Push2Heat

D1.2 Project Management Plan

V0.3

Grant agreement: No. 101069689

From: TECNALIA

Prepared by: Maider Epelde

Date: 02/12/2022

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ABBREVIATIONS

CA	Consortium Agreement
EC	European Commission
GA	Grant Agreement or General Assembly, on depend on the context
PEB	Project Executive Board
PM	Project Manager
QAP	Quality Assurance Plan
WP	Work Package
WPL	Work Package Leader

LIST OF FIGURES

VERSIONS

No.	Name	Partner	Contribution	Date
0.1	Maider Epelde	TECNALIA	First complete draft	02/12/2022
0.2	-	ALL	Checked by the partners	09/12/2022
0.3	Maider Epelde	TECNALIA	Format updated to the PUSH2HEAT report template	21/12/2022

1. INTRODUCTION

1.1 Objective of the deliverable

The main objective of the WP1 is to develop an effective, transparent and comprehensive administrative, financial and legal management to ensure the successful execution of the project.

The management WP consists of three tasks, that last the whole duration of the project:

- T 1.1 Project coordination and quality assurance
- T 1.2 Communication, reporting and monitoring
- T 1.3 Data management plan

This deliverable D1.2 is related to the task T1.1 and is aimed at defining the project management plant, in other words, establishing the management and working model to be followed in the PUSH2HEAT project.

1.2 Deliverable description

The deliverable D1.2 is structured into several chapters explaining the following key aspects related to the project management in the project:

- Governance structure
- Communication channels
- Reporting process
- Quality plan for deliverables
- Innovation management
- Conflict resolution
- Risk Management
- Annexes

Note: the PUSH2HEAT proposal was submitted with four demo sites but one of them (the pilot plant to be implemented at CAPSA) failed during the GA preparation phase. CAPSA is not officially a beneficiary of the PUSH2HEAT project and the consortium is looking for a demo site that will substitute it. Once the alternative demo site is confirmed the

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responsibilities that should have been assumed by CAPSA will be transferred to the new partner. However, it has not been possible to find the alternative demo site yet, so for the sake of clarity 'CAPSA' and 'demo site in Spain' are used to refer to this demo site.

1.3 Contribution of partners

The task T1.1 in WP1 is led by TECNALIA and participated by the WP Leaders, i.e. TECNALIA, FRAUNHOFER, POLIMI, OST and EHPA.

Being so, TECNALIA, as the lead beneficiary of the project is the main contributor of the content provided in this deliverable.

1.4 Relation with other activities in the project

This deliverable is related with each and all activities, tasks and work-packages in the project as this "Project management Plan" will be the basis for the procedures to be followed in the execution of the project to guarantee the success and the accomplishment of the challening objectives.

2. GOVERNANCE STRUCTURE

The PUSH2HEAT **project governance** is structured into 3 layers:

- Governing layer
- Steering layer
- Performing layer

In the next

Figure 0.1, the governance structure of the PUSH2HEAT project is exposed:

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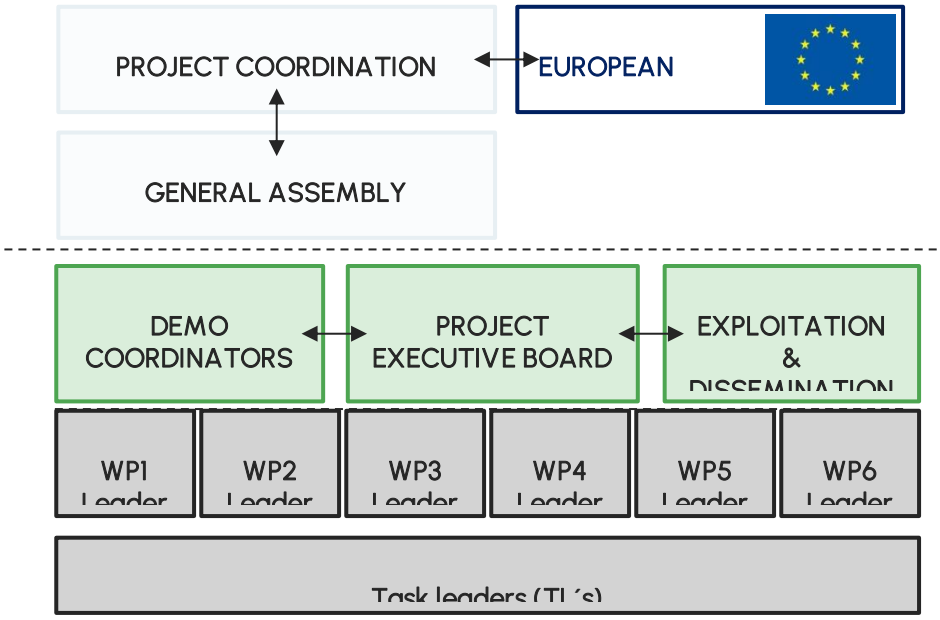

