BioMates

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IPR-risk management report - 2nd update

Version 01

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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 inter*medi*a*tes* (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 H_2-compression** and the state-of-the-art **renewable H_2-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.

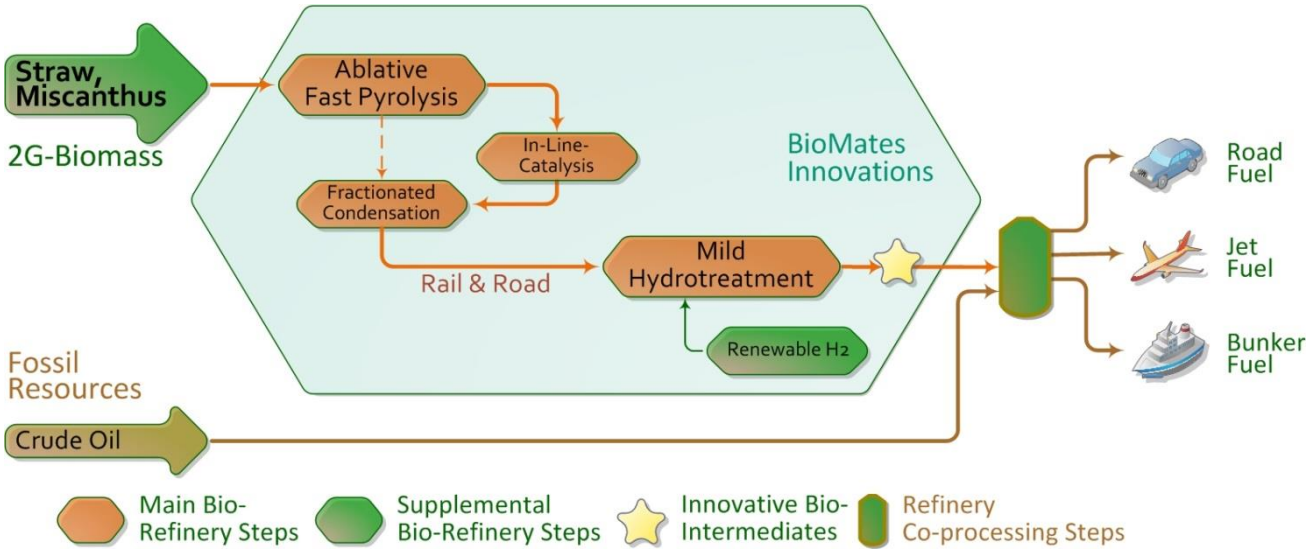

Figure 1: The BioMates-concept

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*
- HyET Hydrogen B.V. / HyET, Netherlands - *www.hyethydrogen.com*
- 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. Preface

This report is the second update of Deliverable 5.2: IPR-risk management report, submitted in month 13 of the project. It was elaborated under WP5, Task 5.3 in close coordination with Deliverable 7.6 – 3rd report on IPR, which will be submitted in September 2019. Following members of BioMates Consortium contributed to the report:

- University of Chemistry and Technology Prague, Czech Republic (UCTP),
- BP Europa SE (BP),
- Centre for Research & Technology Hellas - Chemical Process & Energy Resources Institute, Greece (CERTH),
- HyET Hydrogen B.V., the Netherlands (HyET).

This deliverable summarises approaches, procedures, and results of their exploitation on the intellectual property produced (or possibly produced) during the period of the BioMates project. Prevention of risks connected with improper use of intellectual property (either owned by Consortium members, created during the project period, or third party IP) is the main goal; the second one is dealing with problems arising in this field. The status in IPR for the first 34 months of the project is covered. The document is focused on both risk management in general and addressing specific questions of IPR-risks dealt within BioMates project.

The procedures within the report were proposed updated, and improved during the project course with the aim to balance efficient prevention of IPR-related risks with the freedom of research and dissemination activities, avoiding unnecessary formal procedures. Nevertheless, strict compliance with the guidelines is necessary for all concerned members of the project team.

