BIKE

BIOFUELS PRODUCTION
AT LOW - ILUC RISK
FOR EUROPEAN SUSTAINABLE
BIOECONOMY

D 8.4

FINAL PROJECT REPORT

Dissemination level:

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Executive summary

The Project Final Report describes the results of the project and of the management activities already described in the Deliverable D8.1, “Preliminary Project Management Plan”, and addresses the work performed for the technical and scientific activities of the BIKE project. This report follows the Deliverable D8.3 “Interim project management plan”, submitted in Month 18, which summarized the project management activities performed during the first 18 months, and it represents an update of the Interim project management plan, where the activities carried out from M19 to M36 are described. This deliverable is thus intended as summary of the project activities, critical aspects, and outcomes. In order to do this, a summary of the activity carried out in each WP is described. Moreover, people contacts and respective roles within BIKE project have been defined as a summary. In conclusion, the present report contains an overview of BIKE project management activities, including the main project findings and an assessment of most critical aspects encountered during the three-years project activity.

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1 Introduction

Conventional biofuels have raised concern about their impact on food prices, and on the use of land for agricultural and forest products. This impact is known as Indirect Land Use Change (ILUC). The low ILUC-risk concept was first introduced into EU legislation in 2015 when a definition of low ILUC-risk fuels was added to the Renewable Energy Directive; but no measures were introduced at the EU level at that time. In the 2018 recast of the RED, low ILUC-risk fuels were for the first time given a defined regulatory role, providing an exemption from limits placed on the supply of biofuels from feedstocks deemed to be high ILUC-risk. Within the year 2030, the REDII mandates that Member States must require fuel suppliers to ensure that at least 14% of the transport sector's energy consumption comes from renewable sources. The overarching goal of the BIKE project is to facilitate the market uptake of European low ILUC-risk feedstocks for the production of biofuels, bioliquids and biomass fuels from 2020 to 2030. The BIKE project follows a **value chain approach** that covers land use, feedstock provisioning, conversion processes, and end-product outputs. This approach combines top-down modelling estimates, based on statistical data and recent research, with bottom-up analysis of actual case studies, with profiles matching the current definition of low ILUC-risk biofuels, bioliquids and biomass fuels.

The activities of BIKE are organized around two low ILUC-risk value chains that match the definition of additionality given by RED II Directive: 1) *Cultivation on unused, abandoned or severely degraded lands* and 2) *Productivity increased through improved agricultural practices*. The BIKE project identified two case studies per each value chain, i.e. four in total, where low ILUC-risk feedstocks are used for the production of three types of biofuels: cellulosic ethanol, renewable diesel (HVO), and biomethane. Two case studies refer to cultivation on unused lands and are: i) perennial grasses to advanced (lignocellulosic) ethanol, and ii) castor beans to renewable diesel (HVO and biodiesel). The other two case studies refer to implementation of sequential cropping systems and are: iii) brassica carinata for renewable diesel production and iv) the Biogas Done Right (BDR) model for biomethane-to-liquid fuels.

BIKE worked to examine the sustainability and to facilitate the market uptake of the four identified case studies. The assessment activity, distributed over 7 work packages, led to the creation of an ISCC system certification module for certifying low ILUC-risk biofuels production sites. This module was validated through on-site audits conducted on the identified case studies. Additionally, the assessment led to the recognition of market opportunities and the potential for replicating the identified low ILUC-risk biofuels case studies throughout the EU territory. Moreover, an environmental, social, and economic sustainability assessment of low ILUC-risk advanced biofuels production routes was performed for each case study. In parallel, an analysis of the EU and national policy framework was conducted, in order to identify the existing barriers and support the implementation of future regulation.

To facilitate industrial actors, a first low ILUC-risk certification methodology has been developed by the ISCC system and tested on real case studies. In the future, the methodology could be

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adopted by stakeholders as a standard procedure recognized by the European institutions. Critical aspects have been identified in the existing regulation, mainly concerning the lack of clarity on the methodology for classifying the unused or severely degraded land as low ILUC-risk. Solving these issues will help farmers and biofuels producers in the development of long-term business plans.