Figure 0.1: Governance structure of the PUSH2HEAT Project

2.1. Governing layer

In general terms, the Project Coordinator and the General Assembly are the key agents or bodies in the governing layer, which is the management layer operating at director level to determine the vision and strategy for the entire project.

Project Coordinator (PC) - TECNALIA

The main responsibility of the PC is to ensure the timely and effective overall progress of the project according to the Grant Agreement. The PC is the intermediary between the Consortium and the EC, dealing also with contractual, administrative and financial matters in addition to overall responsibility for project progress reporting. The PC ensures the timely and effective overall progress of the project, monitoring compliance by Parties with their obligations and will manage all the aspects connected with payment of financial contributions, administering the financial contribution of the EC. PC will be in charge of managing the preparation, signature and maintenance of a Consortium Agreement (CA) between partners.

The Project Manager (PM) appointed by TECNALIA for PUSH2HEAT is Ms. Maider Epelde. The PM, assisted by the Project Support Team (PST) and supported also by the Project Executive Board (PEB), is responsible of the communication between the Consortium and the EC, as well as the day-to-day administrative, legal and financial issues.

General Assembly (GA)

The GA, participated by all the partners, is the highest-level decision-making body of the project, chaired by the Project Manager and composed by a senior representative from

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each partner. The GA meets physically twice a year and it is responsible for the project overall strategy, in charge of all important decisions of general nature within the frame of the Grant Agreement (GA) signed with the EC and the Consortium Agreement (CA) signed among all partners, especially when such decisions may affect the agreements reached in these two contracts (examples: changes in the management structure, changes in the consortium composition, changes in the work plan, major technical decisions, contingency plans and planning decisions affecting the resources or the time for the implementation of the project, etc.).

The GA is also responsible for ensuring that the project remains in line with the overall objectives and checks the progress according to the set of deliverables and milestones, based on regular updated reports of the project activities received from the Project Executive Board ('Steering Committee') and Project Coordinator.

2.2. Steering layer

The Steering layer is composed by the Project Executive Board (PEB, also called 'Project Steering Committee' (PSC)), the Exploitation and Dissemination Team and the Demo Coordinators. This layer provides general project direction and guidance, keeping the project focused towards its objectives, mobilizing the necessary resources and monitoring the project performance. It reports to the governing layer bodies and focuses on day-to-day project operations.

Project Executive Board (PEB)

The PEB is the supervisory body of the advances of the project and is formed by WP leaders and chaired by the Project Manager. The WP Leaders are: TECNALIA (WP1, WP2), FRAUNHOFER (WP3), POLIMI (WP4), OST (WP5) and EHPA (WP6).

The PEB, executive body of the project, is responsible for proposals and recommendations to the GA on the global steering, monitoring and management of the project, as well as for the execution of the GA decisions. Therefore, the PEB acts as a "core group" assuming the executive decision making and supporting the Project Coordination in relevant management aspects.

The PEB manages all the technical activities outlined in the project's work plan and is responsible for the day-to-day liaison between Consortium partners to consolidate inputs into project planning, progress monitoring and technical milestone reporting.

Exploitation & Dissemination Team (EDT)

The Exploitation and Dissemination Team or EDT is composed of three experts in the Consortium to assist to the PSC regarding exploitation, dissemination and innovation management issues. The Exploitation Manager (EM, TECV) is responsible for the exploitation plan and follow up on this plan, coordinating exploitation activities across partners. The Dissemination & Communication Manager (DM, EHPA), on the other side is

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responsible for the dissemination plan, communication, and other communication mechanisms.