In the first section of this document, approaches to identify, assess, and handle risks in general are discussed. In the second section, above mentioned guidelines in their updated form are summarized. Following section is aimed to particular problems which occurred in recent period of BioMates Project.

3. Risk management framework in general

Risk management in general aims at identification, quantification, treatment and evaluation methods to reduce risk connected with various activities. Successful risk management process should be carried out continuously with accented proactivity. Appropriate strategies for risk mitigation should comprise of identification, assessment, treatment and monitoring. Following paragraphs will deal shortly with these parts of risk management procedures with respect to IPR protection.

3.1. Risk identification

During the course of a project, varying IPR related risks can arise depending on a particular activity or phase of the project, such as research, dissemination of results, their protection using different tools (especially patents) or commercialization (e.g. by licensing). Most common types of risk in research and development IPR are wasting costs by duplicating research due to insufficient prior art search in the project development phase, using protected third-party knowledge in research, IPR disputes of cooperative parties if results joint ownership is poorly treated, or losing revenues by not claiming intellectual property right after completing the research or development.

3.2. Risk assessment

Risk evaluation is commonly carried out using well-known formula “risk = impact * probability”, showing that both extent of damages as well as their likelihood are important when deciding if a particular risk is acceptable or not.

The Impact could be scaled (how “serious” it is) usually by a three-point scale of low, medium and high (sometimes minor, moderate, or significant). The similar scale could be used to express the likelihood of the issue occurring. Impacts of risks lie on consequences caused by occurring untreated risk, which can be of financial and non-financial nature - such as grant reduction or penalties, costly legal battles or fines, missed commercialization opportunities, loss of potential sources of new funds, or loss of reputation.

It is important to say that assessing the risk of non-technical nature such as that related with legal issues is often difficult, especially in cases where there are no tools for exact quantification of impacts (like in case of costs) and probabilities.

3.3. Risk treatment

Risk treatment is the process of choosing and implementing suitable measures to resolve risk. Risk treatment measures can include avoiding, acceptance and mitigation or transferring risk. The measures should be selected according to risk strategies developed for specific areas or activities.

- *Avoidance or prevention* – the risk is not taken due to appropriate and preventive action. Prevention is the main and most effective way to reduce risk in research and development. Carefully conducted patent searches and analysis is the basic tool to ensure the freedom to operate and prevent IPR infringement as well as duplicating research due to poor knowledge on the state of the art in respective areas.

- *Acceptance/mitigation* – the risk is accepted without any preventive measure (e.g. if the probability and/or impact is small or even negligible), or the risk is decreased by mitigation of the likelihood or impact. In IPR, this approach is rarely used.
- *Transfer* – the risk is handed over to another entity; e.g. transferring intellectual property rights itself could enable avoiding some types of risk (while "gaining" other risks, e.g. complete loss of acquired IPR if an improper selection of a third party for IPR transfer is carried out).

Several risks are associated with clearance of third-party rights, if their use is necessary. The process can be time-consuming, fees may be requested, or permission may be refused.

3.4. Risk Control and Monitoring

The set of measures should be established to control and monitor risks. Preventive as well as continuous actions are to be taken at project application, prior to the project beginning, and throughout the project life. The substantial part of IPR control mechanisms is embodied in the Consortium Agreement. However, additional codes of practice should be developed, and team members and employees trained and informed. In research and development, intellectual property archives (database of patent and literature searches) are a useful basic tool.

4. IPR–risk management standards and procedures for the purpose of BioMates project

The impact of project risks and conflicts on project objectives is assessed by the project manager and the work package leaders. The impacts is actively addressed through early assessment and elimination of risk with the identification of proper actions to be taken to mitigate or reduce the probability of occurrence or the impact in case of occurrence to acceptable levels.

