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A large, full-page background image showing a microscopic view of numerous green, oval-shaped cells or spores. The cells are clustered together, with some showing internal structures. The overall color is a vibrant green.

D6.3 INNOVATION AND IPR MANAGEMENT PLAN



The VIVALDI project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000441.



History Chart

Version	Date	Implemented by
V2.0		
V1.1		
V1.0	27 August 2021	ISLE

VIVALDI Consortium

Coordinator:	UNIVERSITAT AUTÒNOMA DE BARCELONA (UAB)
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Executive Summary

The IPR and Knowledge Management Plan (D6.3) of the VIVALDI project is one of the five parts of the Plan for Dissemination and Exploitation of the Results (PEDR) that will include all the required initiatives for fast market adoption of VIVALDI's solutions (Figure 1).

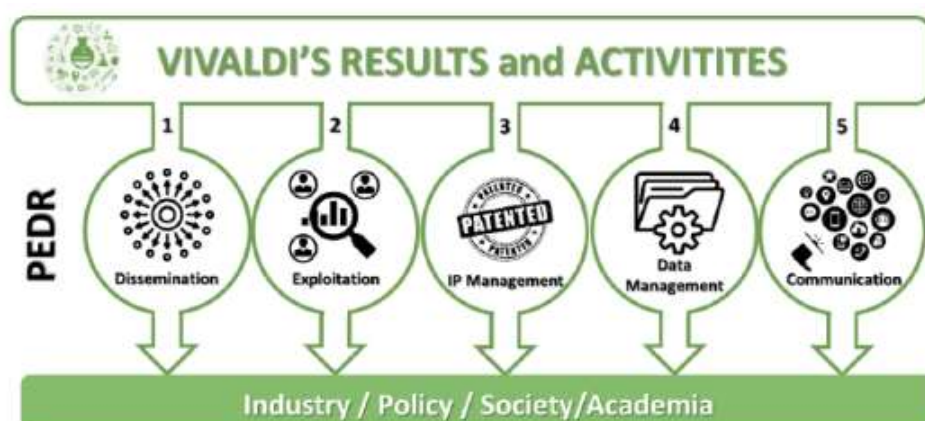


Figure 1. Main axes of VIVALDI's Plan for Dissemination and Exploitation of the Results.

The IPR and Knowledge Management Plan is focused on protecting the results generated under the project (any tangible or intangible output, more particularly data, knowledge, or information).

The main objective of the IPR and Knowledge Management Plan (D6.3) is to provide the VIVALDI's partners with a document that defines how newly generated knowledge and related new IP (Foreground) will be managed within the project. The methodology to ensure a proper handling of the knowledge and IP during the project implementation is aligned with: (i) the IP-related provisions provided in the Grant Agreement (GA) and (ii) the IP arrangements specified and agreed on the Consortium Agreement (CA).

The VIVALDI's Innovation Board, led by ISLE (leader of WP6.Exploitation and Regulation), will be the main responsible for implementing the IPR and Knowledge Management Plan focusing on the preservation of IPR before any dissemination of the results and ensuring the future exploitation of VIVALDI results.

The IPR and Knowledge Management Plan is divided in three main sections:

- **Background:** this section includes the identification of pre-existing knowledge of the project partners, the methodology and rules to modify the background and grant access to it.
- **Results:** this section defines the methodology implemented within the VIVALDI project to identify the project results and assess their exploitability. Aspects such as ownership of the results, protection of the results, transfer and licensing of the results and access right to the results are addressed in this section.



This section also includes a description of the exploitation strategy, which defines the methodology to identify the best exploitation route for the project results based on the type of result, exploitability readiness level potential and impact. It also includes the rules and obligations related to the exploitation of the results. The VIVALDI Exploitation and Business Strategy Plan (D6.1) will provide more detailed information on the strategy to further utilise the results of the project for further, research, potential economic activities, or policy recommendations.

The dissemination strategy is also included in this section where the methodology, rules, and obligations to disseminate the results are defined. The Dissemination Plan (D7.2) will provide more detailed information on the dissemination strategy of the project results and it will be focus on spreading VIVALDI results to a wide stakeholder base that is interested in VIVALDI's outcomes and are likely to use them in activities other than exploitation, including scientific diffusion and knowledge exchange.

- IPR Surveillance and Optimal IPR Protection: this section includes the description of the methodology to map existing patents and identify potential overlapping IPR, surveillance IP landscape and definition of the strategy to address any possible conflicts, propose optimal IPR protection options in link with selected business model options and implementation of proper IPR protection measures during the project.



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List of abbreviations

CA	Consortium Agreement
EBSP	Exploitation and Business Strategy Plan
GA	Grant Agreement
IB	Innovation Board
IPR	Intellectual Property Rights
PEDR	Plan for Dissemination and Exploitation of the Results
SC	Steering Committee
WP	Work Package



1. INTELLECTUAL PROPERTY RIGHT RULES

The major scope of the Intellectual Property Right (IPR) and Knowledge Management Plan is to ensure the protection of the knowledge and innovation that will be generated within the VIVALDI project, guaranteeing a strong exploitation positioning.

The IPR and Knowledge Management Plan of the VIVALDI project will be built up on the IPR rules under the H2020 framework programme, which are set in the two agreements signed by the VIVALDI consortium:

- **VIVALDI Grant Agreement (GA)** is the core agreement of the VIVALDI project. It establishes the general terms and conditions (legal and financial regulations) of the project, and it is signed between the Research Executive Agency, the Coordinator, and the rest of the partners of the Consortium. The GA set outs the general rules regarding IPR, their use and dissemination. The IPR regulations can be found in Section 3 (Rights and obligations related to background and results) of the GA number 101000441 – VIVALDI (Article 23-31).
- **VIVALDI Consortium Agreement (CA)** is an internal agreement signed between all the Consortium partners. The CA provides provisions on IPR, dissemination and exploitation and it cannot be contrary to the provisions of the GA. The CA tackles the IPR issues of the project, including confidentiality, agreement on background, access right, ownership/joint ownership, protection of results, and exploitation of results. The CA is the base for the design of the VIVALDI exploitation strategy.



2. KEY TERMS

The VIVALDI GA includes the definition of 5 key terms that will be used as core structure of the IPR and Knowledge Management Plan of the project (Table 1).

Table 1. Definition of the key terms included in the VIVALDI's GA.

Key terms	Brief Description
Background	GA Art.24.1 - "Background" means any data, know-how or information – whatever its form or nature (tangible or intangible), including rights such as intellectual property rights - that: <ul style="list-style-type: none"> a. Is held by the beneficiaries before they acceded to the Agreement, and b. Is needed to implement the action or exploit the results
Results	GA Art 26.1 – "Results" means any (tangible or intangible) output of the action, such as data, knowledge or information – whatever its form or nature, whether it can be protected or not – that is generated in the action, as well as any rights attached to it, including intellectual property rights.
Exploitation	GA Art 28.1 – Each beneficiary must – up to four years after the period set out in Article 3 – take measures aiming to ensure "exploitation" of its results (either directly or indirectly, in particular through transfer or licensing, see Article 30) by: <ul style="list-style-type: none"> a. Using them in further research activities (outside the action) b. Developing, creating, or marketing a product or process c. Creating and providing a service, or d. Using them in standardisation activities
Dissemination	GA Art 29.1. – Unless it goes against their legitimate interests, each beneficiary must – as soon as possible – "disseminate" its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results) including in scientific publications (in any medium).
Access Rights	GA Art. 25.1 – "Access Rights" means right to use results or background under the term or condition laid down in this Agreement. Waivers of access rights are not valid unless in writing. Unless agreed otherwise, access rights do not include the right to sub-license

2.1. Other Key Terms

Other key terms to be considered are:

Key terms	Brief Description



Intellectual Property

IP means all intellectual property rights and know how including inventions, discoveries, patents, design rights (registered or unregistered), trademarks, copyright, know how, information, including business and economic information, experience, processes, procedures, devices, compositions of matter, skills, samples, trade secrets, designs, formulae, specifications, methods, techniques, compilations, programs, devices, technical information, concepts, developments, in each case whether registered or unregistered and including all applications for and renewals or extensions of such rights, and all similar or equivalent rights or forms of protection in any part of the world.

Innovation Board

Board responsible to ensure that all the project results are identified, described and the best routes for exploitation prioritised.

Project results assessment

Methodology applied to assess the project results based on the categorisation of each of the project results, the identification of the route of exploitation (e.g., commercial, or non-commercial) and whether it is required to protect them or not.



