D1.3

Risk Management Strategy

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More information on the project can be found at: https://www.low2highdh.eu/

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Executive Summary

The current Risk Management Strategy (D1.3) serves as a comprehensive guide aimed at documenting the risk management process within the Low2HighDH project. This Strategy defines and documents the entire Risk Management Process, including its various aspects. It outlines how risks will be identified and assessed, the tools and techniques employed, the evaluation scales and tolerances, and describes the relevant roles and responsibilities. The Strategy also specifies the frequency with which risks will be revisited and establishes the procedures for risk monitoring and escalation, defining the structure of the Risk log that will be used to document and communicate risks along with their corresponding response actions.

The purpose of this document is:

- To outline the risk approach and processes to be used in the Low2HighDH project;
- To identify the roles and responsibilities related to risk management;
- To specify the methodology, standards, tools and techniques that will be used.

In summary, the following Risk Management Strategy provides information on:

- Risk management processes including:
  - Risk identification
  - Risk assessment
  - Risk response
  - Risk control activities,
- Quality management processes,
- Issue management.

The Risk Management Strategy may be updated at any moment of the Low2HighDH project implementation to correspond to the evolving project needs and as a result of the continuous communication within the consortium.

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List of Acronyms and Abbreviations

Abbreviation	Definition
GA	Grant Agreement
CA	Consortium Agreement
EC	European Commission
PO	Project Officer
WP	Work Package
GA	Grant Agreement
PB	Project Board
PM at EP	Project Manager at Europroject
KPIs	Key Performance Indicators
QM	Quality Management
PC	Project Coordinator
EAB	External Advisory Board
ERB	Exploitation and Replication Board
RM	Responsibility Matrix
PM templates	Project management templates

Risk Management Objectives

Risk management is a continuous and systematic process for identifying, assessing, and managing risks, which improves project teams' ability and confidence to deal with uncertainty. It focuses on handling proactively any internal or external event that might threaten project objectives and maximises the chances for successful implementation of all project activities according to the initial plan.
Within the Low2HighDH project, risk management is a continuous process that commenced during the project's setting-up phase and will continue throughout its entire lifetime. The risk management framework includes key activities such as risk identification, analysis, ongoing monitoring, and control.
As the project progresses, the project team will consistently engage in the assessment of already identified risks and the identification of new ones. The proactive risk management actions aim to enhance the likelihood of project success within its initial budget, scope, and timeline. Identifying potential risks early in the project lifecycle will enable the Low2HighDH project team to formulate mitigation measures to either prevent or minimise the likelihood of adverse events occurring. This approach contributes to a more resilient and adaptable project, increasing the probability of achieving project objectives successfully.
The Low2HighDH project's Risk Management Strategy's primary goal is to provide guidance and enhance transparency regarding foreseen and unforeseen risks for their effective management within the consortium. The strategy is designed to proactively address and continually monitor and control project risks identified throughout the project's lifetime.
The key objectives of the project risk management strategy are to make sure that all identified project risks are:

- Properly and timely identified, analysed, monitored, and managed throughout the project's lifecycle;
- Reported to the respective responsible project body;
- Comprehensively monitored and controlled;
- Handled through timely and effectively implemented risk response actions.

Risk Management Process Description

Following the PM2 risk methodology, the risk management process in the Low2HighDH project is structured into four distinct steps. These steps are systematically designed to ensure a comprehensive approach to identifying, assessing, prioritising, managing, and controlling risks that could impact the project's execution and reaching its objectives.

Step 1: Risk Identification

The purpose of this step is to streamline the identification and documentation of risks that have the potential to impact the project objectives. Recognised as an ongoing and iterative process spanning the entire project lifecycle, it acknowledges that new risks may emerge at any time. They should be identified and incorporated into the Risk log for subsequent analysis and action.

During the initiating phase of the Low2HighDH project, a preliminary risk list was created through collaborative efforts within the consortium. This initial list serves as a foundational document available at the very start of the project implementation and will undergo regular updates to reflect the evolving

nature of the project and its associated risks. This active approach will remain consistent throughout the project's duration, ensuring that the Risk log is continuously monitored and emerging risks are timely included in it. Constituting risk management as an adaptive and iterative process ensures that the project team pays continuous attention to potential risks and addresses challenges. The Risk log will be used as a dynamic tool, capturing the evolving risks and providing a basis for informed decision-making throughout the project lifecycle.