The EM, in close collaboration with the DM, coordinates all the exploitation, dissemination, communication and training activities, and they are also responsible for IPR management.

The Innovation Manager (IM, TECNALIA) is the responsible person for verifying that the development of the project is being done according to the innovation management process (see chapter *"0 6. INNOVATION MANAGEMENT"*). The IM assists to the PEB meetings in order to assure the innovation management plan is being followed into the work plan: the generation of innovative ideas, verification of the state-of-the-art evolution, the TRL status of the technology, the demands of the market, the state of patentability, the potential of business, etc.

Demo Coordinators

The demonstration nature of PUSH2HEAT determines the workplan and partners organisation. A **Local Demo Team** is formed for each demo site and the purpose of these working groups is to facilitate the implementation of the PUSH2HEAT system by dealing with case-specific issues, such as, local regulatory framework, etc.

- *Leader* and members of the Local Demo Team in Germany: *FRAUNHOFER*, STC, SPH
- *Leader* and members of the Local Demo Team in Italy: *POLIMI*, CDG, BONO, ENERTIME
- *Leader* and members of the Local Demo Team in Spain: *TECNALIA*, CAPSA, BS-NOVA

2.3. Performing layer

In the performing layer, the WP Leaders and the Task Leaders oversee the execution of the work committed in the project.

Work Package Leaders (WPL)

The WP leaders are the partners responsible for managing the tasks grouped in the Work Packages (WP). The WPL reports to the PEB, ensuring the timely fulfilment of duties from the scientific and technical point of view. The WPLs assure the coordination between the different project teams that collaborate with the aim of exchanging intermediate results. They assure the timely execution of tasks included in each WP, stimulating the interaction between the various partners involved. They are also in charge of the consolidation of the reports and execution of the tasks within each WP.

Task Leaders (TL)

The TL is responsible of the technical follow-up of the specific task and the detailed coordination with the other tasks within the same work package. They assure the timely

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and proper execution of their tasks and report to the WPL in case of any deviation or risk. They are also responsible for leading the preparation of the deliverables resulting from their tasks and the coordination with other tasks for their participation in the deliverable preparation, and for the preparation and delivery of internal task progress reports to the WP leader.

Partner Representative (PR)

In order to limit any duplication of information and to facilitate an efficient communication process by both face-to-face and virtual channels, the distribution of all relevant project information is channelled through the Project Manager to one key person for each partner (Partner Representative). The PR is member of the GA (in case of unavailability a deputy or assistant could be appointed) and acts as a switchboard thus ensuring that the concerned persons within the partner organisation are reached as required.

3. COMMUNICATION CHANNELS

The **fluent and continuous communication** is one of the **key pillars for success** in the accomplishment of the ambitious goals of the PUSH2HEAT project.

The communication occurs at different levels in the project:

- Communication within the Consortium – Internal communication
- Communication with the Project Officer, European Commission
- Communication with the external audience

3.1. Internal communication channels

For the **communication between all the partners of the Consortium**, several internal communication channels and tools are on disposal to the whole Consortium, such as:

- SharePoint repository
- Contact list and emails
- Project meetings

These internal communication channels and tools are explained in detail in the deliverable *"D1.1 Quality Assurance Plan (QAP)"*.

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3.2. Communication with the Project Officer, European Commission

The Communication **with the EC** is centralized through the Project Coordinator. According to the governance structure of the project, *"the PC is the intermediary between the Consortium and the EC, dealing also with contractual, administrative and financial matters in addition to overall responsibility for project progress reporting"*.

The PC will keep open the communication channels with the Project Officer (PO), Mr. Pau Rey. The main communication channels will be:

- Email & phone
- SEDIA (Single Electronic Data Interchange Area) portal
- Meetings, both official meetings of the projects and bilateral audio-meeting among TECNALIA and the PO

3.3. Communication with the external audience

The Communication with the external audience is the working topic of the "WP7 Communication and Dissemination".