3. INTRODUCTION

3.1. Innovation Board

The Innovation Board (IB), led by ISLE (chaired by Dr Blanca Antizar) will be composed by all the technology developers of VIVALDI (UAB, BOKU, LTU, VITO, UFZ, LEITAT, PROC, NUT, NVMT). The IB will mainly be responsible for implementing the IPR and Knowledge Management Plan (see Figure 2), ensuring that the market will be continuously monitored to understand its needs so that VIVALDI development meets all of them. Moreover, the IB will focus on the preservation of VIVALDI's IPR before any dissemination of the results and ensuring the future exploitation of VIVALDI integrated solution.

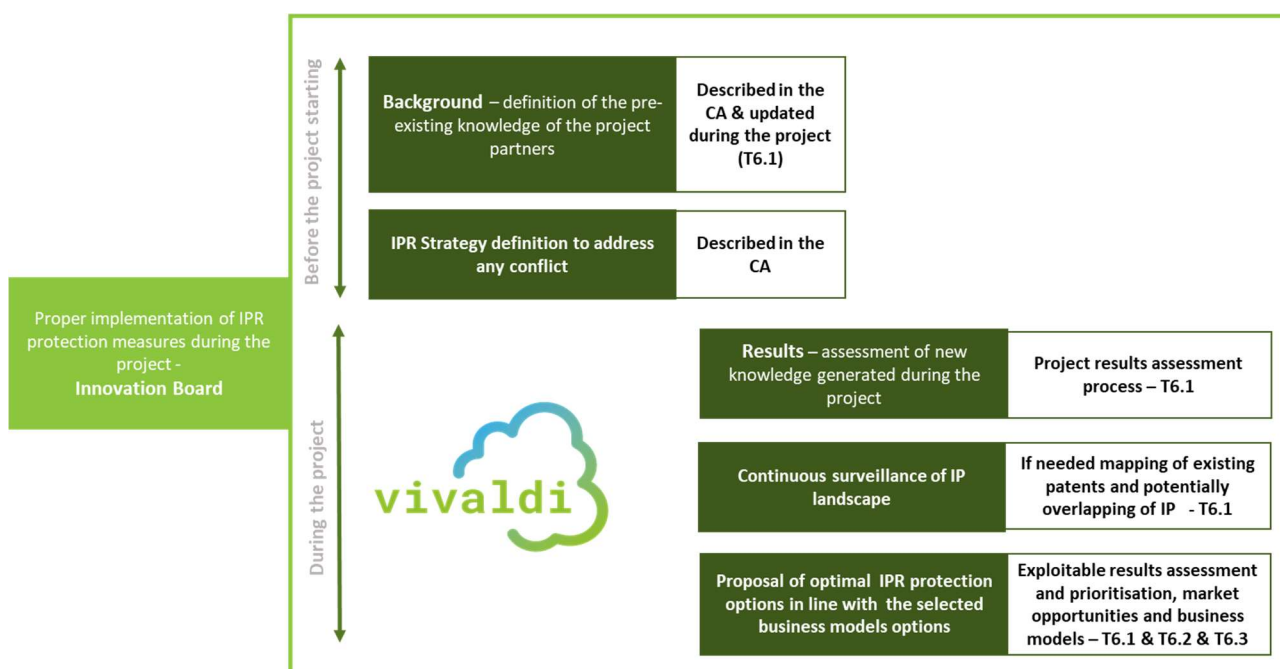


Figure 2. Overview of the main steps included in the VIVALDI IPR and Knowledge Management Plan.

3.2. IPR and Knowledge Management Plan Structure

The IPR and Knowledge Management Plan is a key part within the Exploitation Strategy of the VIVALDI project results that will be implemented within the VIVALDI project to ensure that the impact of the project results is maximised.

The main objective of the IPR and Knowledge Management Plan is to ensure that the innovation activities and IPR in the VIVALDI project are addressed in a proper and systematic manner. To do so, the VIVALDI IPR and Knowledge Management Plan has been structured into the following main activities to ensure that the new knowledge generated, and related IP is managed efficiently (Figure 2):



- Definition of pre-existing knowledge of the project partners – Background (section 6)
- Assessment of the new knowledge generated during the project – Results (section 7)
- IPR surveillance and optimal IPR protection (section 8) that includes:
 - Mapping of existing patents and potential overlapping IPR, if needed.
 - Continuous surveillance of IP landscape and strategy definition to address any possible conflicts.
 - Proposal of optimal IPR protection options in link with the selected business models options.
 - Proper implementation of IPR protection measures during the project.

The following sections in the document provide a description of each of these parts included within the IPR and Knowledge Management Plan.



4. BACKGROUND

4.1. Pre-Existing Knowledge Definition

The VIVALDI CA in Attachment 1, includes the pre-existing knowledge of the project partners. The CA establishes in section 9 (subsections 9.1.1 and 9.1.2) which are the Access Rights to the pre-existing background.

Modifications on the background identified in the Attachment 1 of the CA can be done during the project, either adding further background or withdrawing any background previously identified by any of the Consortium partners. The procedure to follow by the partners that wish to modify or withdraw its Background is as follows (see Figure 3):

- To communicate to the Steering Committee (SC) whether the relevant consortium partner wishes to modify or withdraw any of their own Background in Attachment 1 of the CA. The SC needs to approve any modification of the Background in Attachment 1 of the CA.
- Once approved by the SC, the relevant consortium partner should inform of the change(s) made by written notice to the rest of the Consortium's partners.

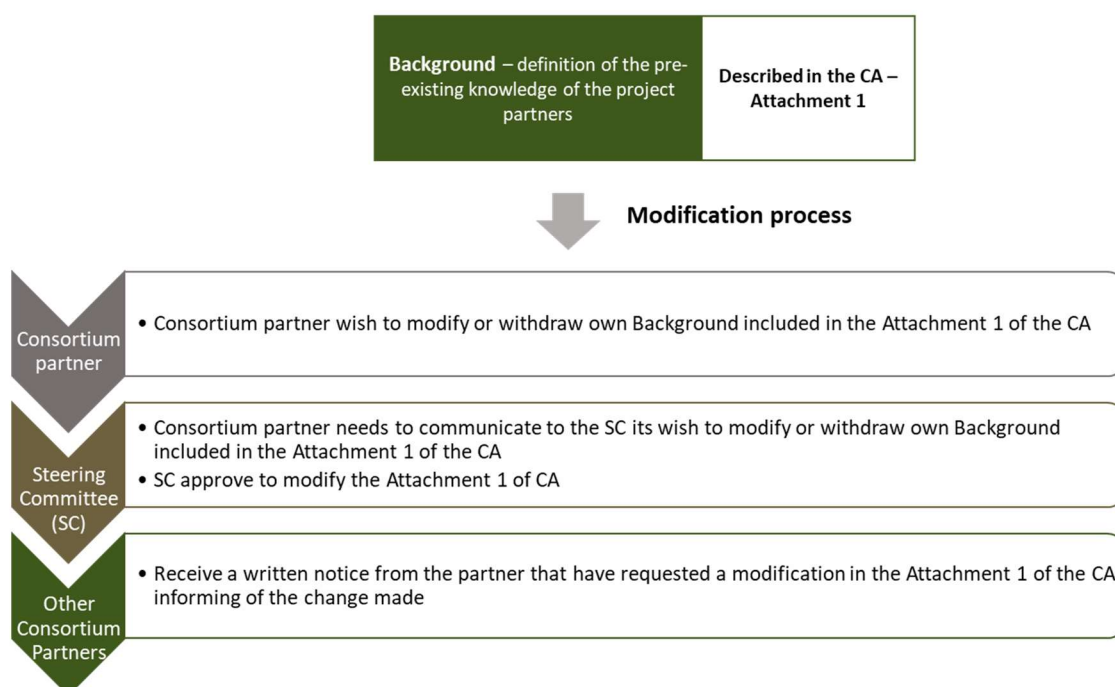


Figure 3. Overview of the process that the Consortium Partners must follow to modify or withdraw their Background in the Attachment 1 of the CA.



4.2. Access Rights to Background

The Access Rights to Background are defined in the Article 25 of the GA and the definition of Access Rights is included in the Article 25.1. of the same agreement.

According to the GA (Article 24) Background is defined as “data, know-how, or information...” that is needed to implement the action or exploit the results”. Because of this need, Access Rights have to be granted in principle, but Parties must identify and agree amongst them on the Background for the project.

The Attachment 1 of the CA shows the Background identified by each of the Consortium partners and agreed upon for the project, including the identification of specific limitations and/or conditions for implementation and exploitation of the Background which are defined in the Article 25.2 and 25.3 of the GA, respectively (see Annex I of the GA).

A summary of the pre-existing knowledge (Background) identified (number) by each partner at the time of the signature of the CA and the Access Rights for implementation and exploitation of the Background is presented in the following Table 2.