Within the Low2HighDH project, the following techniques will be used for risk identification:

- Risk log containing the risk identifier, risk name and short description, the risk category and owner, as well as strategies, actions, and timing which will facilitate the monitoring and control aspects of the project. The PM2 Risk log template will be adapted to the needs and used within the Low2HighDH project.
- Risk Typology to group the identified various types of risks into categories and enable the easier tracking of the risk's interdependencies.
- Risk Assessment Meetings will be held on a 6-month basis as part of the Project Consortium Meetings. The risks reported or identified during these meetings will be added to the project Risk log. Additionally, the status of already listed risks will be checked and analysed.

The tools and techniques that will be used for risk identification are further documented and explained in Tools & Techniques section of this document.

Step 2: Risk Assessment

The purpose of this step is to systematically evaluate the likelihood and impact of identified risks concerning their potential influence on project objectives. This assessment serves as a prerequisite for any subsequent risk response planning activities.
The risks will be assessed by considering both their likelihood of occurrence and the impact they could have on project objectives. The multiplication of these two factors results in the determination of the Risk Level, which serves as a way to prioritise risks and develop appropriate risk response strategies. In the context of the Low2High DH project, the risk assessment procedure is planned to be conducted regularly, at least once every six months by all WP leaders, recognising that risks may evolve over the project's lifespan.
A probability-impact matrix will be used in the risk assessment process, facilitating the team in positioning each risk appropriately. The specific scales and tolerances for the risk matrix evaluation will be further explained in the Tools & Techniques section of this document, providing the team with a clear framework for comprehensive risk assessment and informed decision-making.

Step 3: Risk Response Development

The purpose of this step is to carefully choose the most effective risk response strategy and outline the actions required for active monitoring and control of risks. In the Low2HighDH project, the selection of risk response strategies will be based on the outcomes of the risk assessment, considering factors such as risk level, the nature of the risk, and its impact on other WP and tasks implementation, as well as on achieving the overall project objectives, including schedule and costs. The chosen strategy or strategies for each risk will be recorded in the Risk log.

Continuous risk monitoring throughout the project's lifespan is particularly important and includes the analysis of trigger conditions for each risk and documentation of the monitoring process. Considering this, the Low2HighDH project team will pay particular attention to the top three risks with the highest scores. Their status will be included as a recurring agenda item during the 6-months Consortium meetings, ensuring that risk monitoring remains an ongoing and integral process throughout the project's lifetime.
The following primary risk response strategies—Reduce, Avoid, or Accept—will be considered for each identified negative risk. Once the strategy (or a combination of them) is selected, specific actions to implement the decision made will be clearly defined, described, scheduled, and assigned.
Actions outlined in the Risk log will explicitly specify the target resolution date, resource estimates, and dependencies involved in the implementation process.

Step 4: Risk Control

The purpose of this step is to effectively control the implementation of risk response activities while maintaining continuous monitoring of the project's internal and external environment for emerging risks or alterations in the identified risks, such as changes in probability and/or impact. This process will be implemented again during the 6-month Consortium Meetings. Furthermore, risks will be revisited following the occurrence of any significant events that might impact the project environment and, consequently, the identified risks.
The updating of the Risk log will include various actions, including the addition of new risks or actions, updating the status of response activities, adjusting risk levels based on mitigation actions, and modifying the assignment of actions.
The Project Manager at Europroject (PM at EP) will be responsible for managing the processes of identifying, assessing, prioritising, and controlling risks, as well as for reporting the status of major risks to the Project Coordinator (PC) and the Project Board (PB).
The four steps outlined in the risk management process—risk identification, risk assessment, risk response planning, and risk control— will constitute a recurring cycle throughout the Low2HighDH project lifetime. Each iteration of this cycle involves a dynamic and iterative approach to managing risks and the active involvement of all consortium partners.
The repetitive four-step process of risk identification, assessment, response planning, and monitoring and control is visualised on Figure 1.