Although the status quo of IPR for BioMates in general is known and the knowledge updated on a regular basis, there is a certain risk that one or another minor aspect could be filed by 3rd parties. Should there be IPR-publications released that conflict with BioMates, the chances of objecting will be assessed, and if necessary and promising, legal actions like formal objections will be taken. Should IPR be published that affects aspects of BioMates without the opportunity to be dealt with legally, alternative technological solutions will be sought, or the 3rd party will be contacted in order to prepare a licensing agreement for the BioMates commercialization phase that will start after the end of the project.

Since IPR management activities took place and were already described in Deliverable D7.2, principles and rules can be quoted from the report (pp 1-2, *2. IPR management activities*):

> "Each party of the consortium is organising future protection of results once it is necessary before dissemination phase. The identification of results which would enable/necessitate any form of IP is continuously carried out by dedicated staff members or parties have access to professional knowledge staff which gives advice on legal, financial, commercial or IP protection issues (knowledge transfer offices etc.) in order to protect the results from early disclosure. Dissemination of results is carried out consistently with respect to their IPR status regardless the communication channel used (scientific journals, conferences, workshops, public communication), aiming at maximum impact whilst understanding the intellectual property value of the results.

> According to the Attachment 1 of the Consortium Agreement, neither of the parties involved in the Project provides Background ("data, know-how or information that is needed to implement the action or exploit the results") to another party. According to the Section 8 of the Agreement, results are owned by the party that generates them (Section 8.1). The necessity of establishing joint ownership of results is not expected in ongoing period of the project as the parties focus on separate topics and only particular results are communicated if necessary without sharing their key know-how. In this view, no need supervened to change or amend respective provisions of the Consortium Agreement. In a case of jointly owned results will originate during the project, the consortium has the intention to reach an agreement for the effective management of such results with details, for example, on shares, exploitation and licensing to third parties.
>
> To comply with appropriate practice with regard to handling of confidential information, according to Section 10.8 of Consortium Agreement, confidential data, results and documents are exchanged via secured data-exchange platform. Dissemination of results is discussed between partners before any dissemination activity."

In cases of any unavoidable conflict with respect to mitigation measures, the Consortium general Assembly should meet and gather consensus where solutions and mitigation measures will be identified and mutually select the one that is in the interest of the project objectives.

Risk management practices were proposed, which include as a minimum the identification and monitoring of the corresponding project risks with appropriate mitigation strategies.

Contrary to risk general management procedures used in technical practice described above, listed risks were not strictly evaluated based on their impact and probability, and should be therefore treated with equal attention and diligence.

It is important that IPR management should not inhibit the dissemination of knowledge. There is always a risk that an over-protective approach will prevent team members from using different methods of dissemination or collaboration. None of the abovementioned recommendations and strategies are intended to interfere with the dissemination of knowledge.

In general, IPR risk management follows the procedure described and defined by Korn and Oppenheimer and the regulations and recommendations of the European Parliament, Council and Commission /Korn-2008/ /EC-2008/EP-2013/.

5. IPR–risk management in the 3rd year of the BioMates project

The standards and procedures related to IPR-risk management, established in D5.2, were adopted and practiced by individual task leaders. No issues were encountered with respect to IPR protection and handling, or conflict with dissemination activities.

6. Conclusion

The second update of IPR - specific risk management procedures were prepared 21 months after submission of first IPR-risk management report. Guidelines proposed for various risk situations (insufficient protection of project results, infringement of third-party IPR, etc.) are continuously used to identify the risks for their proper handling. According to the current status, the procedures and approaches outlined in the first version of the

report and the first update are also improved, if necessary, by BioMates Consortium members and project task leaders.

The report was prepared with close coordination with materials in preparation for Deliverable D7.6 (3rd report on IPR), where current status for 36 months from the beginning of the project will be documented.

7. Literature

EC-2008 Commission Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations, European Commission 2008

EP-2013 Regulation (EU) No 1290/2013 of the European Parliament and of the Council laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006, December 2013

Korn-2008 Naomi Korn, Charles Oppenheimer: IPR Risk Assessments, Rights Clearances and Rights Management, Strategic Content Alliance, October 2008

8. 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.