In the WP6, led by EHPA and participated by all the partners, a Communication strategy and a Dissemination strategy will be defined, and dissemination and communication activities will be developed and executed throughout the whole project. This work will raise awareness of the potential benefit for retrofitting the building stock, the replicability potential of the system, ultimately leading to a higher impact of the positive results.

The required dissemination and communication material will be created, and the most appropriate channel will be chosen in each communication and dissemination activity to maximize the impact for the various market beneficiaries of the PUSH2HEAT solution.

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4. REPORTING PROCESS

The whole reporting process, both internal and official ones, in the PUSH2HEAT project is summarized in the next Figure 0.2:

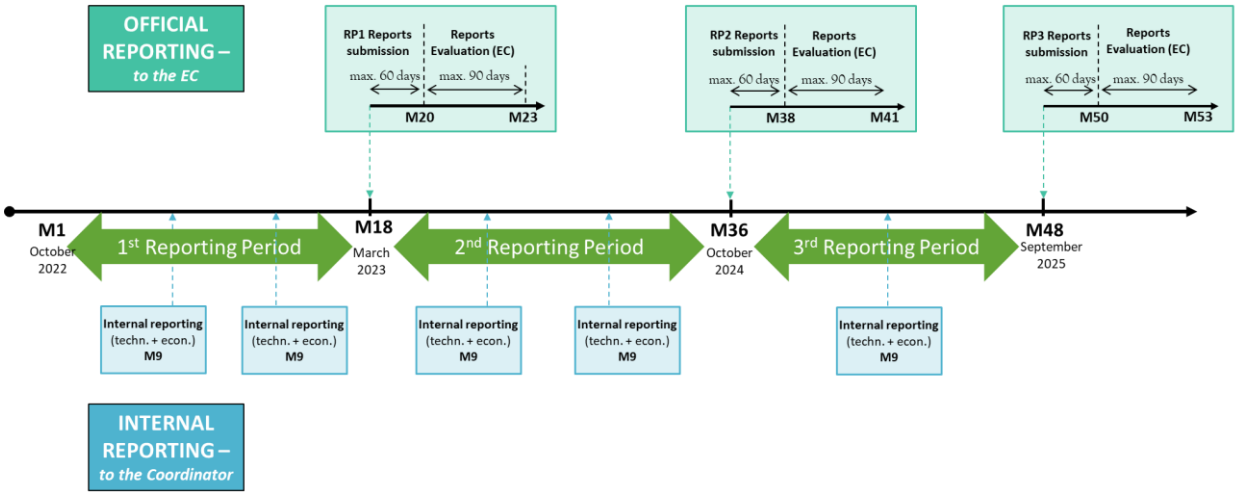

Figure 0.2: Reporting process in PUSH2HEAT

In the following two subchapters, the reporting process to be followed in the PUSH2HEAT project is explained: frequency, scope, templates, etc.

4.1. Periodic Progress Reports

To support the project reviews, three specific reports namely Periodic Progress Reports and a Final Report will be prepared and delivered. These will be organised by the Project Coordinator that will request the necessary contributions from partners. These activities will be considered as part of the WP1 although they are not officially considered as deliverables by the European Commission.

The Coordinator must submit the technical and financial reports to the Agency within 60 days following the end of each reporting period, according to the Article 20 in the Grant Agreement, including requests for payment and using the forms and templates provided in the electronic exchange system.

During the life of the project, the official progress reposts (RPs) to the Commission will be three:

- PR1: 1st report from month 1 to 18
- PR 2: 2nd report from month 19 to 36

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- **PR 3: 3rd and final report from month 37 to 48**

The periodic report must include the following:

- **Part A - a 'periodic technical report'**, containing an explanation of the work carried out by the partners, an overview of the progress towards the objectives of the action, including milestones and deliverables, a summary for publication by the Agency, and the answers to issues related to the action implementation and the economic and societal impact.
- **Part B - a 'periodic financial report'**, including an 'individual financial statement' from each partner and an explanation of the use of resources and the information on subcontracting from each partner for the reporting period concerned.