Table 2. Summary of Background identified by different partners at the time of the signature of the CA and the Access rights for implementation and exploitation

Partner	Background Number	Specific limitations and/or conditions for implementation (Article 25.2 GA)	Specific limitations and/or conditions for exploitation (Article 25.3 GA)
UAB	4	The use of the specified background under VIVALDI is based on a preceding agreement between UAB and any other VIVALDI Party.	The use of the specified background under VIVALDI is based on a preceding agreement between UAB and any other VIVALDI Party.
BOKU	2	The use of the specified background under VIVALDI is based on a preceding agreement between BOKU and any other VIVALDI Party.	The use of the specified background under VIVALDI is based on a preceding agreement between BOKU and any other VIVALDI Party.
LTU	1	Access Rights to Background is only granted to the extent that it is needed for implementation of the action, owned by participating researchers, has been published, has been clearly entered into the Project by the owner or party.	Access Rights to Background is only granted to the extent that it is needed for implementation of the action, owned by participating researchers, has been published, has been clearly entered into the Project by the owner or party.
VITO	1	The use of the specified background under VIVALDI is based on a preceding agreement between VITO and any other VIVALDI Party.	The use of the specified background under VIVALDI is based on a preceding agreement between VITO and any other VIVALDI Party.
UFZ	2	The use of the specified background under VIVALDI is based on a preceding agreement between UFZ and any other VIVALDI Party	The use of the specified background under VIVALDI is based on a preceding agreement between UFZ and any other VIVALDI Party



Partner	Background Number	Specific limitations and/or conditions for implementation (Article 25.2 GA)	Specific limitations and/or conditions for exploitation (Article 25.3 GA)
BZK	1	In certain situations, the use of a specific background within VIVALDI may require a separate agreement between BZK and any other VIVALDI Party	In certain situations, the use of a specific background within VIVALDI may require a separate agreement between BZK and any other VIVALDI Party
LEITAT	2	No specific limitations and/or conditions identified	
PROC	1	No specific limitations and/or conditions identified	
ISLE	1	No specific limitations and/or conditions identified	
SUN	1	No specific limitations and/or conditions identified	

There are 6 partners of the project (UVIC, NTU, AVT, CVE, DAMM and NVMT) that at the moment of the signature of the CA stated that: “At the best of their knowledge, no data, know-how or information of them shall be needed by another party for the implementation of the project or exploitation of that other party results” (see Annex I of the CA).

The methodology to assess the VIVALDI Project Results (detailed in section 7.2) will be used to capture any pre-existing knowledge owned by the partners that was not identified and included as Background in the Annex I of the CA at the signature of the agreement. If a modification and/or withdraw of the Background owned by the partners is required during the project this will be done through the procedure described in the previous section of this IPR and Knowledge Management Plan (section 6.1) and all the Background rules included in the GA and CA will apply to these new Backgrounds.

5. RESULTS

5.1. Results Definition

Results according to the GA (Article 26) are defined as “any (tangible or intangible) output of the action such as data, knowledge or information – whatever its form or nature, whether it can be protected or not – that is generated in the action, as well as any right attached to it, including intellectual property rights”.

5.2. Project Results Assessment

The Project Results Assessment process that will be implemented within the VIVALDI project will provide a clear overview of what the potential of exploitation is for each project result in the VIVALDI project and what is the best route to exploit them. This information will be used to determine the best exploitation strategy for each of the exploitable results to maximise their impact in the market, society and/or scientific community.



The IB will be the responsible to ensure that all the project results are identified, described and the best routes for exploitation prioritised, including whether the project results must be protected or not. The routes for commercial exploitation of the different project results will be refined during the project through the Project Results Assessment Process described in this section, and that will be undertaken in WP6. The outputs of the assessment will be included in the Exploitation and Business Strategy Plan (EBSP) for VIVALDI results.

The different steps included in the Project Results Assessment are shown in Figure 4.

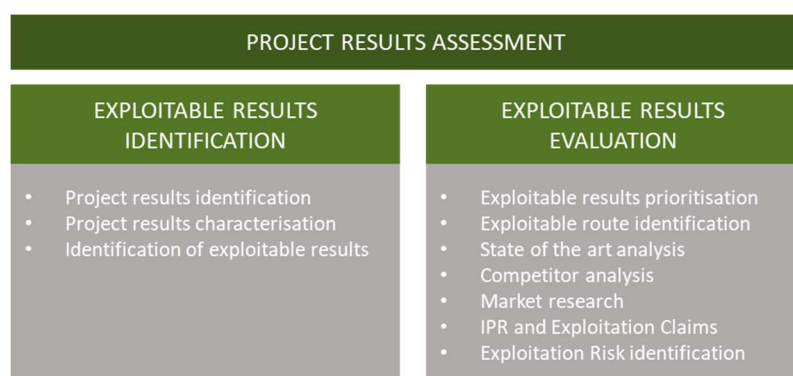


Figure 4. Project Results Assessment Process

5.2.1. Exploitable Results Identification

The Project Results Assessment will start at the beginning of the project with the Exploitable Results Identification. This involves identifying all the VIVALDI project results, with information gathered about the type of project result, in which Work Package (WP) was generated, the partner owner of the project result, the partners involved in the generation of the project results, the level of exploitability and IPR information on the project result.

This information will be used to characterise all the project results, depending on their nature and their level of exploitability, to identify which results could be exploited beyond the project. The identification and characterization of all the project results is the first step to identify the Exploitable Results of the project.

To identify all the VIVALDI projects results, IP status and their expected route of exploitation, a PROJECT RESULTS TEMPLATE was put together at the start of the project to capture all information required from VIVALDI partners. This PROJECT RESULTS TEMPLATE is divided in 3 main sections:

- **Project results description.** This section gathers the general information related to each of the project results, including the partner owner and other potential partners involved in the development of the Result and the exploitation route (Table 3).

Table 3.. Part 1 of the project result characterisation information gathering criteria

Part 1: Project Results Description
Project result name



Part 1: Project Results Description

Work Package

Partner owner

Partners involved

Description

Type of project result

Exploitable level

Development phase

Time to exploitability

Exploitation route

Geographical exploitation level

- **IP status.** This section identifies the IP status related to the project result, and the IP protection measures that may apply to the project results (Table 4).



Table 4. Part 2 of the project result characterisation information gathering criteria

Part 2: IP Status
Status of IP_Background
Is further IP protection required?
Status of IP_Foreground

Information on the different types of IP protection that could be applied depending on the type of results is provided in the PROJECT RESULTS TEMPLATE and are shown on Table 5.

Table 5. Types of IP protection measures that may apply to the VIVALDI project results

IP Protection	Description
Patent	Invention, software
Utility model	Invention
Industrial design	Design of product, website
Copyright	Software, scientific article, design of a product, website
Trademark	Design of a product, Name of a product, service/project, website
Confidential information	Invention, software, know-how
No IP protection required	

- **Route to exploitation.** This section is designed to be completed for those project results that are going to be commercially exploited beyond the completion of the project (Table 6). The purpose of collecting this information was to ensure that effective business plans could be created to enhance the exploitability of the results beyond the VIVALDI Project

Table 6. Part 3 of the project result characterisation information gathering criteria

Part 3: Route to Exploitation
Do you want to commercially exploit this project result?
Unique Selling Point
Market areas of application



Part 3: Route to Exploitation

Potential end-users/customers

Potential competitors

Key exploitation partners

Key resources

Exploitation risks

Revenue streams

The PROJECT RESULTS TEMPLATE has been already shared with all the partners of the VIVALDI Consortium at the start of the project to gather all the information available at the beginning of the project related to the Project Results that are expected to be developed during the project, including the need of IP protection (an example of PROJECT RESULTS TEMPLATE filled by a partner and a summary of the main information gathered can be seen in Annex II). The information capture will be used to carry on the first assessment of the VIVALDI project results. The information in the PROJECT RESULTS TEMPLATE will be updated every 6 months by the corresponding owners of the respective results.

The bi-annual update on the project results characterization, IP status and exploitation route will be used to establish the best strategy to disseminate and exploit the results through the identification of the best route of exploitation of each result (through the Exploitation Results Evaluation process).

Dissemination and commercialization will occur only when full protection of innovations and agreements (among consortium partners but also with external ones)- following the rules and obligations indicated in the GA and CA - will be reached. The process to fully protect the Project Result will be supervised by the IB; this board will take care of the innovation activities and IPR issues in VIVALDI project that are addressed in the CA (see section 5.1).

5.3. Exploitation of the Results

The Article 28 of the GA defines the obligations of the Consortium Partners related to the Exploitation of the Results.

According to it, each partner within the VIVALDI project must take measures to ensure the exploitation of its results, either directly or indirectly, through different exploitation routes (e.g., using them in further research activities, developing, creating, or marketing a product or process; creating and providing a service; or using them in standardisation activities) and business models (e.g., transfer or licensing the project result).