The case studies showed different profitability and uncertainty factors. Sequential cropping with Biogas Done Right (BD) model demonstrated to produce biomethane and enough digestate to meet cropland requirements, avoiding the need to use chemical fertiliser derived from fossil fuel. Moreover, the already large number of Anaerobic Digestion facilities and the high readiness level of the biomethane-to-liquid technologies make this case study highly profitable. The case studies on renewable diesel production (HVO, biodiesel) showed a good profitability. Introducing brassica as winter crop in place of non-productive cover crop resulted a profitable practice, increasing biomass production without affecting the yield of summer crops. Similarly, the Castor Oil to HVO production is profitable, providing income to both local farmers and industrial stakeholders and it can be improved by implementing measures that minimises transport cost between cultivation areas, HVO departing ports and biorefineries. The strength of these case studies lies in the high TRL of the adopted technologies, and in the possibility to use existing infrastructure. The cultivation of Miscanthus and perennial grasses on unused farmland showed more criticalities. To ensure sustainability, reduced transportation distance is needed. In the UK case study, the transportation of Miscanthus within 100 km from an existing could satisfy only 5% of a full size 2G plant capacity. Moreover, as dedicated refineries are required for 2G bioethanol production, larger investment and more time is needed for this low ILUC-risk solution to penetrate the market. To support both investors and institutions, BIKE project estimated the potential replicability of low ILUC-risk case studies in Europe and their potential impact on the EU transport sector. Moreover, BIKE project has shown that Low ILUC risk biofuels value chains represent a promising alternative to fossil fuels for transportation. The additionality of biomass feedstock derived from the low ILUC-risk practices improves both the sustainability of the value chain, and the economic profitability for farmers. In addition, the identified cultivation practices represent an opportunity to restore the European unused and degraded lands, increasing soil carbon content and reducing the use of inorganic fertilisers. The benefits of low ILUC-risk agricultural practices couples with the readiness of the technologies involved in the value chain.

2 Project management and partners cooperation

RE-CORD has been the partner responsible for the coordination of BIKE for the whole project duration. The Coordinator managed both the financial and administration aspects, supervising the partners activities to ensure an efficient organization of the work. RE-CORD, as Coordinator, communicated as an intermediary between the project partners and INEA – the EC agency responsible for project oversight. During the project, an amendment was requested by the consortium and approved by the European Commission concerning the substitution of one

project partner, NAIK AKI, with another Hungarian partner, AKI. During the project, the coordinator also promoted and ensured a continuous communication and cooperation between partners so that to maximize the knowledge exchange. The roles of the coordinator, and of project partners – which is summarized in Figure 2 – was respected during the whole project duration.

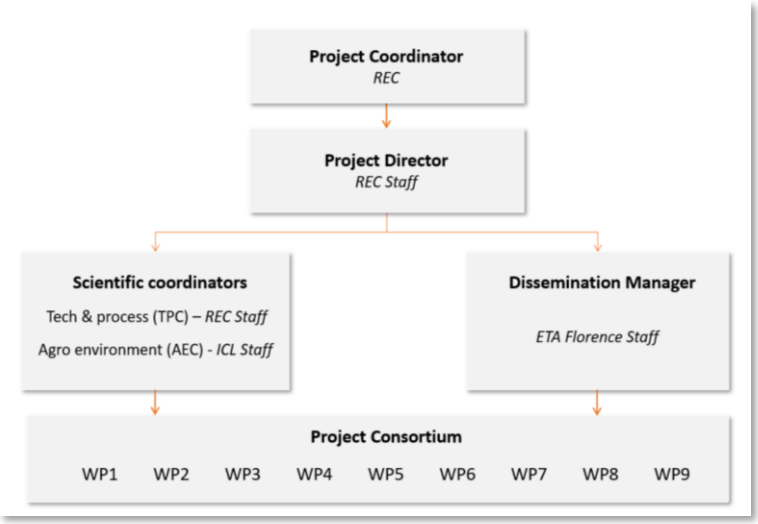

Figure 1. BIKE management roles

BIKE WP Leaders are listed below:

- WP1 - ISCC System
- WP2 - Imperial College
- WP3 - RE-CORD
- WP4 - FAO
- WP5 - EXERGIA
- WP6 - CRES
- WP7 - ETA Florence
- WP8 – RECORD
- WP9 - RECORD

3 BIKE Project activities and main findings

3.1 Work package 1

First period (M1-M18). ISCC, supported by project partners, has set up and prepared an ISCC handbook including the identified criteria and indicators to be adopted for the certification scheme, the audits checklist, document list, audit report, and guidance document to be used during the audits of low ILUC-risk biofuels production case studies. Deliverable D1.1. and D1.2

were submitted. From month 12 to month 18 the organization of first audits to the selected case studies has begun.

Second period (M19-M36). During the second half of the project, ISCC performed the audits to the four identified low ILUC-risk biofuels production sites: Fattoria della Piana (Italy), Miscanthus nursery (UK), ENI (Kenya), UPM (Uruguay). The results of the auditing activities were reported in the Deliverable D1.3. Moreover, the collaboration with BIKE partners in WP2, WP3 and WP6, and the contribution of sustainability criteria identified by WP4, brought to the development of the Handbook for low ILUC-risk certification, published as Deliverable D1.4 by ISCC. The summary of all the performed activities is reported in the final deliverable: D1.5.

3.1.1 Main findings of WP1

The main findings of WP 1 can be found in the handbook published as Deliverable 1.4, which contains a proposed methodology by ISCC to certify the low ILUC-risk biofuels production system, according to the existing EU policy and to the results of BIKE activities. Under the RED framework, low ILUC-risk certification can be used to "counter" the phase-out of high ILUC-risk feedstocks to be used for biofuels production. So far, the EU COM solely identified palm as a feedstock fulfilling the criteria for high ILUC-risk crops and thus being linked with significant deforestation. As set out in the RED II, high ILUC-risk feedstocks will be gradually phased-out from the RED market starting in 2023 until 2030. In many EU Member States, this process is accelerated, and palm cannot be used as a feedstock for biofuels (e.g., Germany, France). Companies have the opportunity to certify "additional" and thus low ILUC-risk feedstock and biofuels proving that they go beyond mandatory and voluntary sustainability requirements. The example of ENI, one of our pilot partners, shows that there is a strong interest from companies to implement the needed, additional measures and to produce "additional", low ILUC-risk feedstocks and biomass for the biofuels market.

3.2 Work package 2

First period (M1-M18). During the first 18 months partners of WP2 reviewed the recent and ongoing studies and contrasted them with datasets developed by BIKE partners and statistics, in order to develop the baseline for relevant crops produced in European land, i.e. suitable for biofuel production. The activity led to the development of a paper to be published within month 20. These activities have been performed within the first 12 months, ending in a Milestone named "First assessment for low ILUC-risk risk feedstock options resulting from productivity increase and crops cultivated in unused lands". Detailed description of WP2 activity is reported in the BIKE first periodic report.

Second period (M19-M36). In the second period, the activity of WP2 focused on the task 2.3, on climate positive farming solutions, which consisted in the development of model- and optimisation- based methodologies that address challenges related to climate positive farming solutions. The model was developed on the basis of BIKE four case studies, and calculated net

farm income, total crop produced and net present value. Input data consisted of farmland size, crop yield, unit production cost, unit crop selling price, interest rate, crop rotation sequence and cropping calendar. The activity was delayed compared to the expectation, in order to enable BIKE industrial stakeholders to collect all the information needed by Imperial college to run the model. In particular, more time was needed to collect data about cultivation yields, harvesting performances and products quality.