Figure 1. Risk management process within Low2HighDH project

Risk Management Roles and Responsibilities

As described in the Low2HighDH Project Management Handbook, the PB of the Low2High project will be the ultimate decision-making body, responsible for project operation, including risk management.
The PM at EP is responsible for providing all needed risk management templates and implementing the whole four-step process of assessing, managing, and monitoring the risks of the project. This requires the active engagement of the PB, PC, Exploitation and Replication Board (ERB), and all the partners within the Low2HighDH project consortium. The PM at EP will ensure that the appropriate risk owners provide the necessary status updates which include the risk status, identification of trigger conditions, and the documentation of the results of the risk response.
New risks and related actions suggested by any of the team members, as well as changes to identified risks and actions should be approved by the PC and reported to the PB.
The PB and the other Governance Bodies will validate the identified risks and actions, and plan other actions, if adequate.
The process for risk management will be iterative. During each iteration, the Risk log will be updated.
1. Each partner in the project is responsible for reporting potential risks (and proposing remedial actions) to the PB, by informing their Work Package leader and the PC.
2. The PM at EP, Work Package Leader, and the PC have the responsibility to, together with the respective partner, assess the risk impact, probability of occurrence and remedial actions. All risks that can be managed at this level should be addressed as soon as possible. Major risks threatening the overall implementation of the project will be escalated and immediately reported to the European Commission by the PC.

3. For risks of more severe grade (first 3 in the Risk log), the PC should inform the External Advisory Board (EAB), which will provide strategic guidance on how the problem should be addressed and take actions and decisions, where needed. All risks reaching this level shall be reported to the European Commission.
4. The Risk log will be reviewed and updated at least on a 6-month basis as a part of the Project Consortium meetings. The occurrence of risks and the triggered remedial actions will be described in the 9-months Project Review Reports developed by the PM at EP.

A responsibility matrix (RM), based on the ARSCI Model for Assigning Responsibilities[1] defining five different degrees of responsibility, will be used and include the following degrees:

A – Accountable - ultimately answerable for the correct and thorough completion of the deliverable or task, the one who ensures the prerequisites of the task are met and who delegates the work to those responsible. There should always be a single Role Accountable for any given management activity or artefact, to approve work that responsible provides.

R – Responsible is responsible for doing the work (e.g. creation of an artefact). When responsibility is delegated, the delegator becomes accountable for the performance of the delegated work. There should always be a single role Responsible for any given management activity or artefact.

S – Support - work with the person Responsible to complete the given activity or artefact. Support role helps complete the task.

C – Consulted - need to provide information or insights to the person Responsible so that they can complete a given management activity or artefact, typically subject-matter experts in a two-way communication.

I - Informed - need to be kept informed of the progress or/and the end result of the activity or artefact in one-way communication.

The following RASCI table defines the responsibilities of those involved in risk management:

RASCI	**PM (EP)**	**PC**	**WP leaders**	**All team members**	**PB**	**ERB**	**EAB**	**PO** (EC)
Risk Management Plan	R	C	I	I	A	I	I	**I**
Risk identification	R	C	S	C	A	I	I	-
Risk assessment	R	C	S	C	A	I	I	-
Risk response planning	R	C	S	C	A	I	C	-
Risk monitoring and control	**R**	**C**	**S**	**C**	**A**	**I**	**I**	-

Table 1. Risk management responsibilities within Low2HighDH project

[1] Kourounakis, N., Project Governance and the RASCI Model, 2019

The contact details of each of the above stakeholders are documented in the Project Contact list available to all project partners in the Low2HighDH shared folder.

TOOLS AND TECHNIQUES

The following techniques will be used for risk management:

- Questionnaires;
- Meetings;
- Risk checklists.