5.3.1. Exploitation Strategy

The Exploitation Strategy of the VIVALDI Results will be defined based on the outcomes of the Exploitable Results Evaluation phase (see Figure 4).



The Evaluation of the Exploitable Results includes two steps:

- **Prioritisation of the VIVALDI exploitable results** to determine what impact they can have in the market, society and/or scientific community and,
- **Establish the best strategy** to disseminate and exploit the results through the identification of the best route of exploitation for each result.

The Exploitable Results will be classified in two main groups based on the routes that can be used to exploit them to achieve the maximum impact in the market, society and/or scientific community.

- **Non-commercial project results** – main route of exploitation is scientific and/or societal
- **Commercial project results** – main route of exploitation is economic. Commercial project results can be also exploited through scientific and/or societal routes.

The identification of which are the best routes of exploitation of each Exploitable Result will also support the establishment of the best strategy to disseminate each exploitable result (see section 7.4) to make sure that the exploitable results are presented to the most appropriate events. That will enable the VIVALDI partners to reach the correct audience in respect to the relevant exploitable result, thus enhancing exploitation.

5.4. Dissemination of the Results

The Article 29 in the GA establishes the rules and obligations that applies to the Consortium Partners to disseminate the Results.

According to it the VIVALDI partners must – as soon as possible – disseminate their results by disclosing them to the public by appropriate means (other than those resulting from protection or exploiting the results) and including in scientific publications (in any medium). That does not change the obligation of the partners to protect results as it is stated in the Article 27 of the GA, the confidentiality obligations in Article 36 of the GA, the security obligations in Article 37 of the GA or the obligations to protect persona data in Article 39 of the GA, all of which still apply.

5.4.1. Dissemination Strategy

A Dissemination Plan will be developed in the VIVALDI project to establish the dissemination strategy with the purpose of diffusing the results of VIVALDI project in the appropriate fora and to relevant stakeholders and thereby increase the impact of the project and its potential to be the seed of further activities. Due to the similar principles, it will be developed simultaneously with the Communication Plan. The VIVALDI project outcomes (Exploitable Results), such as the specific materials, technologies, and methodologies portfolio, as well as the learning material built, will be disseminated through a variety of channels, and following agreed procedures.



The dissemination of the VIVALDI Exploitable Results will never jeopardise the potential protection of generated IPR (e.g., patent, product design) and further industrial application. The right to claim ownership or to deny the disclosure of specific background, as well as foreground information that may compromise future exploitation paths, will be assured to all the partners by means of a framework of shared rules summarized in Figure 5. Ownership issues, open access routes (green or gold) and protection methods will be addressed by the consortium, the Innovation Manager (ISLE) and the Dissemination Manager (CVE).

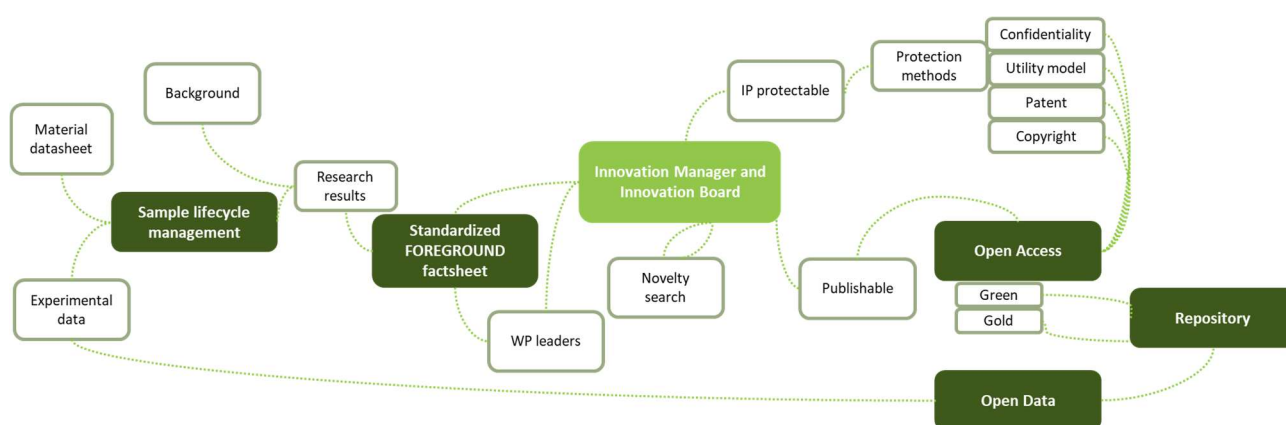


Figure 5. Dissemination and protection of Foreground: paths and rules

Therefore, before any dissemination activity (publication, presentation, etc.), strict rules of prior notice to all partners will be applied under supervision of partners leading dissemination and exploitation activities. For this reason, a foreground factsheet template will be developed to collect snapshots of the results (including information on type, ownership, proposed dissemination actions or level and method of protection). Partners will have the possibility to refuse dissemination of their own know-how (background or results) when it could potentially harm the partners' interests. The Innovation Manager will carefully oversee promoting, fostering, and monitoring all the aspects related to IP protection. The consortium will not charge IPR for the publication of project results on VIVALDI website, publications, or other dissemination activities. Scientific publications produced by VIVALDI will be governed by the H2020 Open Access Policy as required by the EC and described in Open AIRE.

The section 8.4 of the CA establishes the rules and paths that governs the dissemination of the Project Results within the VIVALDI project (Figure 6).

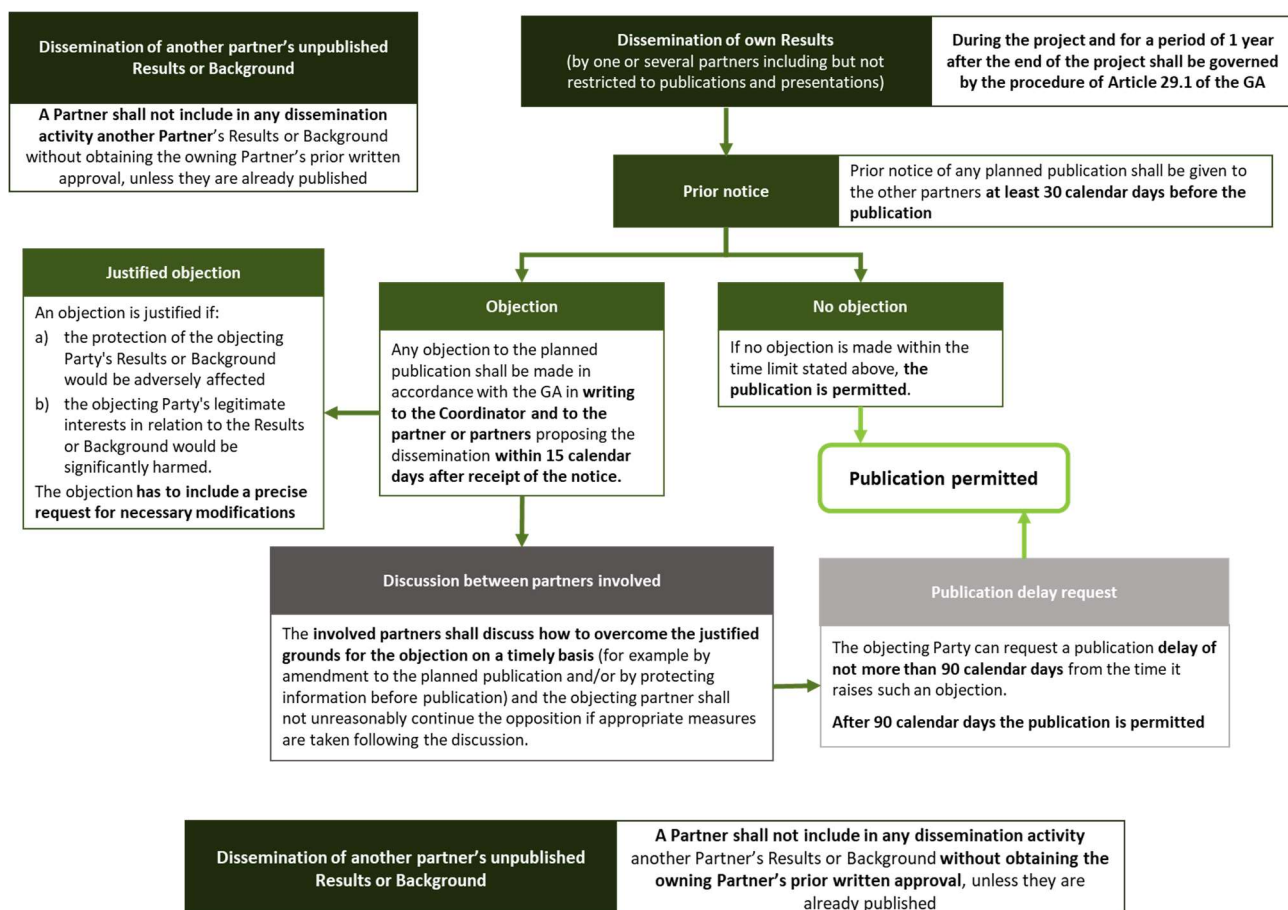


Figure 6. Paths and Rules defined in section 8.4 of the CA that governs the Dissemination of own Results and another partner unpublished results or background within the VIVALDI project.