3.2.1 Main findings of WP2

The main findings of WP2 were the quantification of the economic benefits provided by the four low ILUC-risk biofuels production systems identified by the BIKE project. WP2 assessed the economic potentials related to the biomass additionality obtained by cultivating biomass in both degraded or abandoned land, and as cover crops with conventional food crops. Some key conclusions are reported below:

- Introducing brassica as winter crop in place of non-productive cover crop leads to additional biomass feedstock without affecting the yield of summer crops;
- Sequential cropping together with Biogasdoneright© model produces biomethane and sufficient amount of digestate that meets cropland requirements, therefore avoiding the need to use chemical fertilisers derived from fossil fuel;
- Miscanthus produced on farmland within 100 km from an existing biorefinery satisfies only 5 % of the 2G plant capacity;
- The existing value chain for HVO production is profitable, providing income to both local farmers and industrial stakeholders. However, profitability can be improved by implementing measures that minimize transport cost between departing port (in Mombasa, Kenya) and biorefinery (in Gela, Italy);
- Additional sustainability issues will need to be coupled to the technical analysis.

3.3 Work Package 3

First period (M1-M18). On September 2021, RE-CORD published the report “review of biofuels plants and related technologies currently existing in Europe”, finalized in accordance with the activities of task 3.1. Furthermore, during this phase, the activity on task 3.2 about Technology Innovation Assessment of low ILUCC-risk biofuels has started and almost finalized.

Second period (M19-M36). During the second half, in month 24, Deliverable 3.2, “Technology Innovation assessment of low ILUC risk system in the EU biofuels sector”, was finalized. The submission of the deliverable was done in month 25. Following the results of task 3.1 and 3.2, RE-CORD performed a study to assess the possibility of replicating the selected case studies, at EU and western Balkans. The deliverable D3.3, titled: “Replication potential of case studies examined in BIKE” was expected at Month 30 of the project. The submission was done in month 32. The results reported in the Deliverable D3.3 gave evidence about the potential production of low ILUC-risk biofuels by means of BIKE identified value chains in the EU territory. On the basis of these results, an assessment of the role and the impact of low ILUC-risk biofuels in the EU

energy sector in 2030 and 2050 was performed. The results of this study are reported in Deliverable D3.4, submitted in month 36. Finally, the decision support Toolkit was developed by Imperial College, as a tool to help stakeholders to approach the Low ILUC risk biofuels production. The Decision support Toolkit is described in Deliverable D3.5.

3.3.1 Main findings of WP3

The activity of WP3 demonstrated that, even adopting cautionary estimations, the potential replication of BIKE case studies in Europe is large, with a theoretical production of about 1.5 Mil tons of bioethanol and 2 Mil tons of renewable diesel achievable in the short term, and a huge potential, in the range of 10 mil. Tons, obtainable from the conversion of biomethane into liquid fuels such as F.T. liquids and Methanol. The Technology Innovation Assessment (TIS) performed in Task 3.2 and described in D3.2 enabled to identify the Biogas Done Right model as the most developed case study at EU level, and the lignocellulosic bioethanol as the further from a large-scale market uptake. Within 2030, the replication Biogas Done Right case study in UK, France, Germany and Italy could bring to produce 3.3 billion liters of F.T. fuel, and the cultivation of Castor bean and Brassica Carinata in the Mediterranean area could produce about 2.5 billion liters of renewable diesel (HVO and biodiesel). A reduced amount is expected, in 2030, for lignocellulosic ethanol from perennial grasses in unused land (500 million liters), mainly due to the lack of existing 2G biorefineries. These numbers, derived by cautionary estimations explained in Deliverable D3.3, could rapidly increase thanks to the efforts of industrial actors and with the entry in force of a more effective environmental and energy policy. A common barrier resulting from the study seems to be the lack of a clear version concerning low ILUC-risk biofuels market support, and potential development.

3.4 Work Package 4

First period (M1-M18). The activity of WP4 started at project M12. The WP4 leader almost finalized the preliminary set up of Life Cycle Assessment study, according to task 4.1 (Development of a tailored set of sustainability indicators for bioenergy based on the specific conditions of each of the case study sites) and task 4.2 (Compilation of existing environmental, social, and economic data necessary for the measurement of the tailored set of sustainability indicators for bioenergy). Data gathering from leaders of case studies has also started.