The methodology for the reporting progress will be as follows:

- At the end of the reporting period the PM will ask WP leaders to report the activities carried out (technical). The WP leaders will be responsible for collecting all the necessary information from Task Leaders and compiling all the information into a final version of the related WP.
- At the end of the reporting period the PM will ask all partners to report the resources consumed for the reporting period concerned.
- The PM will prepare and send out the templates to be used (both technical and financial) and will communicate the deadlines for the different steps to be carried out.
- TECNALIA as PC will receive the technical reports and financial statements and will contact partners/WPL as far as necessary (asking for clarifications, recommendations for improvements, missing explanations, etc)
- Once an advanced version of the reports is available, TECNALIA and the WP Leaders will make the last revision of the appropriacy / coherence of the reports and finalize the reports to prepare them for submission.

4.2. Internal Reports

Regarding the **internal reporting process** during the project, the report about advances, both technical and resources consumption, will be carried out every 6 months. The **objectives** of this internal reporting process are:

(1) to solve any doubt that may arise among partners

(2) to detect any deviation or problem or risk and to act consequently

The internal 6-month reporting process will be done using an easy to fulfil excel file to gather the next information about each partner:

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- Summary table of the human resources (measured as person-month or PM) dedicated to each WP.
- Explanation of the activities carried out in each WP.
    - In the 2-monthly WP Leaders meeting, each WP leaders will also provide an update of the advances in the activities and objectives in the WP.
    - In the General Assembly every 6 months, an update of the status of each WP will be presented
- Gender (male, female, non-binary gender) and professional category (researcher / non-researcher) of the people working in the semester in the project.

At the end of the first semester of the project, i.e. by the end of March 2023, the Project Coordinator will explain in detail how to fulfil this excel file and will support all the partners in the completion of this report during April and May 2023.

5. QUALITY PLAN FOR DELIVERABLES

The quality plan for deliverables is encompassed by two parts:

- Procedure for Deliverable review
- Templates and formats

These two tools created to assure the quality of the deliverables are explained in deep details in the deliverable *"D1.1 Quality Assurance Plan (QAP)"*.

6. INNOVATION MANAGEMENT

Innovation management is the key for boosting competitiveness and sustainable growth in Europe. The effective innovation management system needs to include the innovation from the idea generation to the market results.

The innovation management procedure (IMP) is established as to maximize the capability of project outputs of being successful in the form of future products, services or processes, by combining creativity and a technical and market wise perspective.

The PUSH2HEAT project will implement TECNALIA's Standard Innovation Management Process ISAMPE, a derivative of ISAEP model 1. The innovation management is explained in deep details in the deliverable "D1.1 Quality Assurance Plan (QAP)".

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7. CONFLICT RESOLUTION

Consortium Agreement includes full details about the voting rules of decision bodies' mechanism. The resolution of problems and conflicts must be handled systematically and establishing a good working relationship between the project team members is a prerequisite for the quick resolution of problems and issues.

This chapter is therefore focused on the procedure for the escalation and resolution of conflicts and here the key ideas to be kept clear among all the partners are outlined. Conflicts must be resolved at the lowest possible level, starting at task level, followed by WP, and at last level in the PEB and GA as the last level:

1. In day-to-day work, task leader will face several decisions in order to develop the project. Task leaders are entitled to take such decisions and report them to the WP Leader.
2. In case of controversial decisions generating a conflict among partners, they have to be communicated as soon as possible to the WP Leader involved to make a decision on it through a "principled negotiation" process focused on optimising outcomes and maximising the benefits of all parties involved.
3. In the unlikely case that serious disputes arise among project partners, conflict resolution procedures will be initiated, whereby the Project Manager will advise the Project Executive Board, the decision body where difficult-to-solve conflicts among partners are to be dealt, to meet in an emergency session to discuss the conflict and reach a resolution. PEB will hear to all the partners involved, will discuss about alterative solutions and will come with an agreement. The final decision will be taken by consensus preferable and if not possible, then the majority of voting will be decision making method, being the vote of the Project Coordinator decisive in case of tie. The Project Coordinator can consult PO or a third-party, if necessary.
4. All decision will be taken in the framework of the GA and CA without overruling them.

