Sunlight Production
of Chemical Fuels

SPOTLIGHT

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D6.8 Exploitation plan

WP6 Techno-economic and environmental assessment

WP LEADER	RINA-C
DELIVERABLE RESPONSIBLE	RINA-C
DELIVERABLE AUTHOR(S)	Andrea Pestarino (RINA-C) Marco Ariagno (RINA-C)
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EXECUTIVE SUMMARY

The SPOTLIGHT project led to the development and validation of different technologies and innovative solutions (the Key Exploitable Results). On the one hand, those are expected to have an important economic impact for companies and organizations selling or licensing the products and processes, entering novel and established markets with new solutions. On the other hand, the innovative technologies will have a relevant impact from the ESG point of view, leading to significant resources and energy savings, emissions reduction and creation of new jobs.

In this context, the Exploitation Plan is a fundamental tool to trace the route for further development of project's results, indicating what activities are needed to scale the Technology Readiness Level (TRL), with a special focus on the first year after the end of the project.

Based on a consolidated methodology defined in D6.7 "Strategy for IP Management" and in section 1.3 of the present deliverable, the document reports, for each KER, the most important factors for a full exploitation of project's results:

- The actions needed and the roles in the supply chain, along with an estimation of revenues, costs and payback time.
- The interests of partners in the exploitation of results, which will allow the involved organizations to collaborate and create partnerships to bring the results to maturity and, finally, to the market.
- The final decisions for the protection of the results.
- The most relevant risks that can jeopardize a successful exploitation of the results.

This report integrates and complements the information collected in D6.7, offering a final overview of the exploitation plan for the SPOTLIGHT project Key Exploitable Results, including the entire SPOTLIGHT process.

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CONTENTS

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

LIST OF FIGURES

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

LIST OF TABLES

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

ABBREVIATIONS

BFMULO	Background, Foreground, Making, Using, Licensing, Other
ESCo	Energy Service Companies
ESG	Environmental, Social and Governance
EU	European Union
FWO	Fonds Wetenschappelijk Onderzoek (Flanders Research Foundation)
HR	Human Resources
HSE	Health, Safety & Environment
IP	Intellectual Property
IPR	Intellectual Property Rights
KER	Key Exploitable Result
LCoE	Levelized Cost of Electricity
LSC	Luminescent Solar Concentrator
R&D	Research & Development
SaaS	Software as a Service
SNSF	Swiss National Science Foundation
SotA	State of the Art
TRL	Technology Readiness Level
VLAIO	Flanders Innovation & Entrepreneurship
WP	Work Package

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1. INTRODUCTION

This report provides the final results from the exploitation and IPR Management activities, as an integral part of Work Package 6 “Techno-economic and environmental assessment”.

The work presented in this deliverable has been carried out in the framework of Task 6.5 “IPR management and exploitation plan towards future marketability”, led by RINA-C, with the contribution of all partners.

The results here proposed come from the adoption of a widely tested methodology (please refer to D6.7 “Strategy for IP management” and Section 1.3 of this document) for KERs and IPR management, developed by RINA-C with the support of the Horizon Booster Team.

Partners have been involved in dedicated IPR and exploitation workshops and have been provided with checklists and questionnaires to collect information and data. RINA-C collected, checked and homogenized the contributions from partners and finalized them, whereas necessary, by setting one-to-one interviews.

1.1 Glossary

KER – Key Exploitable result. This is the result of the project: a product, a service, a software, a database, a design, etc. Independently from the format, the result comes from the activities of the project and can belong to one or several partners, in general to all those that actively participated in its development.

Result ownership. This represents the share of KER owned by a partner. When a result comes from the activities exclusively carried out by one partner, it owns 100% of the KER. If more partners actively cooperated and brought specific innovations to reach a KER, it will belong to all partners in equal shares: 50-50%, 33-33-33%, 25-25-25-25% etc.

Protection. Whenever new intellectual property (including a KER) is being developed, it is worth evaluating the most efficient ways for protecting it. Based on the results from the patent analysis, as a conclusion for each use case the report will provide suggestions on the possible protection and exploitation strategy.

Exploitation. This is the way partners (especially owners) get benefits from KERs. Benefits can be commercial (revenues) but not only: the submission of a paper, of an abstract that allows a partner to participate to a conference, the licensing to third parties, the future scientific use of results… Usually every “kind” of partners have different objectives of exploitation. For example, a manufacturer would like to produce and sell a new product, while a university is more interested in the knowledge behind it that can be disseminated and further explored.

BFMULO table. In a typical EU collaborative project, partners work together to develop several results and, accordingly, there will be different interests in their exploitation. A useful tool to recap the interest is the so-called BFMULO table. BFMULO is an acronym that stands for:

- **B – IPR’s on background information**. This is the case when a key exploitable result is mostly built on already secured IP (Background): according to EU rules on IP, this belongs only to the partner that owns the background.
- **F – IPR’s on foreground information**. The foreground results are those developed within the project: these results can be owned either by one single partner, in case no other partner’s contribution was necessary during its development, or by several partners, as shared (or joint) IP.
- **M – Making the result**. Depending on the role in the project, the competences and the role in the value chain, a partner could be interested in making (manufacturing) a result.

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This is not strictly related to the ownership of IP: in fact, it is possible that an IP owner doesn't have the competences or assets to manufacture a result. In this case, the interest of one other partner in making it would lead to a bilateral commercial agreement with the IP owner.

- **U – Using the result**. Typically, the demo partners are not interested in commercializing the results or manufacturing them. They participate in the project since they advise a potential benefit from the use of the developed solution and its integration in their systems or procedures. As demo partners are an active part of the project, it is expected that they will have access to the results as users at fair conditions.
- **L – Licensing the result**. When a partner does not have all the competences, assets for fully exploit a result or wants to explore new areas that cannot commercially cover, an option is to license the secured IP. This means that someone else (from the consortium or not) could sign an agreement with the owner and exploit the IP.
- **O – Other exploitation means**. Everything else, which has not been mentioned, including for example selling the IP or creating an ad-hoc company to exploit the IP (with or without other project partners).

Unique selling point. This is constituted by one or several features that differentiate the KER from currently available solutions (competitors). When we speak about an innovative solution, usually the price is not considered as (the most important) selling point. In general, the unique selling point is a specific feature that solves a customer's need or pain point that currently is not solved by the state of the art or just partially approached.

Business model. The business model represents an extended portion of the value chain around a KER. It includes at least the main suppliers and consultants needed to develop, manufacture, commercialize, deliver a product/service and the target customers: the different segments and the way to efficiently reach them. The model also identifies the stream of costs and revenues. In the case of software, the most used ones are the SAAS (software as a service), the licensing, the one-shot sell.

1.2 The Key Exploitable Results (KERs)

From M18 (when D6.7 "Strategy for IP management" was submitted) to M36 no new Key Exploitable Results have been identified by partners.

In **Error! Reference source not found.** the final list of KERs is reported.

Table 1: Final List of Key Exploitable Results

N°	Name of KER	Relevant WP(s)	Leading partner(s)	Involved partners
1	A transparent flow reactor tailored for sunlight-powered processes	WP3	CTR	SNF / TNO / DLR
2	Tailored secondary solar optics for sunlight-powered chemical processes	WP3	DLR	SNF / TNO
3 + 5	Integration knowledge and technologies about artificial and natural light sources for chemical processes - LED light source with dimmable medium to high light intensity	WP3	SNF	DLR / TNO

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N°	Name of KER	Relevant WP(s)	Leading partner(s)	Involved partners
4	A luminescent solar concentrator (LSC) prototype demonstrated at lab scale for spectral conversion	WP3	EPFL	
6	Newly developed plasmonic nanocatalysts	WP4	UHA	TNO / ISC
7	Upscaling process for the plasmonic nanocatalysts	WP4	ISC	TNO / UHA
8	The entire SPOTLIGHT process	WP5	RINA-C	ALL

Please refer to Deliverable 6.7 “Strategy for IP management” for the characterization of each Key Exploitable Result.

1.3 Exploitation methodology

In the first phases of the project, the exploitation activities focused on the individuation and characterization of the Key Exploitable Results and on assessing the competitive landscape revolving around the results of the project thanks to a patent analysis approach.

Those activities laid the foundation for further and more advanced exploitation activities. RINA-C, in fact, defined a comprehensive methodology which included:

1. **Exploitation and IPR workshop**. An exploitation workshop was organized by RINA-C, during M36 General Assemblyto introduce the tools and questionnaires part of the exploitation methodology defined for the second half of the project.
2. **Exploitation Roadmap**. The Exploitation Roadmap is a comprehensive checklist aiming to define all the necessary actions (strategic, marketing, technical, administrative activities) to create a solid exploitation approach for each KER. It involves the definition of the roles in the value chain and an estimation of costs and revenues. This effort is aimed at ensuring that the exploitation process can be executed in the most optimal and effective manner possible.
3. **Assessment of risks and barriers**. Main risks and barriers for each KER are identified through the Risk Assessment Table, where information regarding the probability of risk’s occurrence, the degree of risk’s criticality and potential mitigation actions are collected.
4. **BFMULO matrix**. BFMULO is an acronym for Background, Foreground, Making, Using, Licensing, Other. The matrix is used for the identification of partners’ roles towards exploitation and commercialization of results.

The activities listed above are further detailed in the following sections.

1.3.1 Exploitation Roadmap

The Exploitation Roadmap is a Word format checklist developed by RINA-C for EU-funded R&D projects intended to design a roadmap for the exploitation of KERs. It is structured into different sections to cover all the relevant aspects to fully exploit the results.

- **Actions**. In this section partners indicate which commercial, technical, administrative activities they plan to perform in the first 12 months after the end of the project to exploit the results.
- **Roles**. It intends to define the suppliers’ and commercial side of the business model, offering an overview of the supply and value chain connected to the KER.
- **Timing**. A visual representation of the timeline of the indicated actions is given through a GANTT chart.

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- **Financial costs**. It highlights which are the costs associated with each activity needed to exploit the result.
- **Revenues**. The goal is to estimate pricing, margin and payback time of the developed result.
- **Sources of coverage**. In this section partners indicate where they intend to find the financing needed for exploitation of results.
- **Impact**. It highlights the expected impacts of the KER in three years from the end of the project.

Here a blank template for the Exploitation Roadmap is reported as reference.

Table 2: Exploitation Roadmap Blank Template

Exploitation Roadmap: *KER N#*	
Lead: *KER Leader N#* **KER Owners:** *Partner/s* **TRL at the end of the project:** *TRL #*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☐ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☐ Other **Commercial agreement preparation:** ☐ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts ☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☐ Shares of the IP; ☐ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☐ Rules for managing the IP, in particular costs of maintenance; ☐ Rules for accessing to the IP (e.g. licensing fees, royalties); ☐ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☐ Other.

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	Technical activities towards TRL 9: Select the pilot customers for TRL 9 tests ☐ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines ☐ Build or finalize procedures for: ☐ Quality control ☐ HSE ☐ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☐ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☐ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9:** ☐ Creation of an after-sales team ☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☐ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☐ The creation of a dedicated website centred on the solution; ☐ The creation of a dedicated web-campaign centred on the solution;

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	☐ The creation of a dedicated social media campaign centred on the solution; ☐ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☐ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. …… 2. …… 3. …… **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☐ Raw materials ☐ Semi-finished products ☐ Components ☐ Accessories ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support

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	☐ Basic software ☐ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other **Commercial side of the business model:** Technical partners: ☐ System integrator ☐ Installer ☐ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☐ Dealers, distributors ☐ Local agents ☐ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Please build a GANTT chart for the abovementioned activities:

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												
Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☐ Local/national public funds (please provide details): ☐ European R&D funds (e.g. Horizon Europe): ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☐ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☐ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☐ Other **Social impacts** ☐ New jobs created ☐ Increased quality of job ☐ Increased quality of life ☐ Cultural impacts ☐ New market entrance ☐ New geography entrance ☐ Other **Environmental impacts** ☐ Decreased CO2

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	☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☐ Energy savings ☐ Resources savings ☐ Other **Other impacts** …… ……

1.3.2 Risk Assessment Table

The Risk Assessment Table is an Excel Table aimed at identifying which risks related to the exploitation of Key Exploitable Results are individuated and evaluated. It is a tool for providing partners with a **comprehensive list of risks towards the commercialization / exploitation of KERs**.