5.5. Ownership of the Results

The results as it is established in the GA (Article 26.1) and in the CA (section 8.1) are owned by the partner that generates them.

Both agreements also establish the rules to identify when it can be considered that there is a joint ownership of the project results (Article 26.2 of the GA and Section 8.2 of the CA). The CA (Section 8.2) also defines the rules that apply in terms of IPR in case of a joint ownership of the results.



5.6. Protection of the Results

The Article 27 of the GA establishes the rules that apply to the owners of the Results in terms of Protection, including: (i) Obligation to protect the results (Article 27.1), (ii) Agency ownership, to protect the results (Article 27.2), and (iii) information on EU funding (Article 27.3).

The owners of the Results as it is indicated in the Article 27.1 of the GA must examine the possibility of protecting its results and must adequately protect them - for an appropriate period and with appropriate territorial coverage – if:

- a. the results can reasonably be expected to be commercially or industrially exploited and;
- b. protecting them is possible, reasonable, and justified (given the circumstances).

The methodology applied for the Project Results Assessment (section 7.2) will identify whether the project results must be protected or not. The need for protection the project results and the most suitable type of protection will be examined and updated during the project through the Project Results Assessment Process.

The routes for commercial exploitation of the VIVALDI results will include different approaches on the most adequate protection (e.g., patenting; see Table 5 for the different types of IP protection measures that may apply to the VIVALDI project results) for each of the commercially exploitable project results to ensure that the IP of the results is preserved before any exploitation and/or dissemination activity is undertaken by the partners of the VIVALDI consortium.

5.7. Transfer and Licensing of the Results

The ownership of their own results may be transferred by each partner to other partners or third parties following the procedures indicated in the Article 30 of the GA.

The CA includes in the Annex III, specific third parties that the partners intend to transfer the ownership of their Results. The other partners hereby waive their right to prior notice and their right to object to a transfer to listed third parties according to the Article 30.1 of the GA (section 8.3.2 of the CA).

The CA, in the sections 8.3.3, 8.3.4 and 8.3.5, establishes the obligations of the partner transferring the ownership of the results versus the other partners in the Consortium.

At the moment of the signature of the CA, only one partner (NVMT) informed of its intent to transfer the ownership of its Results (Table 7)

Table 7. List of Third Parties for simplified transfer of the Results identified in the CA (Annex III)

Consortium Partner	List of Third Parties for simplified transfer according to Section 8.3.2. of the CAC
Party N. 16 NOVAMONT SPA (NVMT)	Mater-Biopolymer S.r.l (Mater-Biopolymer), Via Morolense KM 10 SNC, 03010, Patrica (FR), Italy
	Mater-Biotech S.p.A (Mater-Biotech), Via Antonio Gramsci 3, 45011, Bottrighe di Adria (RO), Italy



During the duration of the VIVALDI Project, any update of the intend to transfer ownership of its Results by any of the Consortium Partners will follow the procedure described in Article 30 of the GA and this information will be captured in the updated version of the IPR and Knowledge Management Plan and include on Table 7.

5.8. Access Rights to the Results

The Access Rights to the Results are defined in the Article 31 of the GA. This article sets out the conditions under which Access Rights to the Results are given for:

- Other beneficiaries, for implementing their own tasks under the Project
- Other beneficiaries, for exploiting their own Results
- Affiliated entities
- The EU institutions, bodies, offices or agencies and EU Member States
- Third parties

Section 9 of the CA also establishes the condition in terms of Access Rights to the Results agreed among all the members of the VIVALDI Consortium.



6. IPR Surveillance and Optimal IPR Protection

IPR Management is linked to the VIVALDI exploitation and business strategy of the Project Results since an effective exploitation depends on the protection of the results (see section 7.6), however it is not always mandatory to protect the results.

The choice of the most suitable form of IP protection (e.g., patent, copyright), as well as the duration and geographical coverage depends on the project results in question, but also the business strategy for their exploitation and legitimate interest of VIVALDI project's partners (Figure 7). Thus, it is important to assess the possibility of IPR protection once the project results are generated. To do so, several steps will be undertaken in the VIVALDI project:

- IPR surveillance that will include: (i) mapping of existing patents and potential overlapping IPR, (ii) continuous surveillance of IP landscape and strategy definition to address any possible conflicts.
- IPR Protection that will include: (i) proposal of optimal IPR protection options in link with the selected business models options and, (ii) proper implementation of IPR protection measures during the project.

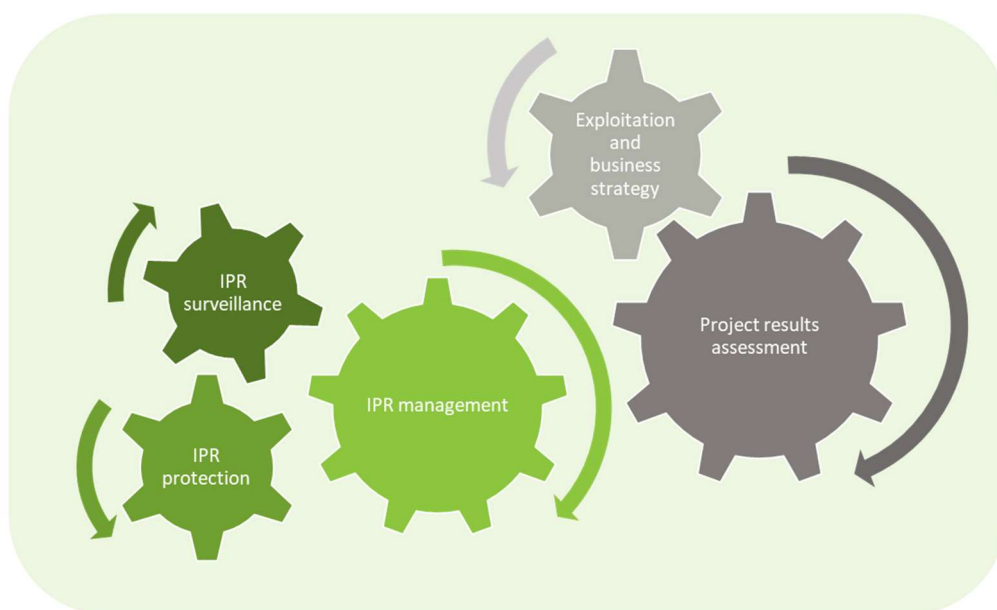


Figure 7. Interlink between IPR management and the Exploitation and Business strategy of the project results

6.1. IPR Surveillance

The IPR Mapping and Surveillance will avoid potential conflicts or overlapping of existing IP with VIVALDI project results.



The IPR Mapping and Surveillance will also help on the definition of the state-of-the-art on the same field where the VIVALDI project results will be developed for, identify their novelty, potential market opportunities and future outcomes.

The IPR Mapping was done at the proposal stage where the already existing patents on the same fields of application as those where the VIVALDI project results will be developed for were identified. The IPR Mapping included the identification of relevant patents from members outside the VIVALDI consortium and relevant patents for the project from VIVALDI Consortium (Table 8). The IPR Mapping helped to set up the IPR landscape surrounding the VIVALDI project and to identify potential overlapping IP.

