

BioMates

Public Summary of Deliverable D4.1: Interim report on
all tasks of the sustainability assessment and interlinkages

Version 01



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Responsible author:	Heiko Keller
Co- author(s):	Heiko Keller, Nils Rettenmaier, Tim Schulzke, Loukia Chrysikou, Stella Bezergianni, Ivan Souček, Rocio Diaz-Chavez
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Contact

Dr Heiko Keller
IFEU - Institute for Energy and Environmental Research Heidelberg
Wilckensstr. 3, 69120 Heidelberg, Germany
Phone: +49-6221-4767-0, fax -19
heiko.keller@ifeu.de, www.ifeu.de

1. Introducing BioMates

1.1. The BioMates Project

The BioMates project aspires in combining innovative 2nd generation biomass conversion technologies for the cost-effective production of *bio*-based intermediates (BioMates) that can be further upgraded in existing oil refineries as renewable and reliable co-feedstocks. The resulting approach will allow minimisation of fossil energy requirements and therefore operating expense, minimization of capital expense as it will partially rely on underlying refinery conversion capacity, and increased bio-content of final transportation fuels.

The BioMates approach encompasses innovative non-food/non-feed biomass conversion technologies, including **ablative fast pyrolysis (AFP)** and single-stage **mild catalytic hydroprocessing (mild-HDT)** as main processes. Fast pyrolysis in-line-catalysis and fine-tuning of BioMates-properties are additional innovative steps that improve the conversion efficiency and cost of BioMates technology, as well as its quality, reliability and competitiveness. Incorporating **electrochemical H₂-compression** and the state-of-the-art **renewable H₂-production** technology as well as **optimal energy integration** completes the sustainable technical approach leading to improved sustainability and decreased fossil energy dependency. The overall BioMates-Concept is illustrated in Figure 1.

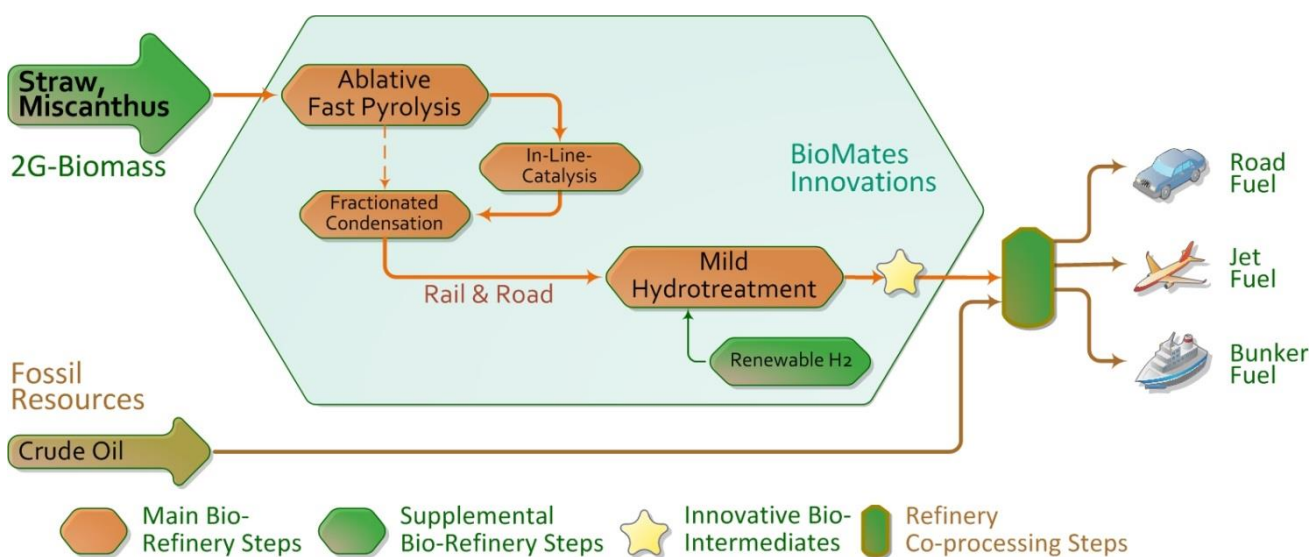


Figure 1: The BioMates concept.

The proposed technology aims to effectively convert residues and non-food/feed plants or commonly referred to as 2nd Generation (straw and short rotating coppice like miscanthus) biomass into high-quality bio-based intermediates (BioMates), of compatible characteristics with conventional refinery conversion units, allowing their direct and risk-free integration to any refinery towards the production of hybrid fuels.

1.2. European Commission support

The current framework strategy for a Resilient Energy European Union demands energy security and solidarity, a decarbonized economy and a fully-integrated and competitive pan-European energy market, intending to meet the ambitious 2020 and 2030 energy and climate targets /EC-2014a, EC-2014b/. Towards this goal, the European Commission is supporting the BioMates project for validating the proposed innovative technological pathway, in line with the objectives of the LCE-08-2016-2017 call /EC-2015/. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727463.