The Table divides risks into 5 macro-categories (Partnership risks, Market risks, IPR/Legal risks, Financial/Management risks and Environmental/Regulation/Safety risks). The matrix provides an estimation of the:

- **Degree of criticality of the risk** related to the final achievement of this Key Exploitable Result. This is the level of impact the risk can have on the project or exploitation roadmap. It is measured on a scale 1-10, where 1 means it has a very low impact and 10 a very high impact.
- **Probability of risk happening**. This is the probability that a certain situation can occur. As the degree of criticality, it is measured on a scale 1-10, where 1 means it has a very low probability and 10 a very high probability.
- **Risk Grade**. It is the estimation of the risk, and it is calculated as the multiplication of the first two parameters (impact and probability). Accordingly, the result is on a scale of 1-100.
- **Potential intervention**. Every risk should be associated with a potential intervention that can lower either the risk probability or its impact or both. This is also called **mitigation action** (or strategy). There is an important difference with the "contingency" plans: while a mitigation action is put in place when risks have not happened, a contingency plan is an action to be carried on when the risk happened, to recover promptly.
- **Estimated Feasibility/Success of Intervention**. Not all interventions (mitigation actions) are easy to implement, safe or cost efficient: this means that their effectiveness can vary as much as their final success. This is here evaluated on a scale of 1-10, where 1 means it has a very low level of success and 10 is a very effective plan.

Some common risks are already proposed, while partners can add risks related to the specific results.

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Table 3: Risk Assessment Table blank template

KER Risk Assessment Map							
	Description of Risks	**Criticality of the risk**	**Probability of risk happening**	**Risk Grade**	**Potential intervention**	**Success of Interventi on**	**Conclusion**
	Partnership Risk Factors						
1	Poor cooperation among partners			**0**	Regular meetings to improve performance and update partners on new developments, exchange on experiences etc. (***Example***)		**Not Filled**
2	Different perspective for industrialization and exploitation			**0**			**Not Filled**
3	Lack of commitment/ resources to promote the new solution into the market			**0**			**Not Filled**
4	Disagreement on future investments, some partner may leave after the project			**0**			**Not Filled**
5	Disagreement on ownership rules, procedures, shares			**0**			**Not Filled**
6	Partners may leave the initial plan and develop alternative solutions/products/service s			**0**			**Not Filled**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)			**0**			**Not Filled**
	Market Risk Factors						
10	Customers are already satisfied by less advanced solutions or by basic products			**0**			**Not Filled**
11	LCoE too high compared to existing conventional and/or other competitive solutions			**0**			**Not Filled**
12	Performances are lower than expected or lower than competitors or market's needs			**0**			**Not Filled**

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13	Sales forces are not adequate to fully commercialize the solution			**0**			**Not Filled**
14	Difficult or even impossible (e.g. monopoly market) to enter in a traditional and well-established market			**0**			**Not Filled**
15	New solutions are emerging, and they appear to have higher performances, lower costs, higher sustainability….			**0**			**Not Filled**
	IPR/Legal Risk Factors						
20	IPR shared with all partners involved in the TP			**0**			**Not Filled**
	Financial/Management Risk Factors						
21	No future financing sources has been identified yet			**0**			**Not Filled**
	Environmental/Regulation/Safety risks:						
26	TP3 is not aligned with expectations of incoming new local incentives			**0**			**Not Filled**

Based on the combinations of Risk Grade values and Estimated Success of Intervention, the document suggests the action to perform, as summarized in Table 4:

Table 4: Actions based on Risk Grade and Estimated Success of Intervention

Action	Risk Grade	Estimated Success of Intervention	Notes
No Action'	<50	<5	The risk is low, and the intervention has probably scarce success
Between Control & No Action	<50	=5	In between
Control	<50	>5	The risk is low but, since the intervention has probably good success, could be worth to monitor the evolution of the scenario and be ready to start the intervention

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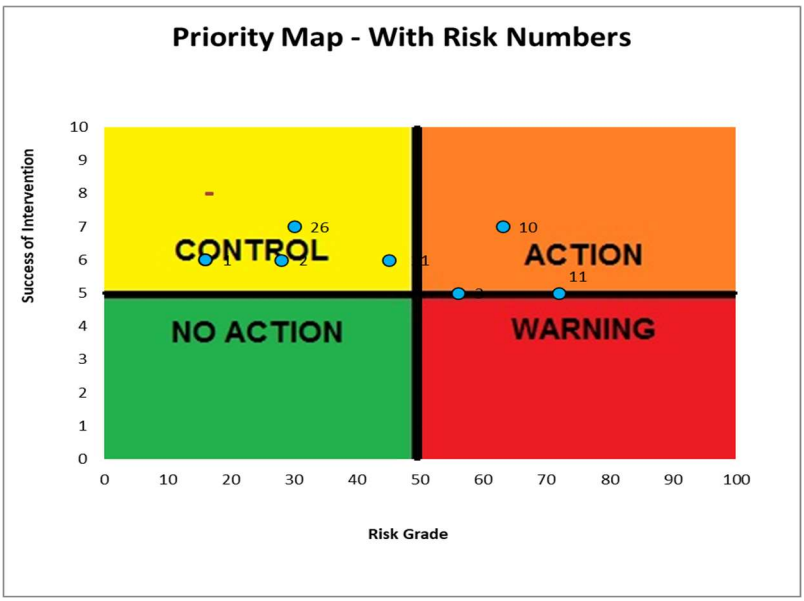
Between Control & Action	=50	>5	In between
Action!	>50	>5	The risk is high and, since the intervention has probably good success, it is important to start it as soon as possible
Between Action & Warning	=50	<5	In between
Warning	>50	<5	The risk is high but, since the intervention has probably scarce success, it cannot be easily moderated and thus it is important to keep a warning
In the Middle of Everything	=50	=5	In between

Finally, the Risk Assessment Table provides a chart with the priority map for the identified risks, as shown in Figure 1.

Figure 1: Risks' Priority Map



1.3.3 BFMULO Matrix

The BFMULO matrix is utilized as a tool for **recording the exploitation claims and expectations of partners**. The acronym BFMULO represents specific intentions regarding exploitation, which are to be placed within the BFMULO matrix.

BFMULO is an acronym that stands for:

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- **B: IPR's on background information.** It's pre-existing knowledge, information, technologies, or intellectual property that a project partner already possesses or has developed before entering the project. It encompasses any existing intellectual property rights, patents, copyrights, trade secrets, or other proprietary information that may be relevant to the project.
- **F: IPR's on foreground information**. Information and knowledge represented by outcomes produced by project partners. Ownership, rights, and responsibilities related to the project partner foreground are typically addressed in the collaboration agreement or contract between the project partners. These agreements specify how the foreground intellectual property will be owned, shared, used, and protected among the partners. Properly defining and managing the project partner foreground is important to ensure a fair distribution of rights and benefits among the collaborating parties and to facilitate the effective exploitation and commercialization of the project outcomes. If a partner wants to have a contribution recognized in an exploitable outcome (choosing to be a F in the KER), they must be actively involved in tasks that directly contribute to achieving that outcome.
- **M: Making the result**. Being engaged in tasks directly associated with the manufacturing process, creating and selling the results. A partner should actively participate in activities that contribute to the successful production and commercialization of the products/softwares outlined in the KER. This is not strictly connected to IP ownership: if the IP owner does not have the resources or skills to produce and sell the result, an agreement may be signed between the parties.
- **U: Using the result**. Utilizing one's own expertise to generate novel product lines or processing techniques is a way to implement foreground intellectual property. Moreover, foreground intellectual property can be directly or indirectly employed in supplementary research tasks beyond the project's scope or in the development, production, and marketing of a method, product, or service. Demo partners typically display minimal interest in manufacturing or commercializing the outcomes. Their involvement in the project stems from the belief that incorporating the developed solution into their processes or systems could bring potential benefits. As active participants in the study, it is expected that they will have fair access to the outcomes as end-users.
- **L: Licensing the result**. Revenue generated through agreements with external parties, who are not part of the consortium, is an example of income from deals with third parties. One option in such cases is to license the protected intellectual property (IP) when a partner lacks the necessary skills or resources to fully capitalize on a particular result or wishes to explore non-commercially viable areas. This means that a third party, who is not a member of the consortium, may enter into a contract with the owner of the IP and utilize it for their own purposes.
- **O: Other**. Any other methods of exploitation (e.g.: consultancy, provide special services, build academic courses, etc.).

The partner is called to select the appropriate "actions" (B, F, M, U, L, O) in the initial table, and provide a brief explanation for their decision. To assist in completing this task, a checklist is provided to guide the partner's selection process, as shown in Table 5: BFMULO Checklist blank template.

Table 5: BFMULO Checklist blank template

Name of the partner	……..
Title and number of the KER	KER n° …. – Title: ……
B – Background	Do you have background for this KER? ☐ YES

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	☐ NO In case you checked “YES”, your background is: ☐ A patent (please specify the title and publication number) ☐ Other types of IP (e.g. copyright, design, etc.) ☐ Industrial secret ☐ A product/service ☐ A scientific publication (or similar) ☐ Other (please specify)
F – Foreground	Do you have foreground for this KER? ☐ YES ☐ NO In case you checked “YES”, your proposed foreground is: ☐ A patent (please specify the title and publication number) ☐ Other types of IP (e.g. copyright, design, etc.) ☐ Industrial secret ☐ A new or improved product/service ☐ A scientific publication (or similar) ☐ Other (please specify)
M – Manufacturing	Are you going to: ☐ Manufacture (and sell) the full KER (which is a product) ☐ Manufacture (and sell) part of the KER (e.g. one component) ☐ Write the software/firmware (or similar) ☐ Create the tools, software tools to propose the KER (which is a service) ☐ Sell, adjust, evolve the KER (which is a service) ☐ Other (please specify)
U – Using	Are you going to: ☐ Buy / adopt the full KER (which is a product) ☐ Integrate part of the KER (e.g. one component) in one of your products ☐ Buy / use the service ☐ Other (please specify)
L – Licensing	Are you going to licence to third parties (out of the initial consortium) the KER? ☐ YES ☐ NO In case you answered “YES”, have you identified the entity for licensing: ☐ Yes, there is already a name for licensing and initial commercial agreements have started; ☐ Yes, there is already a name for licensing; ☐ Yes, there is a clear profile of the entity for licensing; ☐ No, but it is necessary to find an entity for licensing; What will be the main role of the entity and the scope of licensing (please select all relevant answers): ☐ Manufacturing (also considering software and tools) ☐ Selling the product or providing the same service;;

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	☐ Distributing the product; ☐ Service, after sales; ☐ Maintenance and repair; ☐ Other (please specify).
O - Other	There are several other options to exploit a KER. Please select one or more that can be relevant for your organization and add anything else that is not included in the list: ☐ Build academic courses; ☐ Provide consultancy; ☐ Create a Spin-Off Company; ☐ Support further R&D studies; ☐ Other (please specify).