Table 8. List of patents identified at the proposal stage – IPR Mapping

Relevant patents from members outside the VIVALDI Consortium	
Patent	Principal claims
WO 2013/113724 A2 Electrochemical processes to separate products derived from biological conversions (Rabaey K. and Stevens C.)	This patent sets the foundations for the electrochemical capture of ammonium during fermentations or anaerobic digestions. VIVALDI will include several improvements in the electrode materials and the operational conditions applied
WO 2013/105854 A1 Method for nitrogen recovery from an ammonium comprising fluid and bio-electrochemical system (Kuntke <i>et al.</i>)	The working principles of bio electrochemical ammonia recovery are described. VIVALDI will go one step beyond in the ammonia purification from the NH ₃ -enriched catholyte
US 2020/0010345 A1 Method of desalination and wastewater treatment in a microbial desalination cell (Ortiz <i>et al.</i>)	The working principles of microbial desalination for cation removal are set in a three-chamber system. VIVALDI will go one step beyond when improving cation selectivity using ionophores and tailor-made membranes
WO2018228836A1. Recombinant yeast cell. (Papapetridis I, Pronk J, DSM)	This patent application claims yeast with a functional Calvin cycle co-factors that enable CO ₂ assimilation with a co-substrate like glucose. VIVALDI goes beyond this by enabling CO ₂ as the only carbon source, and we are confident to have FTO using alternative co-factors.
WO2008128522A3 Microorganism for production of succinic acid (Boettner <i>et al.</i> , Organobalance GmbH)	This patent claims yeast strains containing specific modified versions of enzymes related to SA biosynthesis like malate dehydrogenase, fumarase and pyruvate carboxylase. VIVALDI implements more energy efficient variants like PEP carboxykinase and linking them to methanol and CO ₂ assimilation



Relevant patents from members inside of VIVALDI consortium		
Publication Number	Patent title	Assignee
EP 2013/3077495A1	Expansion kit for bioreactors used for performing microbial bio-electrosynthesis	F. Harnisch, S. Hunger, A. Zehnsdorf, D. Beyer, L. F. Morgado Rosa (all UFZ)
WO 2019/141365A1	Electric bioreactor and parts thereof for sterile microbial electrosynthesis for multiple/single use	S. Hunger, F. Harnisch; C. Gimkiewicz, V. Jegorow, L. Rosa, B. Strehlitz (all UFZ)
WO 2018/219995	Yeast expressing a synthetic Calvin cycle	D. Mattanovich, M. Sauer, M. Steiger, T. Gassler, B. Gasser (BOKU)
WO 2011/80297	Continuous process for the production of derivatives of saturated carboxylic acids	NOVAMONT (Italy)
WO 2012/85012	Complex oligomeric structures	NOVAMONT (Italy)
WO 2013/189915	Process for the preparation of complex oligomeric structures	NOVAMONT (Italy)
WO 2015/91952	Process for separation of dicarboxylic acids from aqueous mixtures	NOVAMONT (Italy)
WO 2009/80297	Aliphatic-aromatic biodegradable polyester	NOVAMONT (Italy)
WO 2011/54896	Biodegradable composition comprising polymers of natural origin and aliphatic-aromatic copolyesters	NOVAMONT (Italy)
WO 2011/55973	Biodegradable polyester and wrapping films for packaging produced therewith	NOVAMONT (Italy)
WO 2013/124301	Biodegradable polymer composition for the manufacture of articles having a high heat deflection temperature	NOVAMONT (Italy)



Relevant patents from members inside of VIVALDI consortium		
Publication Number	Patent title	Assignee
WO 2014/131799 A1	Current density distributor for use in an electrode	D. Pant, X. Dominguez-Benetton, Y. Alvarez Gallego, B. Bouwman (VITO)
EP 18176121.4.	Carbon based electrode with large geometric dimensions	B. Bouwman, D. van Houtven, D. Pant, Y. Alvarez Gallego, K. Vanbroekhoven. (VITO)
EP 18248264.6.	Alkali-mediated carbon dioxide capture and utilization	B. Bouwman, D. Pant, K. Vanbroekhoven, M. Bulut. (VITO)
IP 2019/11050001	A membrane-less reactor design and process for biotransformation of carbon dioxide.	M. Kumar, S. Sandipam, S.K. Puri, S.S.V. Ramakumar, L. Diels, B. Bouwman, K. Vanbroekhoven, D. Pant
EP 19213008.	Electrochemical CO ₂ conversion	Maximilian König, Metin Bulut, Jan Vaes, Elias Klemm, (VITO)
EP 20185780	Carbon free gas diffusion electrode	Jan Vaes, Yuvraj Y. Birdja, Deepak Pant, Diane Van Houtven, Ben Jacobs, Erwin Maes (VITO)
US 2017/0370011A1	Method of preparing oxalic acid	Jan Hermen Hendrik Meurs (AVT)
WO 2015/195149A1	Integrated process for co-production of carboxylic acids and halogen products from carbon dioxide	Jerry J. Kaczir, Prasad Lakkaraju (AVT)

The IPR Surveillance will be carried out during the whole duration of the project to identify if new patents that were not identified during the IPR Mapping have been filed, check if the VIVALDI project results infringe someone else's rights and keep track of who is doing what in the same application fields as that where the VIVALDI project results will be developed for.

To identify the most interesting patents related to the core technologies that will be developed in the VIVALDI project and to conduct an efficient search, the first thing in the process will be to define the object of the search, the geographic area, time-period, and keywords that define the innovation. To do so, textual search terms will be combined with patent classification codes which indicate the technical field or fields to which the patent application relates. The International Patent Classification (IPC) will be used to obtain these classification codes. The information will be gathered in a Patent identification Template which will include information such as: Publication number, patent title, assignee, priority date, publication date, principal claims, and link to the patent (Table 9).



Table 9. Patent Identification Template

Publication number	Patent title	Assignee	Priority date	Principal claims	Link	Updated (mm/yy)
IPC code (1)						
IPC code (2)						
...						

The IPR Mapping and Surveillance will provide an overview of the state-of-the-art, including the most current and emerging trends and priorities in the application fields of the core VIVALDI project. The outcomes of the IPR Management and Surveillance will allow the Innovation Board and VIVALDI's partners to identify potential market opportunities for the VIVALDI project results and future outcomes and they will be used on the definition of the best optimal IPR protection for the VIVALDI project results.

6.2. Optimal IPR protection

The optimal IPR protection for the VIVALDI project results will be defined and based on the potential market opportunities and envisaged business models for the project results that promise to be of any potential for commercial exploitation. These project results and the IP strategy that the partner owner of these results will be willing to follow (e.g., protect the result or not protect it) it will be identified during the Project Results Assessment (see section 7.2 and 7.3).

If a partner decides not to protect results that are capable of commercial application, the owner of the results is obliged to notify the European Commission up to four years after the end of the project and be careful not to perform any dissemination activity before this notification. Alternatively, the partner owner of the result may also transfer the right to protect and exploit a specific result to another consortium partner (Article 27 and Article 30 of the GA).

At the proposal stage, the best IPR protection has been already defined for some of the project results based on the commercial exploitation approach (Table 10). This information will be updated during the project through the Project Result Assessment and the IB will make sure that the most suitable forms of IPR protection are applied.

Table 10. Main exploitable results identified at the proposal stage and exploitation approach, including IPR protection if required

Project result	Partner	Exploitation approach
Selective membranes for nitrogen and macronutrients recovery	LEITAT	Collaborative research, licensing to manufacturing companies
BES Reactor for nitrogen recovery	UAB, LEITAT	Collaborative research, licensing
BES Reactor for macronutrients recovery	LEITAT, UAB	Collaborative research, licensing



Project result	Partner	Exploitation approach
CO ₂ enrichment system for selective CO ₂ absorption	LTU	Licensing
Separation and purification processes of a fermentation broth	PROC	Licensing
Establishing CO ₂ to FA/MeOH reduction for biosynthesis	UFZ, VITO, BOKU, UAB	Collaborative research, patenting
Downstream processing for CO ₂ reduction products in dilute aqueous solutions	AVT	Patenting for use with own technology, licensing
Organic acids- Nutraceutical for livestock animals	NUT	New internal product (replacement of antibiotics)



7. ANNEX I

Background identified in the Attachment 1 of the CA including specific limitations and/or conditions for its implementation or exploitation within the project.

The background identified in the following table represents the status at the time of signature of this Consortium Agreement.

Table 11. Background identified in the Consortium Agreement



Partner	Described background	Specific limitations and/or conditions for implementation (Article 25.2 GA)	Specific limitations and/or conditions for Exploitation (Article 25.3 GA)
Universidad Autónoma de Barcelona (UAB)	<p>Fundamentals on BES scale-up. Practical guidelines for moving BES to a L scale.</p> <p>Construction, validation, and application of genome scale models, bringing in the iMT1026 GSM, which has been validated for growth on methanol.</p> <p>Set of 3-HP-producing <i>P. pastoris</i> strains expressing the MalonylCoA reductase pathway</p> <p>LC-MS and NMR analytical methods for accurate 3-HP quantification from fermentation broths</p>	The use of the specified background under VIVALDI is based on a preceding agreement between UAB and any other VIVALDI Party.	The use of the specified background under VIVALDI is based on a preceding agreement between UAB and any other VIVALDI Party.
Universitaet fuer Bodenkultur Wien (BOKU)	<p><i>Pichia pastoris</i> strains capable of growth on CO₂ as carbon source</p> <p><i>Pichia pastoris</i> strains producing organic acids, specifically lactic, itaconic and succinic acid</p>	The use of the specified Background under VIVALDI is based on a preceding agreement between BOKU and any other VIVALDI Party.	The use of the specified Background under VIVALDI is based on a preceding agreement between BOKU and any other VIVALDI Party.