The following tools will be used for risk management:

- Risk Management Strategy;
- Risk log;
- Risk Likelihood/Impact matrix;

Risk log

The Risk Log employed in the Low2HighDH project follows the PM2 Risk Log template, encompassing and detailing various categories as outlined in the table below:

Risk Identification and Description	
ID	The risk identifier.
Category	Risk category related to the area affected by the risk (Management, Implementation, Communication, Other).
Title	A short title for the risk.
Description	A description of the risk, its causes, the kinds of problems that it could result in (potential effects), and risk dependencies.
Status	The risk status can be any of the following: **Proposed:** this is the initial status. Use this while the risk is still being specified. **Approved:** this status is set once the risk possibility has been accepted. **Rejected:** this status is set if the risk was rejected as not relevant. **Closed:** this status is set once the risk has been managed (e.g. mitigation actions have be implemented) and it is not a risk for the project anymore.
Identified by	The Partner organisation who identified the risk.
Identification date	The date on which the risk was identified.
Risk Assessment	
Likelihood (L)	A numerical value denoting the estimate of the probability that the risk will occur. The possible values are: **5=Very high, 4=High, 3=Medium, 2=Low, 1=Very low**
Impact (I)	A numerical value denoting the severity of the risk's impact (should it occur). The possible values are (negative risks): **-5=Very high, -4=High, -3=Medium, -2=Low, -1=Very low** **Note**: use same scale but positive values for positive risks (opportunities).

Risk Level (L*I)	The risk level is the product of the likelihood and impact (**RL=L*I**).
Risk owner	The Partner organisation accountable for managing and monitoring the risk.
Escalation	Whether or not the risk is to be escalated to the PO (**Yes** or **No)**.
Risk Response	
Risk response Strategy	The possible strategies to deal with the identified (negative) risks are: - **Avoid:** risk avoidance, modifying the project or project plan to eliminate the conditions or activities that introduce the risk. - **Reduce:** risk mitigation or reduction through the proactive implementation of risk reduction activities. - **Accept:** acceptance of the risk. In this case, contingency plans should be defined in case the risk occurs (active acceptance).
Action details (effort & responsible)	Description of the mitigation action(s), including its objective, scope, deliverables, and the person responsible and estimated effort needed.
Target date	The date on which the action is expected to be implemented.
Traceability/Comments	The WPs/Tasks (in the Project DoA) that implement the risk response actions. Also include any additional information/comments related to the risk.

Table 2. Low2HighDH project Risk log categories

Based on the categories above, a Risk log has been developed and is available to all project partners in the following MS Sharepoint internal folder: Risk management.

Low2HighDH

This template is based on Open PM² Template for Risk Log. It is adjusted for Low2HighDH project, and content / guidelines in some of the sections are changed

	Risk Identification and Description						Risk Assessment			Risk Response			
ID	Category	WPs affected	Title	Status	Identified By	Identification Date	Risk Level	Risk Owner	Escalation	Risk Response	Action Details (effort & responsible)	Target Date	Traceability/Comments
Guidelines	*‹Risks can be organised in different categories such as Project progress, technical, financial, human resources, legal, other. The current Risk*		*‹Short title for the risk›*	*The risk status can be any of the following: Proposed: this is the initial status. Use this while the risk is still being specified. Approved: this status is set once the risk possibility has been accepted. Rejected:*		*‹Date when the risk was identified ‹dd/mm/yy››*			*‹Should the issue be escalated to the General Assembly ›* *‹Yes› or ‹No››*	*The possible strategies to deal with the identified (negative) risks*	*‹Description of the mitigation action(s), including the objective, scope, deliverables, the person responsible and the estimated effort needed. ›*	*‹Date on which the risk response is expected to be implemented. ›*	*‹The WPs/Tasks (in the Project DoA) that implement the risk response actions. Also include any additional information/comments related to the risk.›*
R02	Management	WP1	Lack of experience and/or human resources from the coordinator to manage a collaborative EU project	Approved	all	proposal stage		CREARA	NO		CREARA and its employees have extensive experience in delivering and supporting energy projects at various scales. Over the last years, CREARA participated in 13 EU-funded and clean energy-related projects, including participating as WP leaders or project leader. E.g.: RenOnBill, MAESHA, THERMOS, ActionHeat. CREARA will be extensively supported by EP, a company with extensive experience in project management and implementation to ensure full compliance with all LIFE procedures, sharing of management roles, appropriate organisational structure set up, and decision-making procedure. SharePoint will be utilized as project repository to share information with the project partners and make the process as smooth as possible.		
R03	Implementation	WP6, WP2, WP4, WP3	No technical or financial solutions are identified to comply with the call's request	Approved	all	proposal stage		all	NO		Technical challenge: partners' experience has demonstrated that integrating low-grade renewables in DH sites across Europe is possible (e.g., in Denmark there are plenty of DHC sites fueled with solar thermal facilities). Also, the overwhelming technical capacities of the partners in the consortium ensure that technical solution can be identified and properly assessed. For this, we count on high-pressure heat pumps ("the enabling technology"). Financial challenge: GNE Finance has extensive experience in financing RES and energy efficiency investments using a combination of financial solutions. This provides the required flexibility to model any financial structure that PooPoocach participant may require.		
R04	Management	WP6, WP5, WP2, WP1, WP4, WP3	Poor communication flow or disputes between partners	Approved	all	proposal stage		CREARA	NO		Low2HighDH project will apply proven communication procedures and dispute mitigation mechanisms thus limiting the risk and resolving any conflicts promptly. More than half of the consortium's members are experienced in working on collaborative projects and together. At the very beginning of the project, clear communication channels were established, such as email communication lists, an online repository accessible to all project members, and regular monthly meetings. If the tools provided are not as effective, new internal communication and dispute-resolution procedures will be adopted. The conflict resolution tools will include open dialogue and mediation during monthly PB meetings,		