Finally, the information collected via the checklist are reported, for each KER, in the following format:

Table 6: BFMULO Matrix

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO						
UHA - IMEC						
ETH						
FRAU						
CTR						
SNF						
DLR						
EPFL						
RINA-C						
ACEA						
FHA						

This table allows all partners to have a comprehensive overview of other partners exploitation intentions and expectations for all the Key Exploitable Results.

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2. MANAGEMENT OF IPR AND EXPLOITATION STRATEGY FOR EACH KER

2.1 Exploitation and IPR workshop

During the General Assembly Meeting held of M36 an Exploitation and IPR workshop was held by RINA-C with the participation of all partners.

The workshop was the opportunity to share with the Consortium the methodology that RINA-C defined for the final activities of Task 6.5 “IPR Management and exploitation plan towards future marketability”.

During the workshop, RINA-C’s forms, checklists and tables necessary to develop exploitation strategies for KERs were presented (Exploitation Roadmap, Risk Assessment Table and BFMULO Matrix) and, with the assistance of KER 1 Leader (Chemtrix), it was shown how to fill the questionnaires.

Furthermore, the workshop was a valuable moment to receive feedback related to the KERs’ development and evolution.

2.2 KER 1: Transparent flow reactor

2.2.1 Exploitation Roadmap

The transparent flow reactor, developed in WP3 by Chemtrix with the involvement of Signify, TNO and DLR, will reach TRL5 at the end of the project.

In the first months after the project ending, CTR has planned pre-commercial strategic activities as well as technical activities to increase the Technology Readiness Level such as tests and preparation of procedures and manuals. Later, many different activities will be performed; in particular, CTR expects to define the supply and value chain for the reactor one year after the end of the project.

Chemtrix will have to draft, before exploiting the product, an agreement on common IP with all the partners who developed KER 1, as no discussion has been performed to decide how to share, manage and access the Intellectual Property.

An important investment is required to get the reactor onto the market, reason why the company will look for funding from different European, national and local funding schemes. However, Chemtrix also considers collecting private investments from business angels.

This innovation is expected to have a significant impact both from the point of view of the company (increased revenues and entrance in a new market) and of the society, as it should create new jobs, increase quality of jobs and generate important energy savings.

The complete checklist is reported in APPENDIX A: Exploitation Roadmaps.

2.2.2 Assessment of relevant Risks

Table 7 highlights the relevant risks identified for KER 1. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

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Table 7: KER 1 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
	Market Risk Factors						
9	LCoE too high compared to existing conventional and/or other competitive solutions	*8*	*8*	**64**	Review potential customers& determine price that they are willing to pay for such a solution	*4*	**Warning;**
	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*8*	*8*	**64**	Work to identify suitable follow-up projects to increase the TRL & identify solution / problem fit with launch Customers	*7*	**Action!**
	Environmental/Regulatio n/Safety Risk Factors						

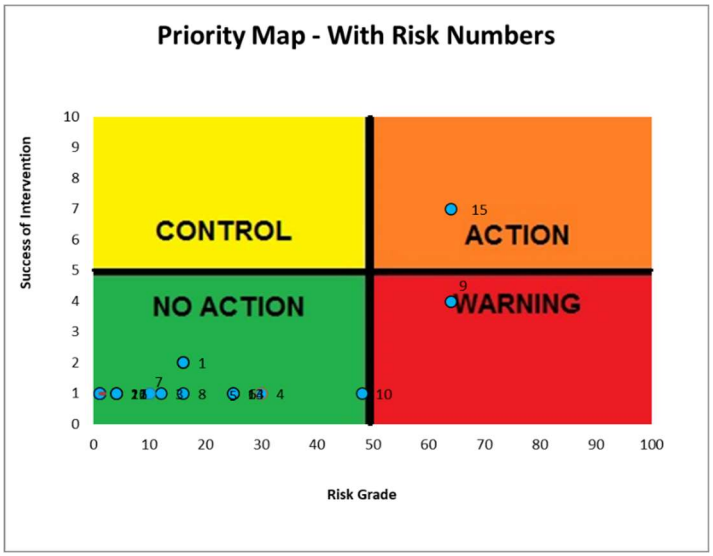

Figure 2: KER 1 Risks' Priority Map

2.2.3 Final conclusions on IPR Management

The decision not to pursue a patent for the reactor is based on Chemtrix's assessment that relying on industrial secrecy offers a superior means of safeguarding the Key Exploitable Result. By keeping the processes and specifications of the reactor confidential, Chemtrix aims to maintain a competitive advantage without disclosing sensitive technical details through a patent.

That does not exclude the possibility of patenting some parts of the solution related to the coupling of the reactor to other essential components of SPOTLIGHT's photonic device, which may be

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fully owned by other consortium partners. In this way, while the reactor itself remains protected through secrecy, strategic aspects related to its interaction with external components can be considered for patenting, ensuring a balanced approach to Intellectual Property management within the consortium.

2.2.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 8: BFMULO Matrix for KER 1

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO				X		X
UHA - IMEC	X					X
ETH						
FRAU						
CTR	X	X	X	X		X
SNF						
DLR		X				X
EPFL						
RINA-C						
ACEA						
FHA						X

2.3 KER 2: Tailored secondary solar optics for sunlight-powered chemical processes

2.3.1 Exploitation Roadmap

KER 2, led by DLR and developed in collaboration with SNF and TNO in WP3, is expected to reach TRL 5 by the end of the project. Since the TRL is still very low and those optics are very far from entering the market, DLR will perform some pre-commercial strategic activities (up to 6 months after the end of the project) and prepare commercial agreements (up to 9 months after project ending) with supply chain partners.

It is important to note that SNF and TNO are likely to be suppliers for DLR in the design and consulting services field.

DLR's future exploitation strategy will rely on the following monetization routes:

- Offer consulting services for the design of the optics.
- Design and sell the secondary optical system where the hardware is bought from external manufacturers.
- Design and sell the secondary optical system where the hardware is also produced (acceptable in case of scale economies).

DLR is likely to create a spin-off company for consulting services or commercialization of the optics. The investment's payback time is expected to be greater than 3 years.

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The research will continue with public funds (both local/national and European funds).

The KER is expected, in the next three years, to generate new jobs, decrease CO_2 and PM10 emissions as well as increase energy savings.

The complete checklist is reported in APPENDIX A: Exploitation Roadmaps.

2.3.2 Assessment of relevant Risks

Table 9 highlights the relevant risks identified for KER 2. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

Table 9: KER 2 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*6*	*3*	**18**	Regular meetings to improve performance and update partners on new developments, exchange on experiences	*7*	**Control.**
3	Lack of commitment/ resources to promote the new solution into the market	*8*	*9*	**72**	Involve other investors, using licensing	*5*	**Between Action & Warning**
5	Disagreement on ownership rules, procedures, shares	*9*	*5*	**45**	Agreement on IP and shares before commercialisation	*8*	**Control.**
	Market Risk Factors						
9	LCoE too high compared to existing conventional and/or other competitive solutions	*10*	*7*	**70**	Improve process efficiency, find ways to cut costs (mass production)	*3*	**Warning;**
11	Sales forces are not adequate to fully commercialize the solution	*8*	*9*	**72**	Involve other companies, use licensing	*7*	**Action!**
13	New solutions are emerging, and they appear to have higher performances, lower costs, higher sustainability….	*10*	*5*	**50**			**Between No Action & Warning**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*9*	*2*	**18**	Prepare exploitation contracts or guidelines while finalizing the project	*8*	**Control.**

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	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*9*	*7*	**63**	Search for public funding opportunities	*7*	**Action!**
	Environmental/Regulation /Safety risks:						
16	TP3 is not aligned with expectations of incoming new local incentives	*4*	*5*	**20**	Proactive screening of incoming new policies. Definition of rules for updating results and the system itself	*5*	**Between Control & No Action**

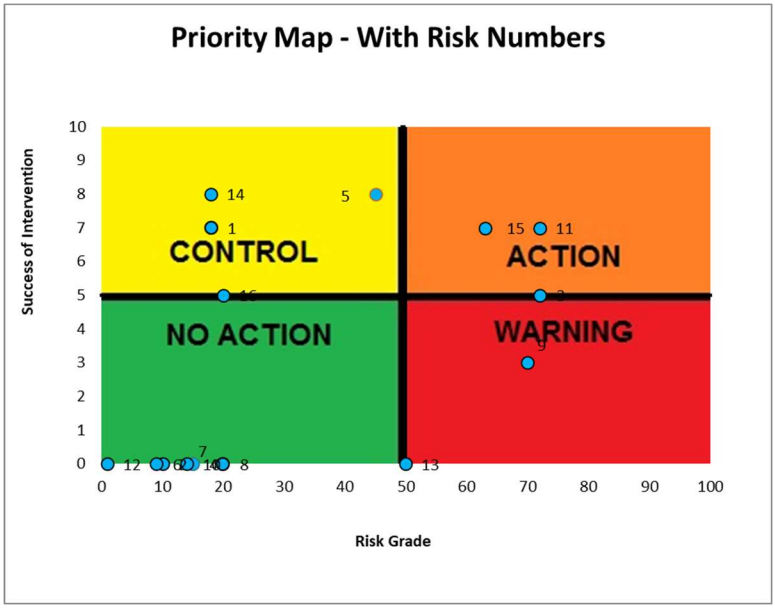

Figure 3: KER 2 Risks' Priority Map

2.3.3 Final conclusions on IPR Management

DLR plans to apply for a patent to protect the innovation developed. This choice could give DLR a competitive advantage in the reference market and push the commercialization of the KER. Since DLR plans to create a spinoff for commercialization, a patent on the technology could help attract important investments.

Furthermore, a publication with the results from the experimental campaign is planned. If the publication will precede the patent application, the information included in the scientific article will have to be carefully evaluated to not limit the patent application.

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2.3.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 10: BFMULO Matrix for KER 2

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO				X		X
UHA - IMEC						
ETH						
FRAU						
CTR						
SNF						
DLR	X	X		X		X
EPFL						
RINA-C						
ACEA						
FHA						X

2.4 KER 3 + 5: Integration knowledge and technologies about artificial and natural light sources for chemical processes - LED light source with dimmable medium to high light intensity

2.4.1 Exploitation Roadmap

This KER, which derives from the union of two different results (KER 3 and KER 5), is expected to reach TRL 7 or TRL 8 by the end of the project. Many activities to get the innovative solution to the market have already been planned by Signify; in particular, they expect to start the tests in a real operational environment (TRL 9) 6 months after the end of the project.

In the next year Signify plans to develop both the supplier and the commercial side of their business model, with the goal of having a clearly defined value chain for commercialization of the KER in Europe and North America, the two main target geographies. Further actions, such as marketing, administrative and after-sales activities are expected to be performed two years after the end of SPOTLIGHT.

Considering the high TRL, Signify considers the possibility of investing its own money to fully develop the technology. Also, the company plans to apply for European funding schemes.

Signify, through commercialization of the result, expects to increase its revenues, but also to have significant impacts on the ESG spectrum such as reduction of CO_2 emission and entrance in a new market with innovative solutions.