Second period (M19-M36). During the second half of the project the activity of WP 4 brought to the finalization of Deliverable 4.1, submitted in month 20. The main outcomes presented in D4.1 consisted in an Excel-based Data Entry Sheets and, in the development of “BIKE Set of Sustainability Indicators”. The activity of tasks 4.1 and 4.2 was used as a basis for the development of the full feasibility assessment study, described in the “Report on the sustainability assessment of the selected low ILUC-risk schemes tested”. The sustainability assessment was based on four real case studies:

- Biogas Done Right (BDR) model implementation for biomethane injection in the gas grid and conversion in liquid biofuels in Italy;
- Mischantus cultivation in degraded lands for production of lignocellulosic ethanol in UK;
- Brassica Carinata cultivation as cover crop for renewable fuels production in Greece;
- Castor Oil production by castor plantation in arid land in Kenya for HVO production;

The report, submitted as Deliverable D4.2, identifies the conditions to ensure a social and environmental sustainability of the four BIKE case studies.

3.4.1 Main findings of WP4

The full assessment activity, reported in Deliverable 4.2, contributes to the discourse surrounding the BIKE project's ambition to foster sustainable case studies. Despite uncertainties concerning the applicability of the concept (the BDR model and Biomethane policies, and some data limitations), results of the BDR-GTL study in Italy showed top-notch environmental sustainability performance. The success in climate change mitigation is mainly due to long-term carbon storage in agricultural soils from biodigestate. Positive social indicators include job creation and income improvement. Economic indicators, in the current context and policy environment, lean towards a positive evaluation. For HVO production from Kenyan castor oil, this case study highlights biochar's role in achieving nearly carbon-neutral bioenergy, alongside water and soil quality benefits. But the value chain's current state doesn't fully support such ambitions. Lack of labour and wage data hindered social indicator measurement. Industrial competition risks affected data collection, leading to mainly secondary data analysis for those indicators.

Regarding the UK's cellulosic ethanol potential, 2023 shows favourable economics due to energy prices. If conditions persist, the value chain remains financially appealing. Positive environmental impacts, like GHG savings and biodiversity, were seen. No negative social effects were found, yet the value chain's contribution to social development indexes is limited.

3.5 Work Package 5

First period (M1-M18). In the first period of the project, the WP leader, supported by the partners involved in WP5, worked to develop a map of the legal, institutional and policy frameworks in EU related to the biofuels sector and, in particular, to the BIKE case studies.

Second period (M19-M36). At the beginning of the second part of BIKE project, the leader of WP5 finalized the first deliverable D5.1, submitted in month 24. The deliverable consisted in a report titled: “Stock taking: mapping the legal, institutional and policy frameworks in EU and case studies”, where EU policy landscape on energy, agriculture and policy impacts the low ILUC-risk

feedstock value chains. After M20 the work of WP5 started from the outcomes of task 5.1 and 5.2 to develop, within task 5.3, a set of proposals for a low ILUC-risk supportive framework for the four BIKE case studies. Moreover, during the project, the activity of WP5 brought to the publications of 13 policy briefs, available on BIKE website.

3.5.1 Main findings of WP5

From the policy analysis performed, the BIKE project sees the opportunity for more sustainable low ILUC-risk systems as much broader and more important than simply being a way to identify responsible palm oil production systems. The most promising regulatory window in the short term is the provision in the RED II itself, which gives Member States agency to regulate biofuels differently on the basis of their estimated ILUC emissions. However, low ILUC-risk production intersects with a number of policy goals and themes outside of the energy sector. The recommended actions to support the market uptake of low ILUC-risk biomass production for biofuels include a mix of facts (opportunities for biomass supply through yield increase based on statistics and modelling) and subjective observations (based on the discussions of the BIKE team with the industrial partners in the project). In this respect, key elements to be noted are:

- Yield increases should be calculated in a transparent and consistent manner;
- Double counting of low ILUC-risk feedstocks (though not those that were not formerly classified as high ILUC-risk) would provide a value signal;
- Recognition of farm-scale "carbon farming" initiatives in national land carbon inventories (such as the EU's LULUCF framework) is needed to allow for farmers valorization of their carbon sequestration, and for governments to make use of an additional decarbonisation pathway;
- Introduction of indicator-oriented incentives, would allow multiple measures to be combined to significantly improve land productivity for both the food and feed and the energy sector;
- Integration of low ILUC risk to rural development programmes;
- Use multi-dimensional sustainability indicator sets to channel support for existing projects and to guide policy decisions about the future of farming.