1.3. The BioMates team

The BioMates team comprises eight partners from industry, academia and research centres:

- Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Germany (Project Coordination) - www.umsicht.fraunhofer.de
- Centre for Research & Technology Hellas / CERTH - Chemical Process & Energy Resources Institute / CPERI, Greece - <http://www.cperi.certh.gr/>
- University of Chemistry and Technology Prague, Czech Republic - <http://www.vscht.cz>
- Imperial College London, United Kingdom
www.imperial.ac.uk
- Institut für Energie und Umweltforschung Heidelberg GmbH / IFEU, Germany - www.ifeu.de
- Hydrogen Efficiency Technologies B.V. / HyET, Netherlands - www.hyet.nl
- RANIDO, s.r.o., Czech Republic
<http://www.ranido.cz/>
- BP Europa SE, Germany
www.bp.com/en/bp-europa-se.html

For additional information and contact details, please visit www.biomates.eu.

2. Disclaimer

This Deliverable report reflects only the authors' view; the European Commission and its responsible executive agency INEA are not responsible for any use that may be made of the information it contains.



3. Public summary

The objective of this document is to set up the framework for a consistent assessment of all relevant sustainability aspects of the BioMates system. This in particular includes:

- To provide the goal and scope of the assessment as well as all initial settings
 - General definitions & settings shared by the assessments of technological, environmental, economic, social, policy and health aspects of sustainability
 - Specific settings and methodologies for each of the assessments
- To provide descriptions of the BioMates systems to be analysed
 - Qualitative descriptions containing Process Flow Diagrams
 - Quantitative descriptions consisting of mass and energy balances

All general definitions, settings and systems descriptions were agreed upon with all project partners during an internal BioMates workshop that took place on 8 November 2017 in Heidelberg, Germany. This includes the definition of general system boundaries and settings such as the decision for a comparison of whole life cycles from cradle to grave or well to wheel (Figure 2). It also comprises the description of the BioMates life cycle elements as well as the description of reference systems such as the substituted conventional products and alternative land uses. Specific settings and methodologies used were contributed by the respective Tasks and harmonised within WP 4 (integrated sustainability assessment). Data quantitatively describing the systems was provided by all partners and collected by Task 4.2 (technological assessment).

This document contains the first complete set of information that enables the assessment of selected BioMates systems. It will be updated continuously until month 36 if adjustments become necessary based on the progress of the project.

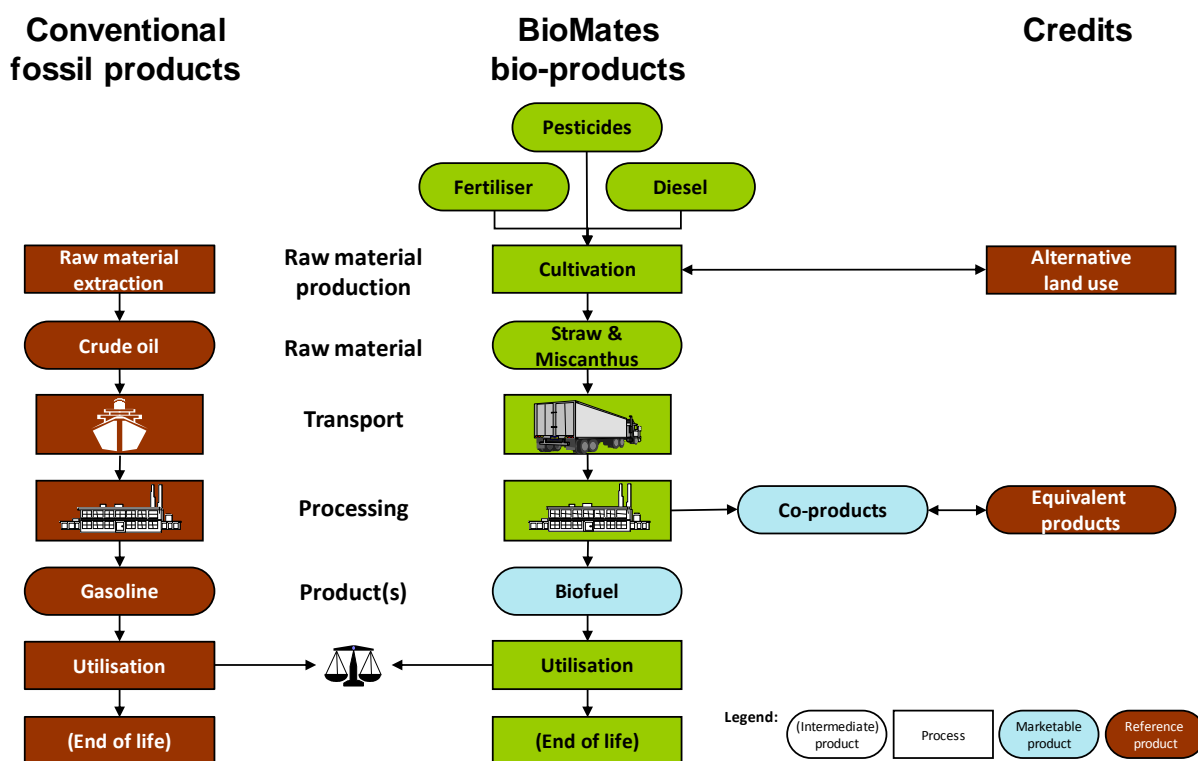


Figure 2: Sustainability assessment in BioMates: The concept of life cycle sustainability assessment, which compares the whole life cycles of all involved products.



4. Literature

- EC-2014a European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A policy framework for climate and energy in the period from 2020 to 2030, COM(2014) 15 final, Brussels, 22.1.2014, http://www.europarl.europa.eu/meetdocs/2009_2014/documents/nest/dv/depa_20140212_06/depa_20140212_06en.pdf; <http://bit.ly/1LUcJKL>
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