2.4.2 Assessment of relevant Risks

Table 11 highlights the relevant risks identified for KER 3+5. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

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Table 11: KER 3 + 5 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
	Market Risk Factors						
8	Customers are already satisfied by less advanced solutions or by basic products	*8*	*7*	**56**	clarification of performance benefits for specific solutions from customer perspective	*5*	**Between Action & Warning**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*8*	*7*	**56**	clarification of financial benefits for specific solutions from customer perspective	*5*	**Between Action & Warning**
10	Performances are lower than expected or lower than competitors or market's needs	*8*	*7*	**56**	map out scenarios for alternative use of the solution in the system	*5*	**Between Action & Warning**
12	Difficult or even impossible (e.g. monopoly market) to enter in a traditional and well-established market	*8*	*8*	**64**	develop contacts with the industry, also for possible alternatives	*4*	**Warning;**
13	new solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*8*	*8*	**64**	actively stay up to date on technology and market development	*5*	**Between Action & Warning**
	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						
	Environmental/Regulation/Safety risks:						

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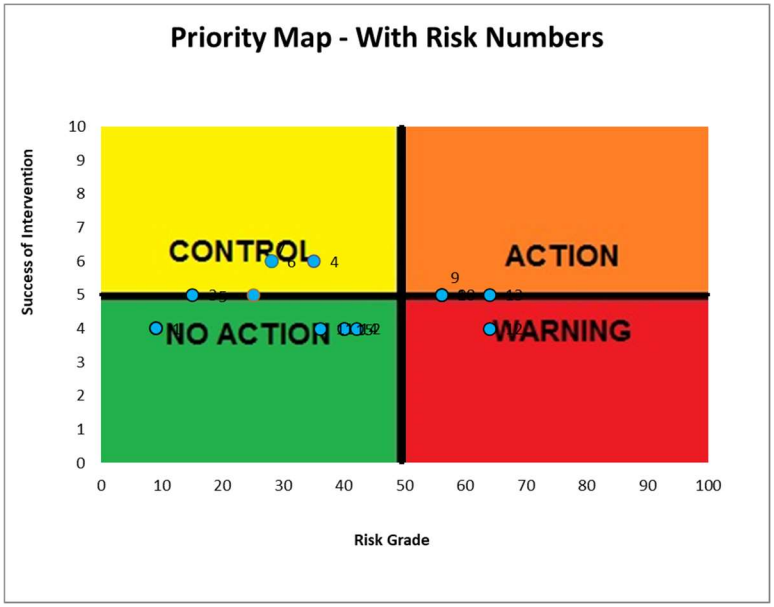

Figure 4: KER 3 + 5 Risks' Priority Map

2.4.3 Final conclusions on IPR Management

As also assessed in the preliminary version of the exploitation plan, the sector is widely explored by companies that aim at protecting knowledge with patents. That makes more difficult the possibility of patenting the idea. Furthermore, SNF has no intention of applying for patent protection. SNF intends to keep the developed solution as an industrial secret, thus they do not intend to publish scientific articles on the topic.

2.4.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 12: BFMULO Matrix for KER 3+5

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO				X		X
UHA - IMEC						
ETH						
FRAU						
CTR						
SNF		X	X			
DLR	X	X		X		X
EPFL						
RINA-C						
ACEA						
FHA						X

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2.5 KER 4: A luminescent solar concentrator (LSC) prototype demonstrated at lab scale for spectral conversion

2.5.1 Exploitation Roadmap

KER 4, developed by EPFL, will be mainly used for building integrated photovoltaics to effectively utilize both direct and diffuse sunlight for electricity generation, especially in urban construction.

EPFL has already planned a vast range of activities to scale the TRL and bring the luminescent solar concentrator onto its target markets, which are Southern and Western Europe, United States of America and Australia.

The exploitation strategy is the direct selling of the product in the abovementioned markets. The company expects a payback time longer than 3 years to recoup the investment needed to bring the KER to the market. Furthermore, to scale the TRL and have a product ready for market entry, EPFL will apply to local funding schemes (as the SNSF funding) and will look for private investments from banks or private industries.

From a financial point of view, with the exploitation of this result the organization hopes to increase its margins and grow its business in new geographies. From an ESG standpoint, this innovation is expected to generate energy and resources savings, as well as increase quality of life for the society.

2.5.2 Assessment of relevant Risks

Table 13 highlights the relevant risks identified for KER 4. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

Table 13: KER 4 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
	Market Risk Factors						
8	Customers are already satisfied by less advanced solutions or by basic products	*8*	*7*	**56**	Look for a better product market fit	*4*	**Warning;**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*9*	*8*	**72**	Try to cut costs	*3*	**Warning;**
	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						

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	Environmental/Regulation /Safety risks:						

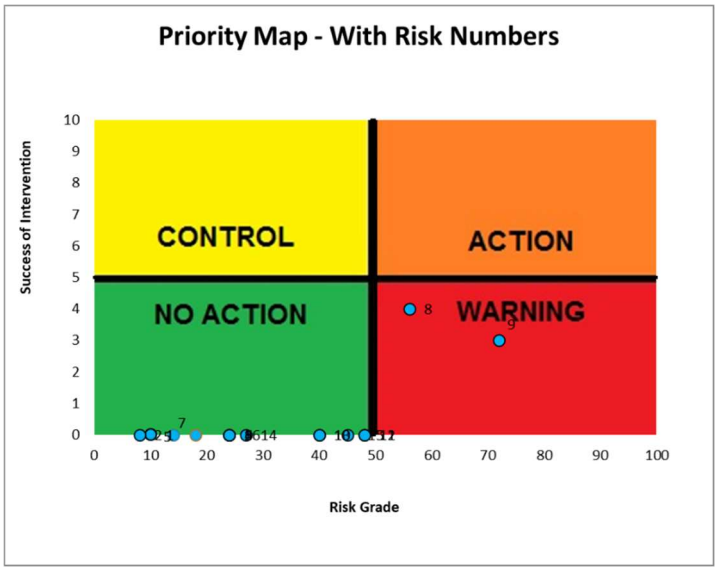

Figure 5: KER 4 Risks' Priority Map

2.5.3 Final conclusions on IPR Management

EPFL, which is a research-based university, plans to publish a journal paper on the topic.

However, when the luminescent solar concentrator efficiency improves further, EPFL should consider the possibility of patenting the innovative solution. This could happen approximately one year after the end of the project. In case, the university will have to carefully consider which information to include in the paper, so as not to disclose sensitive information which could be vital for patent application.

Finally, in D6.7 the option to protect the result with industrial secret was mentioned. EPFL is more inclined towards a patent application than protection as an industrial secret.

2.5.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 14: BFMULO Matrix for KER 4

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO						
UHA - IMEC						
ETH						
FRAU						
CTR						

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SNF						
DLR						X
EPFL		X	X	X		X
RINA-C						
ACEA						
FHA						X

2.6 KER 6: Newly developed plasmonic nanocatalysts

2.6.1 Exploitation Roadmap

KER 6 is strictly connected to KER 7 (Upscaling process for the plasmonic nanocatalysts). This innovative solution has exhibited notable efficiency in pilot demonstrators, signaling its high potential for large-scale applications.

UHA, which is responsible for the development of the innovative plasmonic nanocatalysts, has already planned to perform technical and marketing activities right after the end of the project. In the following months, the organization will work in parallel on precommercial and administrative activities, while finalizing the agreement on IP with the involved partners.

UHA's exploitation approach will develop on three main axes:

1. Continuous dissemination through scientific publications and targeted outreach efforts to keep the global community informed, with the goal of attracting collaborators and industry stakeholders. Emphasizing the catalyst's unique features and its role in sustainable practices will be vital to grant new public fundings both at a local level (FWO, VLAIO) and at an EU level (Interreg VI-NI, Horizon EU). UHA, however, does not exclude the possibility to invest its own capital to get the product closer to TRL9.
2. Strategic partnerships with key industry players in renewable energy to enable collaborative efforts, combining expertise and resources to enhance the development of the result and its exploitation.
3. Licensing agreements with relevant companies to seamlessly integrate the catalyst into existing industrial processes, accelerating its adoption.

The final goal, when the result will reach its full maturity, is to commercialize the nanocatalysts, which could be done, for instance, through partnerships with companies or through the creation of a spinoff. Full exploitation of the result is expected to have an economic impact in terms of additional revenues and new jobs created.

Furthermore, getting this innovative solution in the market would generate significant energy and resources savings and lower CO_2 emissions.

2.6.2 Assessment of relevant Risks

Table 15 highlights the relevant risks identified for KER 6. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

Table 15: KER 6 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion

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	Partnership Risk Factors						
	Market Risk Factors						
13	New solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*8*	*8*	**64**	Continuously monitor the SotA for emerging technologies and solutions. Innovate and evolve the product to meet or exceed market expectations.	*8*	**Action!**
	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*8*	*6*	**48**	Revise financial projections based on updated market data and business insights. Explore grants, subsidies, or government funding programs.	*6*	**Control.**
	Environmental/Regulation/Safety risks						

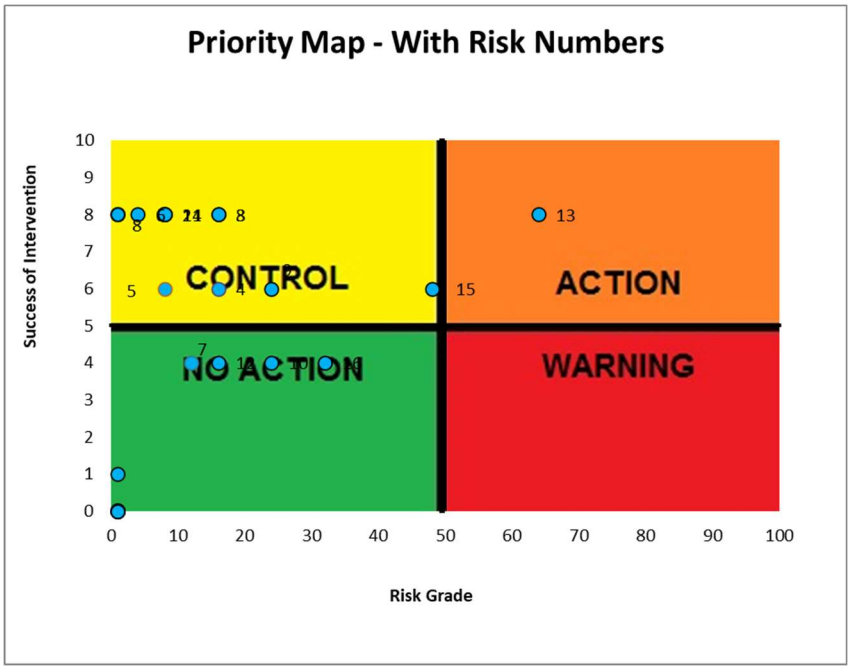

Figure 6: KER 6 Risks' Priority Map

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2.6.3 Final conclusions on IPR Management

The final conclusions on IPR Management for KER 6 have been redacted jointly with KER 7 and are described in section 2.7.3.

2.6.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 16: BFMULO Matrix for KER 6

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO	X	X		X	X	X
UHA - IMEC	X	X			X	X
ETH	X	X				
FRAU						
CTR						
SNF						
DLR		X		X		X
EPFL						
RINA-C						
ACEA						
FHA						X

2.7 KER 7: Upscaling process for the plasmonic nanocatalysts

2.7.1 Exploitation Roadmap

Exploitation of KER 7 is strictly related to the advancements of KER 6. Please refer to Section 2.6.1 as KER 6 and KER 7 are expected to be exploited jointly.