Figure 2. Low2HighDH project Risk management log

The Risk management Log will be updated by the PM at EP at least on a 6-month basis based on the risk assessment provided by the WP leaders during the Consortium meetings.

Risk Likelihood/Impact Matrix

This project is using the PM2 Risk Likelihood/Impact Matrix. The risk level will be calculated by the product of likelihood and impact in the following way:

Likelihood	Impact: 1=Very low	2=Low	3=Medium	4=High	5=Very high
5=Very high	5	10	15	20	25
4=High	4	8	12	16	20
3=Medium	3	6	9	12	15
2=Low	2	4	6	8	10
1=Very low	1	2	3	4	5

Legend:

	Risks can be accepted, contingency plans may be developed.
	Risks cannot be accepted, a risk response strategy should be developed (avoid, reduce, transfer/ share)
	Unacceptable – immediate risk reduction or avoidance response
- - - -	Risk appetite

Figure 3: Risk Likelihood/Impact matrix

The risk management matrix for the Low2HighDH project will be completed individually for each risk associated with the respective Work Package (WP) by the designated WP leader every 9 months. The gathered information will undergo analysis by the PM at EP and will be incorporated into the 9-month Project Review Report. Any modifications or updates will be duly recorded in the Risk log.

Risk Identification Activities

Initial risk identification was first performed when preparing the project's proposal and then again in the Grant Agreement Preparation process. The initial risks identified then are the starting points for further risk identification activities. The identification of risks resulted from desk reviews, interviews, project team brainstorming, project meetings, etc.

Due to the participatory nature of the activities carried on within the project, which will require the voluntary involvement and commitment of selected communities, there are relevant external risks to address to ensure the successful execution of the project. These risks encompass external factors such as the engagement of the stakeholders in the Low2HighDH project, which may vary among countries. Moreover, risks associated with the technological solutions of the project exist, such as implementation risks connected to the ability to implement what has been foreseen. Risks may also be caused by internal vulnerabilities expected in any collaborative research project such as those related to the management

and coordination of the consortium and the dissemination and exploitation of the project results, as well as on the take-up of the project's solutions at the end of the EC funding.
The following risk categories have been included in the risk identification analysis, considering the type of the project:

- Management: related to people and organisations, as well as to project coordination;
- Implementation: related to the implementation of planned project activities, possible delays, etc.;
- Communication: related to the involvement of external stakeholders;
- Other.

The potential risks perceived by the consortium at the beginning of the project are described in the following sections.

MANAGEMENT RELATED RISKS

Risks related to the overall management of the project, corresponding mitigation actions, and contingency plan in case of their occurrence are explained in Table 3. Despite the fact that most Low2HighDH partners have previously participated in other successful European projects in which they acquired valuable experience in project management and financial tasks, several risks were identified and thoroughly examined during the project initiation phase.
Anticipated management risks include those connected to financial deviations, collaboration between partners, and on-time, quality project execution. To mitigate these risks, day-to-day communication among partners is encouraged by the PM at EP and the PC to ensure that all activities are implemented on time and at a high-quality level. Moreover, three management bodies have been created to enhance the smooth management of the project by providing communication spaces for partners to express and discuss their concerns, exchange information about the project development, and become informed about the overall project execution. These are (1) the PB, (2) the ERB, and (3) the EAB. Their roles and responsibilities are defined in the Low2High Consortium Agreement signed by all partners and in the D1.1. Management Handbook.