Lulea Tekniska Universitet (LTU)	LTU has extensive competence and experience in the integration of biocatalytic and chemical processes for selective CO ₂ capture and enrichment from industrial off-gases. This includes solvent design and the use of hybrid chemoenzymatic technologies using custom designed enzymes developed at LTU	Access Rights to Background is only granted to the extent that it is needed for implementation of the action, owned by participating researchers, has been published, has been clearly entered into the Project by the owner or party.	Access Rights to Background is only granted to the extent that said Background is not subject to terms and conditions in existing third-party agreements that may prohibit grant of Access Rights in the Project.
Vlaamse Instelling Voor Technologisch Onderzoek N.V (VITO)	Electrodes/gas diffusion electrodes (lab scale and upscaled) for CO ₂ electroreduction to formic acid/formate and methanol	The use of the specified Background under VIVALDI is based on a preceding agreement between VITO and any other VIVALDI Party.	The use of the specified Background under VIVALDI is based on a preceding agreement between VITO and any other VIVALDI Party.
Helmholtz-Zentrum für Umweltforschung GmbH (UFZ)	Upgrade kit for bioreactors (bioelectrosynthesis): Upgrade kit to enhance conventional bioreactors/fermenters with laboratory reactor systems for conducting comparable and scalable experiments on microbial electrosynthesis for different bioreactor platforms Electric Bioreactor and parts thereof for sterile microbial electrosynthesis for multiple and single use	The use of the specified Background under VIVALDI is based on a preceding agreement between UFZ and any other VIVALDI Party.	The use of the specified Background under VIVALDI is based on a preceding agreement between UFZ and any other VIVALDI Party.
Acondicionamiento Tarrasense Asociacion (LEITAT)	Carbon nanofibers doped with metal nanoparticles for its use in air cathode Method to adapt electroactive biofilms to high nitrogen concentrations		



Processium (PROC)

Background, expertise, and know-how relative to:

1. the development and production of physicochemical and thermodynamic data, in particular: (i) Boiling point, freezing point, melting point (ii) Liquid-vapor equilibria, vapor pressure, liquid-liquid equilibria, (iii) Solubility of gases, mutual solubility, solubility in water, (iv) Azeotropic composition, critical properties, (v) Partition coefficient, Henry's coefficient, activity coefficient at infinite dilution, (vi) Surface tension, density (solids and liquids), heat capacity, viscosity
 2. the development and production of kinetic data, in particular: (i) Concentrations and temperatures as a function of time or residence time, (ii) Multiphase kinetic models, (iii) Material and heat transfer coefficients.
 3. the design and production of software in process engineering and physical properties, in particular: (i) Development and marketing of a web-based physico-chemical data management platform, e-thermoTM, (ii) Development of predictive tools for physico-chemical properties, (iii) Development of a dynamic simulation software for distillation (continuous and batch), SPID-DISTTM, (iv) Application development of tailor-made scientific calculations for the chemical industry
-



4. Separation and reaction techniques: (i) Continuous and batch distillation, under pressure or vacuum, (ii) Extractive and azeotropic distillation, (iii) Scraped film evaporator, (iv) Stripping, adsorption, (v) Liquid-liquid extraction, (vi) Filtration, (vii) Melt crystallisation, (viii) Vacuum drying, (ix) Batch and continuous reactor under vacuum and pressure, (x) Batch or continuous microwave reactor
This information represents a significant intangible asset for PROC.

Fundacio Universitaria Balmes (UVIC)	At the best of their knowledge, no data, know-how or information of the UVic shall be needed by another party for the implementation of the project or exploitation of that other Party results.		
CO2 Value Europe AISBL (CVE)	At the best of their knowledge, no data, know-how or information of the CVE shall be needed by another party for the implementation of the project or exploitation of that other Party results.		
Isle Utilities BV (ISLE)	Market uptake strategies and Exploitation actions	No specific limitations/conditions defined	No specific limitations/conditions defined
Nutrition Sciences (NUT)	At the best of their knowledge, no data, know-how or information of the NUT shall be needed by another party for the implementation of the project or exploitation of that other Party results.		
Avantium Chemicals BV (AVT)	At the best of their knowledge, no data, know-how or information of the AVT shall be needed by another party for the implementation of the project or exploitation of that other Party results.		



Sunpine (SUN)	SUN has background, expertise, and know-how relative to production, storage and processing of tall oil material, derivatives and/or fractions thereof. Processing includes any type of treatment (chemical and/or physical means) of tall oil material and its derivatives/fraction		
Compañía cervecera DAMM (DAMM)	At the best of their knowledge, no data, know-how or information of DAMM shall be needed by another party for the implementation of the project or exploitation of that other Party results.		
Bioagra Spolka Akcyjna (BZK)	BIOAGRA SA has the background in bioethanol producing from corn grain. Ethanol, the main product of the company, is produced in a dehydrated form in fuel and PCK grade, as well as in technical and food grade, in the form of agricultural distillate and other types of ethanol.	In certain situations, the use of a specific background within VIVALDI may require a separate agreement between BZK and any other VIVALDI Party	In certain situations, the use of a specific background within VIVALDI may require a separate agreement between BZK and any other VIVALDI Party
Novamont SPA (NOVAMONT SPA)	At the best of their knowledge, no data, know-how or information of NOVAMONT SPA shall be needed by another party for the implementation of the project or exploitation of that other Party results.		



8. ANNEX II

Table 12. Example of Project Results Template with the information gathered by one of the Consortium Partners

M1		
Project result 1		
Project results description	Project result name	Inventory of CO ₂ -rich off-gas streams
	Work Package	WP1
	Task and/or subtask	Sub-task 1.1.1
	Partner owner	Novamont
	Partners involved	/
	Description	Biogenic CO ₂ as feedstock for further processes to obtain dicarboxylic acids
	Type of project result	Product
	Exploitable level	Highly exploitable
	Development phase	Developed but not exploited
	Time to exploitability	Between 3 and 5 years
	Exploitation route	Economic



		M1		
Project result 1				
		Scientific		
		Societal		
	Geographical exploitation level	National		
		International		
		Regional		
IP Status	Status of IP_Background	Description	Form of IP protection	Owner
		N.A.		
	Is further IP protection required?	It will depend on the projects evolution and obtained results		
	Status of IP_Foreground	Description	Form of IP protection	Owner
		TBD	Patent	Novamont
Route to exploitation	Do you want to commercially exploit this project result?	Yes		
	Unique Selling Point	Biogenic CO ₂ from biotech process to obtain 1,4 bio-BDO which could be combined with other dicarboxylic acids from the project to obtain biopolymers with significant environmental advantages		
	Market areas of application	Market of new biopolymers from CO ₂		
	Potential end-users/customers	Chemical industry and/or captive use		
	Potential competitors	/		



M1

Project result 1

	Key exploitation partners	partners developing biobased processes to valorise CO ₂ into dicarboxylic acids
	Key resources	Investments to potential upgrading and capture of biogenic CO ₂
	Exploitation risks	Regulation issues
		Standard issues
	Revenue streams	Sale of product
	Foreseen product/service price	Not available at the moment
	Cost structure	Not available at the moment



Table 13. Summary with the main information gathered at M1 for the Project results that it is expected to generate within the VIVALDI Project

W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P1	Inventory of CO ₂ -rich off-gas streams	Biogenic CO ₂ as feedstock for further processes to obtain dicarboxylic acids	NVMT	Product	Highly exploita ble	Patent	Develope d but not exploited	Between 3 and 5 years	Product, technolo gy, process, or service	Scientifi c, societal, econom ic	Regional, National, Internatio nal	Research ers, policy makers or regulator y bodies, end users	Sale of product	Y
W P1	Methodology for design, development and scale up of electrodes	Method to make a gas diffusion electrode incorporating novel electrocatalyst and able to convert CO ₂ to formate and /or methanol	VITO	Methodol ogy or method	Highly exploita ble	Patent	Under develop ment	Between 3 and 5 years	Methodol ogy	Scientifi c, econom ic	Regional, National, Internatio nal	Research ers, end users	-	N



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P1	Novel Gas Diffusion Electrodes (GDEs)	A gas diffusion electrode incorporating novel electrocatalyst and able to convert CO ₂ to formate and /or methanol	VITO	Product	Highly exploita ble	Patent	Under develop ment	Between 3 and 5 years	Product, technolo gy, process, or service	Scientifi c, econom ic	Internatio nal	Research ers, end users	-	N
W P1	Methodology for electrode characterisation	SOP for characterization and benchmarking novel electrode materials for the CO ₂ RR (UFZ)	UFZ (VITO)	Methodol ogy or method	Moderat ely exploita ble	No IP protecti on required	Under develop ment	Between 1 and 2 years	Methodol ogy	Scientifi c	Internatio nal	Research ers	-	N
W P1		Thermodynamic, kinetic and stability parameters (up to days), will be derived using static and dynamic electrochemical methods for (VITO)		Scientific articles	Moderat ely exploita ble	No IP protecti on required	Under develop ment	Between 1 and 2 years	Knowled ge	Scientifi c	Internatio nal	Research ers	-	N