3.6 Work Package 6

First period (M1-M18). The activity of WP6 started at project M7. The first and crucial activity of this WP was the collection of information and assessment of BIKE case studies. Four case studies have been selected for auditing:

- Biogas production in Apulia, Italy;
- Castor oil cultivation in Kenya;
- Brassica carinata cultivation in Uruguay;
- Miscanthus cultivation in UK.

Additional case studies, located in Italy, Greece, and UK, have been identified for the open labs and visits.

Second period (M19-M36). In the second phase of the project, four planned open labs have been organized, plus an additional one in Hungary**.** The 1st Open Lab, organized in Sardinia, focused on growing oilseeds like castor bean on marginal lands, the 2nd one, which took place in Greece, focused on growing perennial grasses on marginal lands, the 3rd open lab, in Thessaloniki, showed practices on growing selected oilseeds like carinata and camelina in rotation with conventional crops on typical agricultural lands following specific cultivation protocol to increase the biomass productivity per land unit, and the 4th was organized in Italy on the biogas done right model. The 5th open lab, organized by AKI, in Hungary, addressed the application of low ILUC-risk practices and the refinery process of bioethanol value chain. The case studies identified in WP 6 were also object of a SWOT analysis. All the deliverables related to this WP have been submitted in the second half of the project.

3.6.1 Main findings of WP6

The organisation of the open labs included all BIKE case studies. In total five open labs were organised (two in Italy, two in Greece and one in Hungary) instead of four initially planned. **More than 100 stakeholders joined the BIKE events**. In all cases the open labs had indoors and outdoors sessions (half day each). In all labs, material was distributed to the participants and several questions had been raised during them. The Open labs enabled invited stakeholders, and industrial partners, to understand the state of development, as well as the critical aspects of low ILUC risk case studies identified by BIKE project. Participants could observe the cultivation yield of castor and of perennial crops in degraded lands and have clear information about the potentials and the limits of mechanical harvesting systems.

3.7 Work Package 7

First period (M1-M18). The activity of WP7 – focused on communication, dissemination, and support to implementation of BIKE results – is ongoing since project M1. The visual identity of the project, and in particular the logo, the PPT layout and the website structure, have been drafted. Within M3 the WP leader produced the Stakeholder Engagement & Dissemination Plan (SE&DP), the social media channels and the project website. From M6 to M18 three additional deliverables have been submitted: the Data Management Plan (DMP), the mid-term SE&DP and the mid-term Data Management Plan.

Second period (M19-M36). In the second period, the dissemination activity involved the publication of policy briefing and the organization of webinars addressed to different

stakeholders' categories. 12 policy briefs, 2 webinars and a final event were organized. Moreover, the project communication was carried out on social media and on project website. Deliverables D7.6 ("Final Project Publication"), Deliverable D7.7 ("Final report on activities done within WP7"), and D7.8 ("Final Data Management Plan of BIKE project"), were submitted during the last 18 months of the project.

3.7.1 Main findings of WP7

Due to the nature of its activities and the schedule of Deliverable submissions, the bulk of the D&C activities took place after M24. In the period M1-M24 the visual identity, the website and initial materials were made available, followed by a series of news posts both on Social-media/Website and the participation in some online events. In total, 23 website news items, 12 briefing notes, 4 factsheets, 2 webinars, 2 workshops, 8 video interviews, 3 open lab videos and 1 roundtable were organized during the project. The final project publication was released in August 2023 (M35) and its dissemination is currently the main effort of the D&C activities, as well as the follow-up activities taking place between August and December 2023.