2.7.2 Assessment of relevant Risks

Table 17 highlights the relevant risks identified for KER 7. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

Table 17: KER 7 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
3	Lack of commitment/ resources to promote the new solution into the market	*7*	*6*	**42**	Joint efforts to apply for future funding - future joint projects	*9*	**Control.**
	Market Risk Factors						

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	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						
15	Lack of resources to promote the new solution into the market	*7*	*6*	**42**	Joint efforts to apply for future funding - future joint projects	*9*	**Control.**
	Environmental/Regulation/Safety risks:						

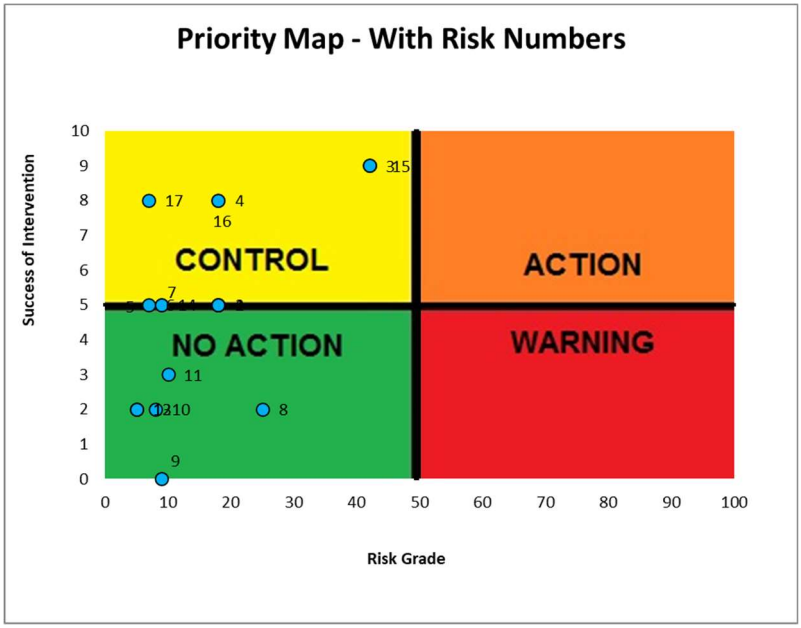

Figure 7: KER 7 Risks' Priority Map

2.7.3 Final conclusions on IPR Management

The IP, in both KER 6 and KER 7, may be owned by one or multiple of the involved partners, viz. TNO, UHA and ISC, considering that different partners contributed to the development of different catalysts or processes.

For KER 6 “Newly developed plasmonic nanocatalysts” patenting is considered a valid option; to this point no patents have been submitted. Some of the findings have been published in a scientific article[1], therefore explicitly correlating the partners to the results and transforming the findings in known art; that reduces the space for a potential patent application. A valid option could be to protect further developments as an industrial secret.

[1] Burova, D.; Rohlfs, J.; Sastre, F.; Molina, P.M.; Meulendijks, N.; Verheijen, M.A.; Kelchtermans, A.-S.; Elen, K.; Hardy, A.; Van Bael, M.K.; Buskens P.; Comparing the Performance of Supported Ru Nanocatalysts Prepared by Chemical Reduction of RuCl3 and Thermal Decomposition of Ru3(CO)12 in the Sunlight-Powered Sabatier Reaction. Catalysts 2022, 12, 284. https://doi.org/10.3390/catal12030284

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KER 7, which is directly based on the IP of KER 6, has not reached yet a high enough TRL to be suitable for patent application or for a scientific publication. Fraunhofer plans, for the moment, to keep it secret and evaluate further steps in the future.

2.7.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 18: BFMULO Matrix for KER 7

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO				X		
UHA - IMEC		X				X
ETH						
FRAU	X	X			X	X
CTR						
SNF						
DLR						
EPFL						
RINA-C						
ACEA						
FHA						X

2.8 KER 8: The entire SPOTLIGHT process

2.8.1 Exploitation Roadmap

KER 8 represents the entire process developed in the SPOTLIGHT's project and is expected to reach TRL 5 by the end of the project. This is the main result of the project, and it encompasses all the previously analyzed Key Exploitable Results.

To fully exploit KER 8, many vital activities are needed, such as the definition of the supply and value chain and technical activities to drive up the TRL (testing, technical manuals, operation procedures). Some marketing activities to communicate and disseminate the innovative solutions have already been performed, such as the creation of a website or social media profiles.

The supply chain will involve many different actors, and most of them can be found inside the consortium. For instance, DLR and CTR can supply components, RINA-C can take charge of design, consulting, quality, certification services and HSE consulting, while TNO can support the design phase, people training and offer IP and legal consultancy. The supplier for raw materials will have to be found outside of the SPOTLIGHT's partners.

The optimal way to scale the TRL is by obtaining public funds, both at the European level and at the national level. It will be possible to apply for many different funding schemes thanks to the impact the SPOTLIGHT's process could play in decarbonization. It has the potential, in fact, to reshape the current value chain for fossil fuels and promote a more efficient use of energy and a significant reduction in CO_2, PM10 and other pollutants' emissions.

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2.8.2 Assessment of relevant Risks

Table 19 highlights the relevant risks identified for KER 7. The complete Risk Table is reported in APPENDIX B: Risk assessment Tables.

Table 19: KER 8 Relevant Risks

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
4	Disagreement on future investments, some partner may leave after the project	*8*	*8*	**64**	Create a roadmap in advance with all the steps to be taken in the years after the end of the project. Seal the roadmap with partnerships and contracts	*6*	**Action!**
5	Disagreement on ownership rules, procedures, shares	*5*	*10*	**50**	Being the sum of more IPRs, the risk of disagreements on use of IPRs is high. Set clear rules and contract in the beginning is very helpful.	*8*	**Between Control & Action**
	Market Risk Factors						
	IPR/Legal Risk Factors						
	Financial/Management Risk Factors						
	Environmental/Regulati on/Safety risks:						

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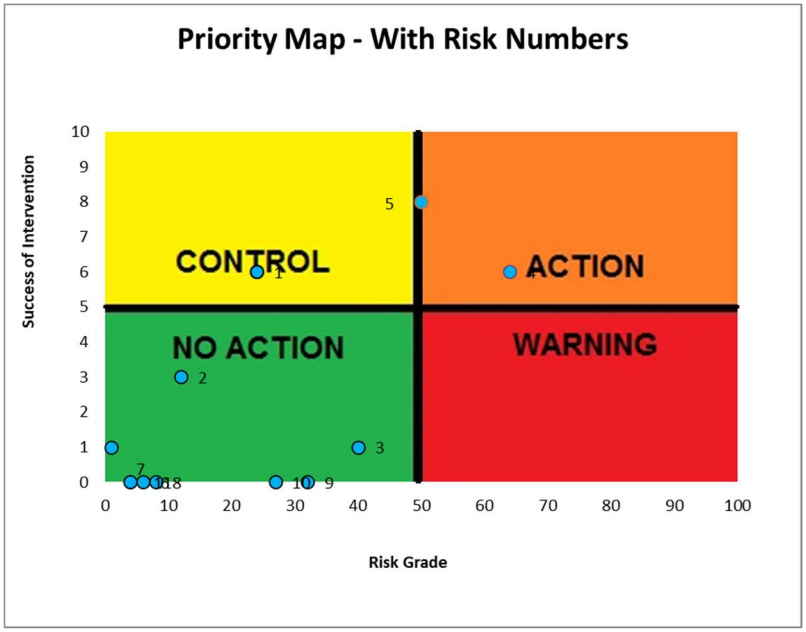

Figure 8: KER 8 Risks' Priority Map

2.8.3 Final conclusions on IPR Management

KER 8 is the process that allows the production of the final products at industrial level. All the other KERs are relevant and indispensable parts of the whole but they cannot, alone, produce the expected result.

While other KERs can be adapted and optimized for other scopes, the process developed by SPOTLIGHT is optimized just to produce solar fuels through the Sabatier reaction.

It would be possible to protect the whole process with a patent, but this is not recommended as some components of the process could be replaced while obtaining the same final result without infringement. Furthermore, the commercial exploitation of the whole process would be complicated as it would require all the partners to work together, without the possibility of some partners being replaced. The best alternative would be to patent the key components, therefore ensuring a stronger protection.

An option remains to protect the process with a Trademark, which could contribute to promoting the process developed within the technical and scientific community with a "name" that could become immediately synonym of the solar fuel production method or of the Sabatier reaction used for creating synthetic fuels.

2.8.4 BFMULO – Partners' interests and expectations in KER's exploitation

Table 20: BFMULO Matrix for KER 8

Partner Name	B Background	F Foreground	M Making	U Using	L Licensing	O Other
TNO	X	X		X	X	X
UHA - IMEC	X	X				X

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ETH						
FRAU						
CTR						
SNF						
DLR		**X**		**X**		**X**
EPFL						
RINA-C	**X**	**X**				**X**
ACEA						
FHA						**X**

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CONCLUSIONS

This deliverable, which is the result of numerous interactions and exchange of information with all the partners, highlights the exploitation plan for the results of the SPOTLIGHT project.

Workshops, one-to-one meetings and several email exchanges fostered formative discussions on the project's results and set the basis for the present report.

D6.7 "Strategy for IP Management" and D6.8 report the results of the methodological steps followed to obtain a comprehensive exploitation plan:

- Definition of the project's Key Exploitable Results and partners' responsibilities.
- Detailed overview of each KER, considering also their value proposition and competition in the reference markets.
- Patent analysis to offer an overview of the competitive scenario revolving around the different technologies.
- Definition of exploitation roadmaps to identify the actions needed to scale the TRL and bring the solutions to the market.
- Overview of partners' interests in the exploitation of results (BFMULO Matrix).
- Final decisions for the protection of the results (IPRs management).
- Definition of the most relevant risks that can influence the exploitation of the results.

All the results analyzed showed a great potential for exploitation. The first paramount step to guarantee a successful exploitation is to ensure that the KERs reach their full maturity; for this reason, it is recommended to invest consistently in the development of these solutions. Thanks to the innovativeness of KERs, organizations can apply to different funding schemes to cover the costs of the complete validation of those technologies.

When the results are mature and the supply and value chains are defined, a commercial exploitation will be possible. Organizations will have the opportunity to enter emerging markets or try to disrupt mature markets with their innovative solutions, leveraging on their positive environmental and social impacts.

Organizations such as universities and research centers will need additional support to enter the markets, as they will have to create spinoffs or set up licensing deals to exploit the results.

From the IPR point of view, no patents have been submitted yet. The partners, at this stage, are keeping the results confidential or planning scientific publications (especially the academic partners and RPOs). Patent applications can be expected for some of the developed technologies in the future.

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APPENDIX A: EXPLOITATION ROADMAPS

Table 21: KER 1 Exploitation Roadmap

Exploitation Roadmap: *KER N1*	
Lead: *KER Leader Chemtrix* **KER Owners:** *Partner/s* **TRL at the end of the project:** *TRL 5*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☐ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☒ Other **Commercial agreement preparation:** ☒ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts ☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☒ With financial bodies and investors ☒ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☒ Shares of the IP; ☒ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☒ Rules for managing the IP, in particular costs of maintenance; ☒ Rules for accessing to the IP (e.g. licensing fees, royalties); ☒ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☒ Rules for specific geographic coverage or markets; ☐ Other. **Technical activities towards TRL 9:** X Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines

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	☒ Build or finalize procedures for: ☒ Quality control ☒ HSE ☒ Further testing ☒ Involvement of third parties ☐ Other ☒ Prepare the technical manual ☒ Prepare the operation and maintenance procedures and plans ☒ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☒ Start contracts with suppliers ☒ Start contracts with selling channels ☒ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☒ After-sales engagement ☒ Management of spare parts ☒ Management of consumables ☒ Management of accessories ☐ Other **After-sales activities towards TRL 9:** ☒ Creation of an after-sales team ☒ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☒ Operation and maintenance technical support ☒ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☐ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☒ The creation of a dedicated website centred on the solution; ☒ The creation of a dedicated web-campaign centred on the solution;

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	☒ The creation of a dedicated social media campaign centred on the solution; ☒ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☒ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Those with stable solar coverage 2. …….. 3. …….. **Activities related to geography:** ☒ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☒ Start-up of local technical support offices, including helpdesk ☒ Establishment of local value chains (production) ☒ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials ☒ Semi-finished products ☒ Components ☒ Accessories ☒ Design, Consulting services ☒ Quality and certification services ☐ Human resources ☐ Production machines / lines ☐ Packaging ☐ Other