8. RISK MANAGEMENT

Thanks to the continuous internal reporting process, to the Workplan Excel (explained in deep details in the deliverable "D1.1 Quality Assurance Plan") and to the (at least) 2-monthly WP Leaders and WP meetings, any unexpected challenge, problem or risk can be identified promptly. In addition, since the beginning of the project, some key risks to be kept monitored have already been identified and listed in the "*Annex 3: List of risks pre-identified the project*".

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The management of identified risks deserves a specific procedure to assure the appropriate approach to the risk in order to avoid or at least to limit the negative effects (difficulties, delays, etc.) on the accomplishment of the committed objectives of the project. So that, the Project Coordinator and the WP Leaders must work together to carry on contingency plans to deal with the identified risks.

The risk management procedure in the PUSH2HEAT Project follows these steps:

- Any partner in the Consortium may identify risks. The risks may be identified during the execution of any activity of the project, during the internal technical reporting process or during the conversations in the project-meetings (WP Leaders meetings, WP meetings, GA&PEB meetings, etc.). There can be four categories or types of risks:
    - Implementation risks, related to technical factors
    - Financial risks, related to unexpected situations affecting the expected investment plans of partners
    - Intellectual Property risks
    - Management and administrative risks
- Once the risk is identified, it must be communicated to the WP Leaders involved and to the Project Coordinator about the identified risk arisen during execution, planning or coordination of the activities of the project.
- The Project Coordinator and WP Leaders deal with the risks during the next WP Leaders meeting, or the next GA & PEB meeting, categorizing them using two parameters:
    - Probability of the risk to occur: high, medium, low
    - Impact if the risk occurs: high, medium, low
- Based on this categorization, the Project coordinator and the WP Leaders prioritize the risks and a contingency plan is defined for each risk. As a rule, the contingency plans will be drafted with occasion of the internal progress reports (every 6 months), unless an urgent action is required.

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Annexes

Annex 1: Consortium members

No	Short name	Legal name	Country	Type of organisation
1	TEC	FUNDACION TECNALIA RESEARCH & INNOVATION	ES	RTD
1.1	TECV	TECNALIA VENTURES SL	ES	SME
2	UPV	UNIVERSITAT POLITECNICA DE VALENCIA	ES	RTD
3	BSNOVA	BS NOVA APPARATEBAU GMBH	DE	SME
4	EHPA	EUROPEAN HEAT PUMP ASSOCIATION	BE	Association
5	SPH	SPH SUSTAINABLE PROCESS HEAT GMBH	DE	SME
6	VITO	VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK	BE	RTD
7	FRAUNHOFER	FRAUNHOFER GESELLSCHAFT ZUR	DE	RTD
8	POLIMI	POLITECNICO DI MILANO	IT	RTD
9	QPINCH	QPINCH	BE	SME
10	ENER	ENERTIME SA	FR	SME
10.1	ENCI	ENERGIE CIRCULAIRE	FR	SME
11	TUB	TECHNISCHE UNIVERSITAT BERLIN	DE	RTD
12	STC	SCHOELLER TECHNOCELL GMBH & CO KG	DE	Large company
13	CARTIF	FUNDACION CARTIF	ES	RTD
14	CAPSA	CORPORACION ALIMENTARIA PENASANTA – CAPSA	ES	-
15	BONO	BONO ENERGIA S.P.A.	IT	SME
16	CDG	CARTIERE DI GUARCINO SPA	IT	Large company
17	OST	OST - OSTSCHWEIZER FACHHOCHSCHULE	CH	RTD

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Annex 2: Gantt chart of the PUSH2HEAT project