3.8 Work Package 8

First period (M1-M18). The Coordination was active since the beginning of the project. The coordinator submitted two deliverables: D8.1, D8.2, and the present deliverable D8.3

Second period (M19-M36). The second period was more intensive than the first period, as it included all the open labs and auditing activity. During this period, the coordinator continuously updated the Project Officer about the ongoing activities and the eventual delays, or critical aspects. Two deliverables have been submitted in this phase: Deliverable D8.4, and D8.5**.**

4 Meetings and cooperation activities performed during the BIKE project.

To ensure an effective partners cooperation and an on-time achievement of expected milestones, the partners organized a set of meetings and events dedicated to the collection of results and to exchange knowledge between partners. The following table (Table 1) summarizes the meetings organized during the project. The events dedicated only to dissemination are not reported.

Table 1. ***Project meetings and management activities performed during period M1 – M36***

N.	Activity type	WP	Partners involved	Date	Discussion topic	Results of the discussion
1	Project meeting	All	All	M1	Kick-Off Meeting	Reported in the "**Minutes of the kick-off meeting**"
2	Set up of BIKE platform	8	All	M2	Project Management	All partners contacts have access to the BIKE management platform
3	Project meeting	All	All	M6	1st Project meeting	1st progress meeting held on 12/03/2021.
4	Data sharing	8	All	M9	Interim financial reporting	Coordinator received preliminary data about financial reporting by partners
5	Project meeting	All	All	M12	2nd Project meeting	2nd progress meeting held on 29/09/2021.
6	Project Meeting	All	All	M18	3rd Project meeting	3rd progress meeting was held on 25th of February 2022.
7	Review meeting	All	All	M20	Review meeting of interim period	Review meeting
8	Data collection	8	All	M24	Interim financial reporting	Data collection
9	Project Meeting	All	All	M25	BIKE progress meeting	Project meeting in Athens, Greece
10	Project meeting	All	All	M31	Progress Meeting	Project meeting n Thessaloniki, Greece
11	Collection of data on financial reporting	All	All	M36	Project final financial reporting	Collection of data on financial reporting
12	Project meeting	All	All	M37	Final project meeting	Final project meeting taking place on 11th of September

5 Critical aspects and limiting factors

As reported at month 18, in the project interim report, one of the most relevant aspects was represented by the Covid-19 pandemic and particularly the second wave, which did not allow any physical meeting, nor partner travels until the end of April 2022, Month 20 of the project.

Thanks to the improving global conditions, the pandemic effect and the related restrictions imposed by national governments gradually decreased after month 20, enabling BIKE partners to start planning the two main activities which strictly required travels and physical meetings: the auditing activity by ISCC to the selected case studies and the open labs to the low ILUC-risk biomass feedstock production or conversion sites. Despite the delay, the auditing activities were carried out on-site, within month 24, by ISCC. The first open lab, on Castor Oil case study, took place the 1st week of September, Month 25 of the project. This event represented the first occasion of project partners to meet together. The Covid pandemic also had an indirect impact on the collection of data related to the low ILUC-risk case studies identified by the project. In particular, data collection and monitoring activity on cultivation of Castor been in Kenya, and on Brassica Carinata, in Uruguay, was possible later than initially expected. This delay impacted on the activity of WP2 and WP4 and, in particular, on the development of Deliverables D2.3 and D4.2, for which a detailed set of data had to be collected and implemented.

6 Conclusions

Despite the criticality represented by the pandemic, the BIKE project consortium worked intensively to respect the initial work programme and to achieve all the expected milestones. Thanks to these efforts, the project achieved a set of relevant outcomes for the future market uptake of low ILUC-risk biofuels in Europe:

- The development of a low ILUC-risk certification system by ISCC, including a handbook explaining the methodology and an assessment of actions to take;
- The identification and auditing of four industrial size low ILUC-risk case studies;
- The determination of main barriers, strengths and status of the identified value chains;
- The assessment of economic benefits and actual opportunities of the four identified case studies;
- The mapping of low ILUC-risk initiatives to be potentially replicated at EU level based on BIKE case studies;
- The development of specific policy proposals to facilitate the market uptake of low ILUC- risk biofuels in Europe.

As a summary, it was found that low ILUC-risk biofuels could strongly contribute to improve the EU agriculture sector, and to the decarbonization of transportation sectors where electric engines could be hardly introduced, like aviation and marine transportation.