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	Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support ☐ Basic software ☐ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other **Commercial side of the business model:** Technical partners: ☒ System integrator ☒ Installer ☐ Operation support ☒ Maintenance support ☐ Local on-site helpdesk ☒ Decommissioning support Commercial partners: ☒ Dealers, distributors ☐ Local agents ☐ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												

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Commercial agreements												
Agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												
After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												
Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): ☒ European R&D funds (e.g. Horizon Europe): ☒ Private investments: ☐ Banks ☐ Financial funds ☒ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☐ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☒ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☒ New market entrance ☐ New geography entrance

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	☐ Other **Social impacts** ☒ New jobs created ☒ Increased quality of job ☐ Increased quality of life ☐ Cultural impacts ☒ New market entrance ☐ New geography entrance ☐ Other **Environmental impacts** ☐ Decreased CO2 ☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☒ Energy savings ☐ Resources savings ☐ Other **Other impacts** …… ……

Table 22: KER 2 Exploitation Roadmap

Exploitation Roadmap: *KER 2*	
Lead: DLR **KER Owners: SNF / TNO** **TRL at the end of the project:** *TLR 5*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☒ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☐ Other **Commercial agreement preparation:** ☒ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts

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	☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☒ Shares of the IP; ☒ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☐ Rules for managing the IP, in particular costs of maintenance; ☐ Rules for accessing to the IP (e.g. licensing fees, royalties); ☐ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☐ Other. **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☐ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines ☐ Build or finalize procedures for: ☐ Quality control ☐ HSE ☐ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☐ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☐ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM

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	☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9:** ☐ Creation of an after-sales team ☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☐ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☐ The creation of a dedicated website centred on the solution; ☐ The creation of a dedicated web-campaign centred on the solution; ☐ The creation of a dedicated social media campaign centred on the solution; ☐ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☐ The identification a (few) final test case of great resonance, that could become a “testimonial” of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Mena region 2. Australia 3. USA **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities

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	☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☐ Raw materials ☐ Semi-finished products ☒ Components ☐ Accessories ☒ Design, Consulting services – SNF, TNO ☐ Quality and certification services ☐ Human resources ☐ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support ☐ Basic software ☒ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other

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	Commercial side of the business model: Technical partners: ☐ System integrator ☒ Installer ☐ Operation support ☒ Maintenance support ☐ Local on-site helpdesk ☒ Decommissioning support Commercial partners: ☒ Dealers, distributors ☒ Local agents ☒ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												
After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												

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Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): ☒ European R&D funds (e.g. Horizon Europe): ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☐ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☐ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☐ Other **Social impacts** ☒ New jobs created ☐ Increased quality of job ☐ Increased quality of life ☐ Cultural impacts ☐ New market entrance ☐ New geography entrance ☐ Other **Environmental impacts** ☒ Decreased CO2 ☒ Decreased PM10 ☒ Decrease of other pollutants ☐ Water savings ☒ Energy savings ☐ Resources savings

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	☐ Other **Other impacts** …… ……

Table 23: KER 3+5 Exploitation Roadmap

Exploitation Roadmap: *KER N3+5*	
Lead: *Signify* **KER Owners:** **TRL at the end of the project:** *TLR 7/8*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☐ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☒ Other; business case **Commercial agreement preparation:** ☒ With partners (suppliers) from the supply chain ☒ With technical consultants and/or experts ☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☐ Shares of the IP; ☒ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☐ Rules for managing the IP, in particular costs of maintenance; ☐ Rules for accessing to the IP (e.g. licensing fees, royalties);

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	☐ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☐ Other. **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines ☐ Build or finalize procedures for: ☐ Quality control ☐ HSE ☐ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☐ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9: not applicable (yet)** ☐ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9: n.a.y.** ☐ Creation of an after-sales team ☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories

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	☐ Other **Marketing campaign towards TRL9. n.a.y.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☐ The creation of a dedicated website centred on the solution; ☐ The creation of a dedicated web-campaign centred on the solution; ☐ The creation of a dedicated social media campaign centred on the solution; ☐ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☐ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Europe……. 2. North America……. 3. …….. **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials; ACEA/FMA

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	☐ Semi-finished products ☐ Components ☐ Accessories ☒ Design, Consulting services: Rina-C ☐ Quality and certification services ☐ Human resources ☒ Production machines / lines; Chemtrix ☐ Packaging ☐ Other Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support ☐ Basic software ☐ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other **Commercial side of the business model:** Technical partners: ☐ System integrator ☐ Installer ☐ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☐ Dealers, distributors ☐ Local agents ☐ Local Service providers

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	☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												yr 2-3
After-sales activities towards TRL 9												yr 2-3
Marketing campaign towards TRL9												yr 2-3
Activities related to geography												yr 2-3
Manufacturing side of the business model												
Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☐ Local/national public funds (please provide details): ☒ European R&D funds (e.g. Horizon Europe): ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) ……..…….. ☒ Own investments

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Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☒ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☐ Other **Social impacts** ☐ New jobs created ☐ Increased quality of job ☐ Increased quality of life ☐ Cultural impacts ☒ New market entrance ☐ New geography entrance ☐ Other **Environmental impacts** ☒ Decreased CO2 ☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☐ Energy savings ☐ Resources savings ☐ Other **Other impacts** …… ……

Table 24: KER 4 Exploitation Roadmap

Exploitation Roadmap: *KER N4*	
Lead: *KER Leader 4* **KER Owners:** *EPFL* **TRL at the end of the project:** *TLR 5–6*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).*

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	Pre-Commercial strategic activities: ☒ Definition of the supply chain ☒ Definition of the distribution chain ☐ Definition of the logistics ☐ Other **Commercial agreement preparation:** ☒ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts ☒ With manufacturers ☒ With third parties that will supply resources (manpower, machine, plants, facilities) ☒ With financial bodies and investors ☒ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☐ Shares of the IP; ☒ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☒ Rules for managing the IP, in particular costs of maintenance; ☒ Rules for accessing to the IP (e.g. licensing fees, royalties); ☒ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☒ Rules for specific geographic coverage or markets; ☐ Other. **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) ☒ Build or finalize manufacturing processes and lines ☐ Build or finalize procedures for: ☐ Quality control ☐ HSE ☐ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☒ Prepare the operation and maintenance procedures and plans ☒ Finalize pre-production tests

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	☐ Other **Administrative activities towards TRL 9:** ☒ Start contracts with suppliers ☒ Start contracts with selling channels ☒ Build or finalize procedures for: ☒ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9:** ☒ Creation of an after-sales team ☒ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☒ Definition of warranty ☒ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☐ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☒ The creation of a dedicated website centred on the solution; ☐ The creation of a dedicated web-campaign centred on the solution; ☐ The creation of a dedicated social media campaign centred on the solution; ☒ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☐ The identification a (few) final test case of great resonance, that could become a “testimonial” of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…)

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	Target geography: List of top 3 target countries/regions where the solution will be proposed: 1. Southern and Western Europe…… United States 2. Australia…… **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☒ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials ☐ Semi-finished products ☐ Components ☐ Accessories ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☒ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support ☐ Basic software ☐ Hardware ☒ Design, Consulting services ☒ Quality and certification services

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	☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☒ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other **Commercial side of the business model:** Technical partners: ☒ System integrator ☐ Installer ☒ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☐ Dealers, distributors ☐ Local agents ☐ Local Service providers ☒ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												

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After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												
Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): SNSF funding ☐ European R&D funds (e.g. Horizon Europe): ☒ Private investments: ☒ Banks ☐ Financial funds ☐ Business angels ☒ Private industry ☐ Other private investors (please specify) …….. ☐ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☐ Increased direct revenues ☐ Increased indirect revenues ☒ Increased margin ☐ Increased market share ☒ New market entrance ☒ New geography entrance ☐ Other **Social impacts** ☐ New jobs created ☐ Increased quality of job ☒ Increased quality of life ☐ Cultural impacts ☒ New market entrance

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	☒ New geography entrance ☐ Other **Environmental impacts** ☐ Decreased CO2 ☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☒ Energy savings ☒ Resources savings ☐ Other **Other impacts** …… ……

Table 25: KER 6 Exploitation Roadmap

Exploitation Roadmap: *KER 6*	
Lead: *UHA* **KER Owners:** *UHA/TNO/ISC* **TRL at the end of the project:** 3/4	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☐ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☒ Other **Commercial agreement preparation:** ☐ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts ☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators

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	☒ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☒ Shares of the IP; ☐ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☐ Rules for managing the IP, in particular costs of maintenance; ☐ Rules for accessing to the IP (e.g. licensing fees, royalties); ☐ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☒ Other. **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines ☒ Build or finalize procedures for: ☒ Quality control ☒ HSE ☒ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☐ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☐ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts

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	☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9:** ☐ Creation of an after-sales team ☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☒ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☐ The creation of a dedicated website centred on the solution; ☒ The creation of a dedicated web-campaign centred on the solution; ☒ The creation of a dedicated social media campaign centred on the solution; ☐ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☒ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Europe……. 2. North America…….

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	3. SE Asia……. **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials ☐ Semi-finished products ☒ Components ☒ Accessories ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☒ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☒ Digital services (e.g. cloud) ☐ It support ☒ Basic software ☒ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services

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	☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other **Commercial side of the business model:** Technical partners: ☐ System integrator ☐ Installer ☐ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☐ Dealers, distributors ☐ Local agents ☐ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												
After-sales activities towards TRL 9												
Marketing campaign towards TRL9												

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

Activities related to geography												
Manufacturing side of the business model												
Commercial side of the business model												

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): FWO, VLAIO ☒ European R&D funds (e.g. Horizon Europe): Interreg VI-NI, Horizon-EU ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☒ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☒ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☒ Other **Social impacts** ☒ New jobs created ☐ Increased quality of job ☒ Increased quality of life ☐ Cultural impacts ☐ New market entrance ☐ New geography entrance ☒ Other **Environmental impacts** ☒ Decreased CO2

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	☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☒ Energy savings ☒ Resources savings ☐ Other **Other impacts** …… ……

Table 26: KER 7 Exploitation Roadmap

Exploitation Roadmap: *KER N7*	
Lead: ISC **KER Owners:** *TNO/UHA* **TRL at the end of the project:** *TLR #*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☐ Definition of the supply chain ☐ Definition of the distribution chain ☐ Definition of the logistics ☒ Other – depends on the further developments of KER6 **Commercial agreement preparation:** ☐ With partners (suppliers) from the supply chain ☐ With technical consultants and/or experts ☐ With manufacturers ☐ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☒ Other – depends on the further developments of KER6 **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☒ Shares of the IP;

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	☐ Roles of IP owners in the future value chain, revenue streams and third parties involved; ☐ Rules for managing the IP, in particular costs of maintenance; ☐ Rules for accessing to the IP (e.g. licensing fees, royalties); ☐ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☒ Other. – depends on the further developments of KER6 **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) ☐ Build or finalize manufacturing processes and lines ☒ Build or finalize procedures for: ☒ Quality control ☒ HSE ☒ Further testing ☐ Involvement of third parties ☐ Other ☐ Prepare the technical manual ☐ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☐ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other: **After-sales activities towards TRL 9:** ☐ Creation of an after-sales team

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	☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim ☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☒ Other – depends on the further developments of KER6 **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☐ The creation of a dedicated website centred on the solution; ☒ The creation of a dedicated web-campaign centred on the solution; ☒ The creation of a dedicated social media campaign centred on the solution; ☐ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☒ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☐ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Europe……. 2. North America……. 3. SE Asia…….. **Activities related to geography:** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities

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	☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production) ☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials ☐ Semi-finished products ☒ Components ☒ Accessories ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☒ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☒ Digital services (e.g. cloud) ☐ It support ☒ Basic software ☒ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☐ HSE consulting ☐ Ip, legal consulting ☐ HR training ☐ Other human resources ☐ Other