		Year 1												Year 2												Year 3												Year 4											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
WP1	**Project Management & Coordination**																																																
T1.1	Project coordination and quality assurance																																															
T1.2	Communication, reporting and monitoring																																															
T1.3	Data Management Plan																																															
WP2	**Full Scale Development and Optimization of Heat Upgrade Techn**													MS																																			
T2.1	Full scale development of vapor compression heat pumps with																																															
T2.2	Full scale development of vapor compression heat pumps with																																															
T2.3	Full scale development of absorption heat pumps																																															
T2.4	Full scale development of thermochemical heat pumps																																															
T2.5	Process integration and steam production																																															
T2.6	Techno-economic map of heat upgrade technologies																																															
T2.7	Heat upgrade technologies: design tools & optimization																																															
WP3	**Implementation of Demonstration Sites**						MS																		MS						MS																	
T3.1	**Demo site 1**																																															
T3.2	**Demo site 2**																																															
T3.3	**Demo site 3**																																															
T3.X.1	Analysis and requirements for the demo sites																																															
T3.X.2	Planning and engineering																																															
T3.X.3	Manufacturing of heat upgrade technologies																																															
T3.X.4	System integration																																															
T3.X.5	Commissioning and first performance tests																																															
T3.X.6	Assessment on commissioning of Heat Upgrade Systems																																															
WP4	**Monitoring & Performance Data Analysis**																	MS								MS																						
T4.1	Monitoring plan																																															
T4.2	Monitoring system integration and validation																																															
T4.3	Monitoring, performance data analysis																																															
T4.4	Guidelines for heat upgrade technologies design & integration																																															
WP5	**Heat upgrade systems Exploitation, Life Cycle & Impact Assessm**																						MS																										
T5.1	Business models and contractual agreements																																															
T5.2	Replication studies																																															
T5.3	Life cycle environmental and cost assessment (LCA/LCC)																																															
T5.4	Scenario-based Impact Assessment at EU level																																															
T5.5	Analysis of barriers and policy recommendations																																															
T5.6	Heat Upgrade Systems Exploitation Roadmaps																																															
WP6	**Dissemination, Communication and Exploitation of Project Results**				MS												MS																																
T6.1	Communication and dissemination: planning and coordination																																															
T6.2	Stakeholders' engagement and capacity building: conferences and																																															
T6.3	Communication and dissemination activation: creating impact and																																															
T6.4	External Advisory Group: Management and coordination																																															
T6.5	Exploitation of project results																																															

MS: Milestone

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Annex 3: List of risks pre-identified the project

No	Description of risk (Likelihood / Severity)	WP(s) involved	Proposed risk-mitigation measures
1	Critical partner leaves the consortium at a crucial point of the project (low likelihood, medium severity)	1	Critical overreliance will be identified and mitigated in a collaborative approach within the consortium. Consortium network will be relied on to identify alternatives.
2	An associated country leaves the consortium (low likelihood, medium severity)	1	Consortium network will be used to find another partner from the same country than the associated partner (or another country with same funding conditions) being able to perform the expected work. If this is not possible the consortium will find the best way of performing the planned work by project beneficiaries.
3	Unexpected delay and/or poor quality of the deliverables (medium likelihood, medium severity)	1	A continuous monitoring of the work will be carried out, leaded by each WP leader and by project coordinator. This will ensure rapid communication of delays within the consortium. The partners will be allocated responsibility for review of other partners' deliverables
4	WP resources not well balanced (low likelihood, medium severity)	1	Monitoring of the work (WP leader and project coordinator) and reallocation of resources in other WPs where necessary.
5	The planned budget is too low (low likelihood, medium severity)	1	Careful planning and follow up of the budget during the implementation phase will be guaranteed by the Coordinator and WP leaders.
6	Partners are reluctant to IP sharing	1	The Consortium Agreement will govern the IPR by properly identifying the background, owners and potential foreground
7	Heat upgrade technologies' not operating in their best conditions (temperature, flow rates, etc.) with regards to the demonstration sites working conditions (low likelihood, medium severity)	2, 3	The demonstration sites boundary conditions will be analyzed from the beginning, as the most important input for the adaptation of each of the technologies to maximize efficiency and profitability.
8	Difficulty in heat recovery for feeding the heat upgrade technologies (low likelihood/medium severity)	2	High focus on process integration and steam production as one of the main requirements in industrial processes. The project will ensure modularity and/or adaptability of the heat upgrade technologies to part load conditions.
9	Difficulty on cost reduction of the heat upgrade technologies (medium	2	The heat upgrade technologies will be developed focusing on cost reduction, by