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitable result	Exploitation level	IP protection	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commercially exploitable (Y/N)
							Develop ment phase (A1)	Time to exploitation (A2)	Type of project result (B1)	Exploitation purpose (B2)	Geographical impact (C1)	Beneficiary of impact (C2)		
W P1	Methodology for electrode integration at bioreactor scale	Process and electrode material allowing performing CO ₂ RR at bioreactor scale and in bioreactor conditions will be established, maybe up to an SOP	UFZ, VITO	Scientific articles	Highly exploitable	No IP protection required	Under develop ment	Between 3 and 5 years	Knowledge	Scientific, societal	International	Researchers, policy makers or regulatory bodies	-	N
W P1	Electrocatalytic CO ₂ reduction to FA and MeOH (ECO ₂ R)- Novel Gas Diffusion Electrodes (GDEs) and electrochemical reactor	A process to convert CO ₂ to FA and methanol based on the GDEs developed in previous tasks of WP1	UFZ (VITO)	Scientific articles	Moderately exploitable	Patent	Under develop ment	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	Sale of product; Licensing; Lending/leasing/ renting	Y



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P1	Method for downstream processing of formate and formic acid	Invention of a new method or process for the separation of formate salt from the electrolyte salt, concentration of the aqueous CO ₂ reduction product stream and acidification of formate to formic acid.	AVT	Methodol ogy or method	Highly exploita ble	Patent	Under develop ment	Between 3 and 5 years	Methodol ogy	Econom ic	Internatio nal	End users	Patenting for use with own technology that will be commercialised	Y
W P2	MEC-based ammonia recovery system	Development of a novel three- chamber bioelectrochemi cal system for the recovery of ammonium as ammonium sulphate (UAB) and ammonium carbonate (LEITAT) from high N-strength loaded wastewaters	UAB	Know- how	Weakly exploita ble	No IP protecti on required	Under develop ment	More than 5 years	Knowled ge	Scientifi c	Internatio nal	Research ers	-	N



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P2	Methodology for design, development of tailor-made BES reactors	Design and construction of a tailor-made BES reactors for nitrogen (based on Microbial Electrolysis Cell) and macronutrients recovery (based on Microbial Desalination Cell)	LEITAT	Know-how	Moderately exploitable	Patent	Under development	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	Sale of product; Licensing; Collaborative research	Y
W P2	Methodology for the optimisation of nitrogen recovery from BI wastewaters	A novel bioelectrochemical methodology to recover nitrogen as ammonium salt from industrial wastewaters	UAB&LEITAT	Methodology or method	Moderately exploitable	Patent	Under development	Between 3 and 5 years	Methodology	Scientific	International	Researchers	-	N



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P2	Methodology for (bio) electrochemical recovery of nitrogen from industrial wastewater for ammonium sulphate production	A novel bioelectrochemical methodology to recover nitrogen as ammonium sulphate from industrial wastewaters	UAB	Methodology or method	Moderately exploitable	No IP protection required	Under development	Between 3 and 5 years	Methodology	Scientific	International	Researchers	Licensing; Collaborative research	Y
W P2	Methodology for (bio) electrochemical recovery of nitrogen from industrial wastewater for ammonium bicarbonate production	Development and operation optimization of a BES reactor that allows the recovery of nitrogen while capturing CO ₂ in the catholyte.	LEITAT	Know-how	Moderately exploitable	Patent	Under development	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	Licensing; Collaborative research	Y
W P2	Ammonium sulphate	Ammonium sulphate	UAB	Product	Moderately exploitable	Confidential information	Under development	Between 3 and 5 years	Product, technology, process, or service	Societal	International	Policy makers or regulatory bodies	Sale of product; Usage fee; Licensing	Y



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P2	Ammonium bicarbonate	Ammonium bicarbonate produced for wastewater streams.	LEITAT	Product	Moderat ely exploita ble	Confide ntial informat ion	Under develop ment	Between 3 and 5 years	Product, technolo gy, process, or service	Scientifi c, econom ic	Internatio nal	Research ers, end users	Sale of product; Usage fee; Licensing	Y
W P2	Guidelines to design and operate the nitrogen- recovery reactor to scale-up	Report on the guidelines for the scale-up of nitrogen recovery processes based on the results obtained in WP2	UAB	Know- how	Not exploita ble		Under develop ment							
W P2	Development of bioelectroconce ntration processes for macronutrients recovery	Process development and optimization for macronutrients recovery, based on bioelectroconce ntration using a Microbial Desalination Cell.	LEITAT	Know- how	Moderat ely exploita ble	Confide ntial informat ion	Under develop ment	Between 3 and 5 years	Knowled ge	Scientifi c	Internatio nal	Research ers	Licensing; Collaborative research	Y



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P2	Guidelines to design and operate the bioelectroncentration process for macronutrients recovery for upscaling	Development and optimization of a process for selective recovery of macronutrients from wastewaters during its treatment	LEITAT	Know-how	Moderately exploitable	Confidential information	Under development	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	Licensing; Collaborative research	Y
W P2	MCD-based cation recovery system - Macronutrients (K, Ca, and Mg) recovery in an MDC using selective bioelectroconcentration approach	MDCS architecture for selective recovery of mono and/or bivalent cations according to the employed cation exchange membrane	LEITAT	Know-how	Moderately exploitable	Patent	Under development	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	Licensing; Collaborative research	Y
W P2	Integration process of the nutrient recovery setup with the fermentation step	First attempt to integrate the nutrient recovery process with the fermentation step	UAB	Know-how	Weakly exploitable	No IP protection required	Under development	Between 3 and 5 years	Knowledge	Scientific	International	Researchers	-	N



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitab le result	Exploita tion level	IP protecti on	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commerc ially exploitabl e (Y/N)
							Develop ment phase (A1)	Time to exploita tion (A2)	Type of project result (B1)	Exploita tion purpose (B2)	Geograp hical impact (C1)	Beneficia ry of impact (C2)		
W P3	Single-stage reactor for electroconversion of CO ₂ to SA	Single-reactor concept coupling electrocatalytic and microbial catalysis operated with real CO ₂ - enriched stream and <i>P. pastoris</i> to produce SA	BOKU, UAB, UFZ	Scientific articles	Highly exploita ble	No IP protecti on required	Under develop ment	Between 3 and 5 years	Knowled ge	Scientifi c	Internatio nal	Research ers	-	N
W P4	Industrial validation for SA production	Biodegradable and compostable bioplastics incorporating SA from biogenic CO ₂ in the formulation	NVMT	Product	Highly exploita ble	Patent	Under develop ment	Between 3 and 5 years	Product, technolo gy, process, or service	Scientifi c, societal, econom ic	Regional, National, Internatio nal	Research ers, policy makers or regulator y bodies, end users	Sale of product	Y



W P	Project exploitable result	Description of the project result	Partner owner	Type of exploitable result	Exploitation level	IP protection	Exploitability readiness level (A)		Exploitability potential (B)		Exploitability impact (C)		Exploitation approach	Commercially exploitable (Y/N)
							Develop ment phase (A1)	Time to exploitation (A2)	Type of project result (B1)	Exploitation purpose (B2)	Geographical impact (C1)	Beneficiary of impact (C2)		
W P4	Optimised protocol for the synthesis of biopolyesters from SA from biogenic CO ₂	Biodegradable and compostable bioplastics incorporating SA from biogenic CO ₂ in the formulation	NVMT	Product	Highly exploitable	Patent	Under develop ment	Between 3 and 5 years	Product	Economic, Scientific, Societal	Regional, National, International	Converters enabling to transform bioplastics into end bioproducts	Sale of product	Y
W P6	Regulatory framework: Recommendations and regulatory measures	Mid-term and final version of the report on the recommendations for the regulatory measures proposed by VIVALDI.	CVE	Know- how	Moderately exploitable	No IP protection required	Under develop ment	Between 3 and 5 years	Knowledge	Societal	International	Policy makers or regulatory bodies	-	N
W P7	Outcomes from thematic workshops and clustering activities with other projects	Report on the network activities generated during all the thematic workshops and clustering activities with other projects	CVE	Know- how	Moderately exploitable	No IP protection required	Under develop ment	Between 3 and 5 years	Knowledge	Scientific, societal, economic	Regional, National, International	Researchers, policy makers or regulatory bodies, end users	-	N



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