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	Commercial side of the business model: Technical partners: ☐ System integrator ☐ Installer ☐ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☒ Dealers, distributors ☐ Local agents ☐ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												
After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												From y2

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Commercial side of the business model												From y2

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): ☒ European R&D funds (e.g. Horizon Europe): ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☒ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☒ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☒ Other **Social impacts** ☒ New jobs created ☐ Increased quality of job ☒ Increased quality of life ☐ Cultural impacts ☐ New market entrance ☐ New geography entrance ☒ Other **Environmental impacts** ☒ Decreased CO2 ☐ Decreased PM10 ☐ Decrease of other pollutants ☐ Water savings ☒ Energy savings ☒ Resources savings

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	☐ Other **Other impacts** …… ……

Table 27: KER 8 Exploitation Roadmap

Exploitation Roadmap: *KER N8 - The SPOTLIGHT process*	
Lead: *RINA-C* **KER Owners:** *All* **TRL at the end of the project:** *TLR 5*	
Actions	*Briefly describe actions planned to be executed within 12 months after the end of the project (select the relevant ones).* **Pre-Commercial strategic activities:** ☒ Definition of the supply chain – There is always need for CO2 and H2 as feed ☐ Definition of the distribution chain ☐ Definition of the logistics ☐ Other **Commercial agreement preparation:** ☒ With partners (suppliers) from the supply chain ☒ With technical consultants and/or experts ☐ With manufacturers ☒ With third parties that will supply resources (manpower, machine, plants, facilities) ☐ With financial bodies and investors ☐ With the distribution chain (sellers, agents, shops, retailers, installers….) ☐ With the logistics operators ☐ Other **The agreement on common IP (if any) should include at least the following items, please select those that still need to be discussed:** ☒ Shares of the IP; ☒ Roles of IP owners in the future value chain, revenue streams and third parties involved;

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	☒ Rules for managing the IP, in particular costs of maintenance; ☒ Rules for accessing to the IP (e.g. licensing fees, royalties); ☒ Rules on exclusion or exclusivity (e.g. exclusion of potential competitors as third-party users); ☐ Rules for specific geographic coverage or markets; ☐ Other. **Technical activities towards TRL 9:** Select the pilot customers for TRL 9 tests ☒ Test the solution at TRL 9, in real operational environment (pilot) – tests needed at lower TRL ☐ Build or finalize manufacturing processes and lines ☐ Build or finalize procedures for: ☐ Quality control ☒ HSE ☒ Further testing ☒ Involvement of third parties ☐ Other ☒ Prepare the technical manual ☒ Prepare the operation and maintenance procedures and plans ☐ Finalize pre-production tests ☐ Other **Administrative activities towards TRL 9:** ☒ Start contracts with suppliers ☐ Start contracts with selling channels ☐ Build or finalize procedures for: ☐ Purchasing ☐ Warehousing ☐ CRM ☐ Invoicing ☐ After-sales engagement ☐ Management of spare parts ☐ Management of consumables ☐ Management of accessories ☐ Other **After-sales activities towards TRL 9: - not applicable** ☐ Creation of an after-sales team ☐ Definition of procedures for technical support ☐ Definition of procedures for customers to claim

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	☐ Definition of warranty ☐ Operation and maintenance technical support ☐ Definition of procedures for technical support with spare parts ☐ Definition of procedures for technical support with consumables ☐ Definition of procedures for technical support with accessories ☐ Other **Marketing campaign towards TRL9.** As soon as the commercial agreements among partners are signed, a marketing plan should be defined with the aim of promoting the launch of the product and involve new stakeholders in the business. Please select relevant items which are still missing (or to be finalized): ☒ The creation of a dedicated website centred on the solution; ☐ The creation of a dedicated web-campaign centred on the solution; ☒ The creation of a dedicated social media campaign centred on the solution; ☒ The set up of a number of remote events (e.g. webinars) to show the achievements of the solution; ☒ The identification a (few) final test case of great resonance, that could become a "testimonial" of the solution; ☒ The creation of all the useful dedicated services around the product (e.g. CAD model of the product, free trials for software, lite versions, handbook and manuals, helpdesk service…) **Target geography:** List of top 3 target countries/regions where the solution will be proposed: 1. Europe 2. Rest of the world 3. …… **Activities related to geography: - not applicable** ☐ Start-up of local commercial offices/branches ☐ Start-up of local manufacturing/assembly facilities ☐ Start-up of local technical support offices, including helpdesk ☐ Establishment of local value chains (production)

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	☐ Establishment of local commercial partnerships (selling) ☐ Planning of local communication (including partnerships with local consultants) ☐ Establishment of other local synergies ☐ Design of local brands or trademarks
Roles	Please check the relevant boxes of the supply chain and insert the name of partners from the current consortium, which are already covering some of the roles: **Suppliers' side of the business model**: Suppliers of (hardware/manufacturing): ☒ Raw materials – feed (out of the consortium) ☐ Semi-finished products ☒ Components – DLR, Chemtrix ☐ Accessories ☒ Design, Consulting services – TNO, RINA-C ☒ Quality and certification services – RINA-C ☐ Human resources ☐ Production machines / lines ☐ Packaging ☐ Other Suppliers of (service/software development): ☐ Digital services (e.g. cloud) ☐ It support ☐ Basic software ☐ Hardware ☐ Design, Consulting services ☐ Quality and certification services ☐ Human resources ☐ Other Other suppliers: ☐ Administrative services ☒ HSE consulting – RINA-C ☒ Ip, legal consulting - TNO ☒ HR training - TNO ☐ Other human resources ☐ Other **Commercial side of the business model:**

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	Technical partners: ☐ System integrator ☐ Installer ☐ Operation support ☐ Maintenance support ☐ Local on-site helpdesk ☐ Decommissioning support Commercial partners: ☐ Dealers, distributors ☐ Local agents ☐ Local Service providers ☐ Financial bodies (e.g. banks, ESCOs…)

Activities/months after the end of the project	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Commercial strategic activities												
Commercial agreements												
Agreement on common IP												
Technical activities towards TRL 9												
Admin activities towards TRL 9												
After-sales activities towards TRL 9												
Marketing campaign towards TRL9												
Activities related to geography												
Manufacturing side of the business model												
Commercial side of the business model												

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

Other sources of coverage	Possible alternative sources for covering the previously introduced costs: ☒ Local/national public funds (please provide details): ☒ European R&D funds (e.g. Horizon Europe): ☐ Private investments: ☐ Banks ☐ Financial funds ☐ Business angels ☐ Private industry ☐ Other private investors (please specify) …….. ☐ Own investments
Impact in 3-year time	Summary of expected impacts: **Economic impacts** ☐ Increased direct revenues ☐ Increased indirect revenues ☐ Increased margin ☐ Increased market share ☐ New market entrance ☐ New geography entrance ☒ Other – impact on the current value chain for fossil fuels **Social impacts** ☒ New jobs created ☒ Increased quality of job ☒ Increased quality of life ☒ Cultural impacts ☐ New market entrance ☐ New geography entrance ☐ Other **Environmental impacts** ☒ Decreased CO2 ☒ Decreased PM10 ☒ Decrease of other pollutants ☐ Water savings ☐ Energy savings ☐ Resources savings ☐ Other **Other impacts** **Energy efficiency**

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APPENDIX B: RISK ASSESSMENT TABLES

Table 28: KER 1 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*8*	*2*	**16**	Regular meetings to improve performance and update partners on new developments, exchange on experiences etc.	*2*	**No Action'**
2	Different perspective for industrialization and exploitation	*2*	*2*	**4**		*1*	**No Action'**
3	Lack of commitment/ resources to promote the new solution into the market	*3*	*4*	**12**		*1*	**No Action'**
4	Disagreement on future investments, some partner may leave after the project	*6*	*5*	**30**		*1*	**No Action'**
5	disagreement on ownership rules, procedures, shares	*6*	*5*	**30**		*1*	**No Action'**
6	Partners may leave the initial plan and develop alternative solutions/products/service s	*5*	*5*	**25**		*1*	**No Action'**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*5*	*2*	**10**		*1*	**No Action'**
	Market Risk Factors						
8	Customers are already satisfied by less advanced solutions or by basic products	*8*	*2*	**16**		*1*	**No Action'**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*8*	*8*	**64**	Review potential customers& determine price that they are willing to pay for such a solution	*4*	**Warning;**
10	Performance is lower than expected or lower than competitors or market's needs	*8*	*6*	**48**		*1*	**No Action'**
11	sales forces are not adequate to fully commercialize the solution	*2*	*2*	**4**		*1*	**No Action'**
12	Difficult or even impossible (e.g. monopoly market) to enter in a	*2*	*2*	**4**		*1*	**No Action'**

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	traditional and well-established market						
13	New solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*5*	*5*	**25**		*1*	**No Action'**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*5*	*5*	**25**		*1*	**No Action'**
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*8*	*8*	**64**	Work to identify suitable follow-up projects to increase the TRL & identify solution / problem fit with launch Customers	*7*	**Action!**
	Environmental/Regulation/Safety risks:						
16	TP3 is not aligned with expectations of incoming new local incentives	*2*	*2*	**4**		*1*	**No Action'**

Table 29: KER 2 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*6*	*3*	**18**	Regular meetings to improve performance and update partners on new devlopments, exchange on experiences etc (Example)	*7*	**Control.**
2	Different perspective for industrialization and exploitation	*2*	*5*	**10**		*0*	**No Action'**
3	Lack of commitment/ resources to promote the new solution into the market	*8*	*9*	**72**	Involve other investors, using licensing	*5*	**Between Action & Warning**
4	Disagreement on future investments, some partner may leave after the project	*3*	*5*	**15**		*0*	**No Action'**
5	Disagreement on ownership rules, procedures, shares	*9*	*5*	**45**	Agreement on IP and shares before commercialisation	*8*	**Control.**

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6	Partners may leave the initial plan and develop alternative solutions/products/services	*3*	*3*	**9**		*0*	**No Action'**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*5*	*3*	**15**		*0*	**No Action'**
	Market Risk Factors						
8	Customers are already satisfied by less adavnced solutions or by basic products	*10*	*2*	**20**		*0*	**No Action'**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*10*	*7*	**70**	Improve process efficiency, findways to cut costs (mass production)	*3*	**Warning;**
10	Performances are lower than expected or lower than competitors or market's needs	*7*	*2*	**14**		*0*	**No Action'**
11	Sales forces are not adequate to fully commercialize the solution	*8*	*9*	**72**	Involve other companies, use licensing	*7*	**Action!**
12	Difficult or even impossible (e.g. monopoly market) to enter in a trditional and well established market	*1*	*1*	**1**		*0*	**No Action'**
13	new solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*10*	*5*	**50**		*0*	**Between No Action & Warning**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*9*	*2*	**18**	Prepare exploitation contracts or guidelines while finalizing the project	*8*	**Control.**
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*9*	*7*	**63**	Search for public funding opportunities	*7*	**Action!**
	Environmental/Regulation/Safety risks						
16	TP3 is not aligned with expectations of incoming new local incentives	*4*	*5*	**20**	Proactive screening of incoming new policies. Definition of rules for updating results and the system itself	*5*	**Between Control & No Action**

