EUR-LEX, 2021b). National adoption of the 2018 revision had a due date of 30th June 2021, but most of the EU Member States have failed to deliver on time. Just after the due date, the EU Commission published in the context of the "Fit-for-55 plan" their proposal for the next revision of RED II, which sets more ambitious targets for 2030 to anticipate the Green Deal. However, the revised, higher targets being proposed for these directives will first need alignment at legislative level among EU institutions over the next two years, and so their transposition into member states national legislation should occur soon after (EUR-LEX, 2021c).

A pressing issue emanating from the RED II is the lack of specific methodology for the allocation of renewable properties for different outputs from the co-processing of biogenic feedstock with fossil streams, such as the BioMates bio-oil, to enable accounting for its contribution to the mandatory new



GHG emissions reduction targets for the transportation sector. Indeed, several methodological issues were left open at the time the RED II was published, and the European Commission was mandated to adopt a series of delegated acts, most of which were scheduled for adoption by 31 December 2021. One of these delegated acts, deriving from Article 28(5), should target co-processed oil (processed in a refinery simultaneously with fossil fuel) of biomass or pyrolysed biomass origin. At the time of finalising this document, this delegated act is still pending and expected for the first quarter of 2022 instead (EP, 2022). A second delegated act on the requirements for renewable electricity deriving from Article 27 of the RED II, which is also relevant for BioMates, is also still pending and adoption by the European Commission is planned for late in 2022 (EP, 2022).

The uneven implementation of policy instruments such as the RED and the FQD underscores the fragmented nature of the policy arena in the EU. Significant variations occur in the ways member states transpose and implement these directives and their compliance mechanisms due to local interpretations of ambiguous and opaque instruments. The enforcement of control mechanisms, verification and documentation for feedstocks and biofuels lack the harmonisation needed to ensure the effective operation of a single market for biofuels across the EU. Policy fragmentation, lack of harmonisation, coherence, transparency, and stability may combine to undermine investor confidence, discouraging or delaying investment decisions in biofuel technologies and ventures, thereby hindering the development of the biofuels sector. Further policy interventions should aim to:

- simplify and stabilise regulatory frameworks and end the delay in national transposition of legislation in EU member states to avoid undermining investor confidence and jeopardising investment in the renewable fuels sector; legal uncertainty arising from ongoing policy review needs to be addressed urgently, with all open issues resolved and pending delegated acts adopted as soon as possible
- promote awareness-raising and capacity building activities amongst policy makers at national and local levels to foster inter-ministerial cooperation and support the development of consistent policy frameworks across different sectors
- provide long term legislative and regulatory certainty, since initial investments into manufacturing assets using new technologies and advanced feedstocks require long payback time.

## 2.2. Supporting bio-based products

A perennial issue besetting the development of the biofuels sector, and the bioeconomy more widely, is the high costs of biomass feedstocks and novel biomass conversion technologies that bioproducts incorporate. This makes it difficult for them to compete against subsidised fossil-based products that evade externalities and sustainability scrutiny, and particularly in the context of prevalent low crude oil prices that create or exacerbate market distortions, or of volatile price fluctuation. A case in point is the intensification of demand for hydrogen for fuel applications, which has been driving up the prices of hydrogen. But green hydrogen is a fundamental prerequisite for many future technologies and EU legislation has yet to enable access to cost-competitive renewable hydrogen. Policy interventions to address these issues include:

- developing a holistic biomass residue allocation concept that envisages biomass use for energy as well as for alternative material uses to avoid unproductive competition



- clear commitment by policymakers to renewable hydrogen (from all sources, including waste) by promoting a supportive investment climate
- fostering the development of alternatives for renewable/green carbon in the chemical sector (renewable chemicals)
- strengthening support to investment in the production and commercialisation of hybrid fuels

### 2.3. Overcoming ‘The valley of death’

Access to public and private capital is crucial to the dissemination and commercialisation of novel processes and technologies, such as BioMates. However, a funding gap exists both for demonstration and scaling up of bio-based projects, with many bio-products failing to make it beyond the demonstration phase, notably in the EU where the focus is on Research and Development. Access to private funding for project scaling-up is still highly constrained by investor uncertainty about potential returns on investment and the risk of potentially stranded investments in new technologies. Policy interventions should aim to:

- increase private sector investment in bioindustry projects to help overcome technological ‘bottlenecks’ and “the valley of death” through mobilisation of public and/or private financial mechanisms
- provide ‘grandfathering’ of incentives/regulations to provide a stable regulatory environment for early adopters of new pathways in meeting compliance for a limited timeframe (15 - 20 years)
- encourage the development of knowledge-sharing platforms to link up investors with bio-project promoters for leveraging private funding to scale up biorefinery concepts (e.g., BioMates)

### 2.4. Strengthening the local level

Supply and value chains for the bioeconomy require rural infrastructure and social capital to thrive, but these are still, in general, rather underdeveloped across Europe. Policy interventions to foster development should contemplate a mix of public support, financial instruments and public-private partnership to:

- incentivise the use of agricultural waste and residues for producing bioproducts taking into account sustainable extraction limits (e.g. for straw and forest residues)
- develop rural infrastructure and logistics (e.g., harvesting, storing, and transportation of biomass feedstocks and agricultural and forestry residues)
- help establish biomass value chains and overcome fragmentation at the local level
- foster cooperation across different value chain actors in rural areas, through the development of networking and clustering actions at all levels (EU, national, local)
- support farmer’s cooperatives and other associations to help make more efficient use of pooled resources
- support skills development, capacity building and entrepreneurship

## 3. Enhancing the EU’s biofuels sector and bioeconomy

The sustainability and success of the biomass and the biofuels sectors, and the bioeconomy more widely, are highly contingent on the formulation and enactment of appropriate and effective policy instruments and stable regulatory frameworks. Advanced biofuels and hybrid fuels have the potential to make a substantive contribution to efforts to reduce the carbon content in road, air, and water



transportation fuels in the short to medium term in the EU. The prospects for the BioMates concept are promising, as it offers a suitable interim solution to the seemingly intractable challenge of achieving zero carbon emissions through the phasing out of fossil fuels from the transportation sector. However, the evolving landscape for transportation fuels necessitates stable and coherent policy frameworks focused on the long-term to encourage the mobilisation of the financial resources needed for the scaling-up and rolling-out of biorefineries as sustainable commercial ventures. It will all also require better articulation of stakeholders, greater commitment by business and government to the defossilisation of the transport sector, and effective state support.

#### 4. Disclaimer

This report reflects only the authors' view. Neither the European Commission nor its executive agency, CINEA, are responsible for any use made of the information it contains.

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