	likelihood/medium severity)		means of modular design, minimization of auxiliary components, maximization of compactness.
10	Missing system monitoring data for technology implementation (medium likelihood, low severity)	3	Selective monitoring of the required process variables will be conducted by the corresponding research partner with adequate monitoring equipment, foreseen in budget for demo site partners.
11	Long-lasting and severe permission clearance processes medium likelihood, high severity)	3	Early identification of needed permission (levels) and strong coordination between related partners.
12	Delay in production/manufacturing of heat upgrade technologies (low likelihood, low severity)	3	Full-scale development of each of the heat upgrade technologies will be starting from the beginning of the project, also identifying in parallel the demo sites requirements. Early identification of possible delays will be carried out by involved partners.
13	Delay during planning and installation of heat upgrade system Delayed tendering and assignment processes (high likelihood, low severity)	3	Project timing has been adequately planned in order to include buffers for possible delays, ensuring a long monitoring time, which in case delays would occur, would represent enough time for adequate technologies evaluation.
14	Wrongly installed equipment and components (pumps, heat exchangers, sensors, etc.), (high likelihood, severity low-high depending)	3	High level of supervision by involved partners during technology implementation. Long enough timing allocated for system integration (T3.4) and commissioning and first performance tests (T3.5).
15	Additional investment costs coming out of unexpected additional safety and construction requirements (high likelihood, medium severity)	3	Adjustment on the budget, rededication of possible cost positions within the project.
16	Not fully commissioned monitoring system (high likelihood, high severity)	3	High level of supervision for implementation of monitoring system during system integration (T3.4).

17	Not fully operational heat upgrade system due to malfunctions, misplaced sensors/signals and identification of those (medium likelihood, high severity)	3	High level of supervision during T.3.4 & T3.5 and fast response on providing technical and personal support by involved partners.
18	The collected data are inconsistent across the demos (medium likelihood, medium severity)	4	The monitoring plan will be prepared in a uniform way, but considering the peculiarity of each demo to assure consistent data collection and KPI calculation.
19	The collected data are fragmented (medium likelihood, high severity)	4	The incoming data are continuously analyzed to assure their quality.
20	Interference of the installation of the monitoring equipment with the plant operation (high likelihood, medium severity)	4	The monitoring plan is starting early (T4.1, M7) following the analysis and requirements of the demo sites (T3.1), this will ensure all the plant constraints have been adequately addressed. The installation of the monitoring system will be done simultaneously with the system integration (T3.4).
21	The monitoring period is shortened due to delays in the system integration (medium likelihood, high severity)	4	The monitoring period is expected to be more than a year and half long, meaning that even with delays in the previous phases the actual data collection period will most likely exceed one year.
22	Business models do not match required profitability/ROI (unlikely, high severity)	5	Due to a preliminary research, some business case at industrial sector are known.
23	Legal barriers do not enable projects (likely, high severity)	5	Stakeholder management with political decision makers, guidelines for redesign for policy makers.
24	Carbon Reductions are not as expected (unlikely, medium severity)	5	In a preliminary research, a strong carbon reduction potential is identified, as well as measures for further reduction.

25	Contractual agreements are not scalable due to location-specific settings and requirements (unlikely, medium severity)	5	Application of new forms of cooperation like service level agreements, joint ventures, ecosystems etc. will overcome barriers.
26	Lack of data being available for assessing sustainability and carbon footprint (likely, medium severity)	5	Up-to-date scientific proven databases will be use. i.e. ecoinvent, in case where data is not available.
27	Technology readiness is not as expected, pilot projects do not match requirements (remote unlikely likelihood, high severity)	All	Based on the research and technology scouting, some projects and technological paths have been identified matching the proposed requirements.
28	Reduced stakeholder engagement (low likelihood, medium severity)	6	The project will take advantage of the extensive network of stakeholders brought by the consortium partners as well as outside networks, initiatives, likeminded projects, technology platforms etc. The capacity building and dissemination would be continual and highly adaptable/customizable.
29	Health restrictions on live gatherings and/or travel (low likelihood, low severity)	6	Using tested online platforms and procedures (e.g. Zoom, REMO, B2Match, Mural, MS Teams), all capabilities can be replicated (as well as offering several advantages (e.g. cost over and outreach) live events).