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Table 30: KER 3 + 5 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*3*	*3*	**9**	Regular meetings to improve performance and update partners on new developments, exchange on experiences	*4*	**No Action'**
2	Different perspective for industrialization and exploitation	*7*	*6*	**42**		*4*	**No Action'**
3	Lack of commitment/ resources to promote the new solution into the market	*5*	*3*	**15**	release additional efforts	*5*	**Between Control & No Action**
4	Disagreement on future investments, some partner may leave after the project	*7*	*5*	**35**	consider alternatives up front	*6*	**Control.**
5	Disagreement on ownership rules, procedures, shares	*5*	*5*	**25**	clarification in and early phase of implementation	*5*	**Between Control & No Action**
6	Partners may leave the initial plan and develop alternative solutions/products/servic es	*7*	*4*	**28**	regular communication on roadmaps	*6*	**Control.**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*7*	*4*	**28**	clarification in and early phase of implementation	*6*	**Control.**
	Market Risk Factors						
8	Customers are already satisfied by less advanced solutions or by basic products	*8*	*7*	**56**	clarification of performance benefits for specific solutions from customer perspective	*5*	**Between Action & Warning**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*8*	*7*	**56**	clarification of financial benefits for specific solutions from customer perspective	*5*	**Between Action & Warning**
10	Performances are lower than expected or lower than competitors or market's needs	*8*	*7*	**56**	map out scenarios for alternative use of the solution in the system	*5*	**Between Action & Warning**

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11	Sales forces are not adequate to fully commercialize the solution	*6*	*6*	**36**		*4*	**No Action'**
12	Difficult or even impossible (e.g. monopoly market) to enter in a traditional and well-established market	*8*	*8*	**64**	develop contacts with the industry, also for possible alternatives	*4*	**Warning;**
13	new solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*8*	*8*	**64**	actively stay up to date on technology and market development	*5*	**Between Action & Warning**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*8*	*5*	**40**		*4*	**No Action'**
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*8*	*5*	**40**	communicate with other partners in the industry on potential risks (and business case)	*4*	**No Action'**
	Environmental/Regulation/Safety risks:						
16	TP3 is not aligned with expectations of incoming new local incentives	*5*	*5*	**25**			**No Action'**

Table 31: KER 4 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*5*	*2*	**10**		*0*	**No Action'**
2	Different perspective for industrialization and exploitation	*2*	*4*	**8**		*0*	**No Action'**

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3	Lack of commitment/ resources to promote the new solution into the market	*6*	*4*	**24**		*0*	**No Action'**
4	Disagreement on future investments, some partner may leave after the project	*6*	*4*	**24**		*0*	**No Action'**
5	Disagreement on ownership rules, procedures, shares	*6*	*3*	**18**		*0*	**No Action'**
6	Partners may leave the initial plan and develop alternative solutions/products/services	*8*	*3*	**24**		*0*	**No Action'**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*7*	*2*	**14**		*0*	**No Action'**
	Market Risk Factors						
8	Customers are already satisfied by less advanced solutions or by basic products	*8*	*7*	**56**	Look for a better product market fit	*4*	**Warning;**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*9*	*8*	**72**	Try to cut costs	*3*	**Warning;**
10	Performances are lower than expected or lower than competitors or market's needs	*8*	*5*	**40**		*0*	**No Action'**
11	Sales forces are not adequate to fully commercialize the solution	*8*	*6*	**48**		*0*	**No Action'**
12	Difficult or even impossible (e.g. monopoly market) to enter in a trditional and well-established market	*8*	*6*	**48**		*0*	**No Action'**
13	new solutions are emerging, and they appear to have higher performances, lower costs, higher sustainability….	*8*	*5*	**40**		*0*	**No Action'**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*9*	*3*	**27**		*0*	**No Action'**
	Financial/Management Risk Factors						

This project has received funding from the Photonics Public Private Partnership programme under Grant Agreement **No.101015960**

15	No future financing sources has been identified yet	*9*	*5*	**45**		*0*	**No Action'**
	Environmental/Regulation/Safety risks:						
16	TP3 is not aligned with expectations of incoming new local incentives	*8*	*3*	**24**		*0*	**No Action'**

Table 32: KER 6 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*4*	*2*	**8**	Regular meetings to improve performance and update partners on new devlopments, exchange on experiences etc.	*8*	**Control.**
2	Different perspective for industrialization and exploitation	*4*	*2*	**8**	Perform a comprehensive cost-benefit analysis to identify the advantages and disadvantages for each perspective. Use insights to guide decision-making and prioritize the most effective strategies.	*8*	**Control.**
3	Lack of commitment/ resources to promote the new solution into the market	*4*	*4*	**16**	Regularly revisit and reaffirm the project's mission to keep everyone aligned with the original plan. Assist partners in finding sufficient recources, if required.	*8*	**Control.**
4	Disagreement on future investments, some partner may leave after the project	*4*	*4*	**16**	Redistribute tasks over remaining partners where possible, look for new partners if needed.	*6*	**Control.**
5	Disagreement on ownership rules, procedures, shares	*2*	*4*	**8**	Establish clear contractual agreements specifying the ownership rules,	*6*	**Control.**

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					procedures, and shares of each partner. Develop a clear conflict resolution mechanism to address disagreements or concerns among partners.		
6	Partners may leave the initial plan and develop alternative solutions/products/services	*2*	*2*	**4**	Ensure that the project's goals and objectives are well-defined and understood by all partners. Regularly revisit and reaffirm the project's mission to keep everyone aligned with the original plan.	*8*	**Control.**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*2*	*6*	**12**	Identify areas of agreement and common goals among the partners and propose compromises that address the concerns of both partners.	*4*	**No Action'**
	Market Risk Factors						
8	Customers are already satisfied by less adavnced solutions or by basic products	*2*	*8*	**16**	Implement a customer awareness campaign to highlight the benefits and advantages of the advanced solutions.	*8*	**Control.**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*4*	*6*	**24**	Explore opportunities for cost optimization through improved processes, technology, or sourcing.	*6*	**Control.**
10	Performances are lower than expected or lower than competitors or market's needs	*4*	*6*	**24**	Invest in product upgrades or enhancements to improve efficiency, reliability, and overall performance.	*4*	**No Action'**
11	Sales forces are not adequate to fully commercialize the solution	*2*	*4*	**8**	Provide effective sales collateral, product documentation, and resources to support the sales	*8*	**Control.**

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					team in their efforts		
12	Difficult or even impossible (e.g. monopoly market) to enter in a trditional and well established market	*2*	*8*	**16**	Develop targeted sales strategies based on market segments, customer profiles, and competitive landscapes	*4*	**No Action'**
13	new solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*8*	*8*	**64**	Continuously monitor the SotA for emerging technologies and solutions. Innovate and evolve the product to meet or exceed market expectations.	*8*	**Action!**
	IPR/Legal Risk Factors						
14	IPR shared with all partners involved in the TP	*4*	*2*	**8**	Consult with legal experts or hire external legal counsel experienced in the relevant field and develop a robust defense strategy.	*8*	**Control.**
	Financial/Management Risk Factors						
15	No future financing sources has been identified yet	*8*	*6*	**48**	Revise financial projections based on updated market data and business insights. Explore grants, subsidies, or government funding programs.	*6*	**Control.**
	Environmental/Regulation/Safety risks:						
16	TP3 is not aligned with expectations of incoming new local incentives	*8*	*4*	**32**	Perform a comprehensive assessment of your product or service against established standards. Develop and implement a plan to address non-compliance issues.	*4*	**No Action'**

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Table 33: KER 7 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*9*	*2*	**18**	Regular meetings to improve performance and update partners on new devlopments, exchange on experiences etc (Example)	*5*	**Between Control & No Action**
2	Different perspective for industrialization and exploitation	*9*	*2*	**18**	Regular meetings to agree on exploitation	*5*	**Between Control & No Action**
3	Lack of commitment/ resources to promote the new solution into the market	*7*	*6*	**42**	Joint efforts to apply for future funding - future joint projects	*9*	**Control.**
4	Disagreement on future investments, some partner may leave after the project	*9*	*2*	**18**	Regular meetings and joint future project proposals	*8*	**Control.**
5	Disagreement on ownership rules, procedures, shares	*9*	*1*	**9**	Regular meetings to agree on exploitation	*5*	**Between Control & No Action**
6	Partners may leave the initial plan and develop alternative solutions/products/servic es	*7*	*1*	**7**	Regular meetings and joint future project proposals	*5*	**Between Control & No Action**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*9*	*1*	**9**	Regular meetings and joint future project proposals	*5*	**Between Control & No Action**
	Market Risk Factors						
8	Customers are already satisfied by less adavnced solutions or by basic products	*5*	*5*	**25**	Extensive exchange with costumers, politicians and legislative	*2*	**No Action'**
9	LCoE too high compared to existing conventional and/or other competitive solutions	*9*	*1*	**9**		*0*	**No Action'**
10	Performances are lower than expected or lower than competitors or market's needs	*8*	*1*	**8**	Further improvements are carried out	*2*	**No Action'**

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11	Sales forces are not adequate to fully commercialize the solution	*5*	*2*	**10**	joint efforts to establish sales forces	*3*	**No Action'**
12	Difficult or even impossible (e.g. monopoly market) to enter in a trditional and well established market	*1*	*5*	**5**	look for new markets	*2*	**No Action'**
13	new solutions are emerging and they appear to have higher performances, lower costs, higher sustainability….	*1*	*5*	**5**	Further improvements are carried out	*2*	**No Action'**
	IPR/Legal Risk Factors						
14	Disagreement on ownership rules, procedures, shares	*9*	*1*	**9**	Regular meetings to agree on exploitation	*5*	**Between Control & No Action**
	Financial/Management Risk Factors						
15	Lack of resources to promote the new solution into the market	*7*	*6*	**42**	Joint efforts to apply for future funding - future joint projects	*9*	**Control.**
16	Disagreement on future investments, some partner may leave after the project	*9*	*2*	**18**	Regular meetings and joint future project proposals	*8*	**Control.**
	Environmental/Regulation/Safety risks:						
17	Chemicals and solvents are categorized as problematic at some point in the future	*7*	*1*	**7**	replace affected components	*8*	**Control.**

Table 34: KER 8 Risk Assessment Table

	Description of Risks	Criticality of the risk	Probability of risk happening	Risk Grade	Potential intervention	Success of Interventi on	Conclusion
	Partnership Risk Factors						
1	Poor cooperation among partners	*8*	*3*	**24**	Meetings to keep all partners aligned and to share updated, successes and problems	*6*	**Control.**
2	Different perspective for industrialization and exploitation	*6*	*2*	**12**	Communicate clearly the intentions before	*3*	**No Action'**

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					exploitating the KER		
3	Lack of commitment/ resources to promote the new solution into the market	*10*	*4*	**40**		*1*	**No Action'**
4	Disagreement on future investments, some partner may leave after the project	*8*	*8*	**64**	Create a roadmap in advance with all the steps to be taken in the years after the end of the project. Seal the roadmap with partnerships and contracts	*6*	**Action!**
5	Disagreement on ownership rules, procedures, shares	*5*	*10*	**50**	Being the sum of more IPRs, the risk of disagreemnts on use of IPRs are high. Set clear rules and contract in the beginning is very helpful.	*8*	**Between Control & Action**
6	Partners may leave the initial plan and develop alternative solutions/products/services	*3*	*2*	**6**		*0*	**No Action'**
7	Veto of some partners on certain aspects (e.g. customers, markets, geography, licensing)	*2*	*2*	**4**		*0*	**No Action'**
	Market Risk Factors						
8	Customers are already satisfied by less adavnced solutions or by basic products	*8*	*1*	**8**		*0*	**No Action'**
9	Performances are lower than expected or lower than competitors or market's needs	*8*	*4*	**32**		*0*	**No Action'**
	IPR/Legal Risk Factors						
10	IPR shared with all partners involved in the TP	*9*	*3*	**27**	Sign agreements clearly dividing IPRs, involving law firms in the process	*0*	**No Action'**
	Financial/Management Risk Factors						
11	No future financing sources has been identified yet	*2*	*2*	**4**		*0*	**No Action'**

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	Environmental/Regulation/Safety risks:						

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