Risk Description	WPs affected	Risk mitigation measures
Lack of experience and/or human resources from the coordinator to manage a collaborative EU project	WP1	CREARA and its employees have extensive experience in delivering and supporting energy projects at various scales. Over the last years, CREARA participated in 13 EU-funded and clean energy-related projects, including participating as WP leaders or project leader. E.g.: RenOnBill, MAESHA, THERMOS, ActionHeat!. CREARA will be extensively supported by EP, a company with extensive experience in project management and implementation to ensure full compliance with all LIFE procedures, sharing of management roles, appropriate organisational structure set up, and decision-making procedure. SharePoint will be utilised as project repository to share information with the project partners and make the process as smooth as possible.
Poor communication flow or disputes between partners	WP6, WP5, WP2, WP1, WP4, WP3	Low2HighDH project will apply proven communication procedures and dispute mitigation mechanisms thus limiting the risk and resolving any conflicts promptly. More than half of the consortium's members are experienced in working on collaborative projects and together. At the very beginning of the project, clear communication channels were established, such as email communication lists, an online repository accessible to all project members, and regular monthly meetings. If the tools provided are not as effective, new internal communication and dispute-resolution procedures will be adopted. The conflict resolution tools will include open dialogue and mediation during monthly PB meetings, problem-solving workshops, and measures to improve the internal project communication, e.g. changing the frequency of meetings, including conflict resolution points, etc.
Lack of financial resources or budget insufficiency	WP6, WP5, WP2, WP1, WP4, WP3	The budget is designed in detail and with enough buffer capacity to hedge against the risk. More than half of the partners have experience in EU projects, including budgeting and financial planning, which reduces this risk. Alternatively, corrective actions will be taken and budget transfers made to ensure the fulfilment of the project's KPIs.
Developmental delays in achieving KPIs, keeping task deadlines and submitting deliverables	WP6, WP5, WP2, WP1, WP4, WP3	Extensive coordination and partner expertise and experience in project management minimises the risk. The PC and WP leaders will continuously control the technical aspects of the project. 7 Consortium Meetings and monthly PB meetings will track project progress. Milestones and deliverables have been placed for control. Should delays occur, WP leaders will encourage a review of task procedures and request partners to place extra effort/include additional staff to meet the deadlines. In addition, the GANTT has been implemented including buffering months to enable avoiding this risk. Corrective actions will be taken during Consortium and PB Meetings and amendments applied if the issue persists.

Non-compliance with the work plan or non-contribution to activities	WP6, WP5, WP2, WP1, WP4, WP3	Continuous assessment of the work to be done through the quality process to detect issues and seek solutions. WP leaders and Task leaders will work closely with task/work package collaborating partners to ensure the information is gathered at the early stages, estimation of tasks' duration has been made collaboratively with all the partners and deliverables should be delivered on schedule. Lagging partners will be requested to increase efforts/resources to provide input via regular bilateral meetings to track progress.
Closing the activity of one partner leaving the consortium	WP6, WP5, WP2, WP1, WP4, WP3	The consortium is highly qualified, partners have certain overlaps in project expertise, and will either assume tasks from a partner leaving the project or seek a substitute within their extensive contact networks.

Table 3. Low2High Project Initial Management related risk list

IMPLEMENTATION RELATED RISKS

The table below outlines key implementation-related risks identified in various work packages (WPs) of the Low2HighDH project. In the process of project implementation, critical challenges may arise from the absence of identified technical or financial solutions to meet the call's requirements, the difficulty in constructing large renewable energy system (RES) generation facilities in DH sites with physical limitations, and a potential reduction of energy prices which poses a risk to investment attractiveness in RES, etc. All these foreseen risks will be completed with unforeseen ones, which may arise at any stage of the project implementation.

Risk Description	WPs affected	Risk mitigation measures
No technical or financial solutions are identified to comply with the call's request	WP6, WP2, WP4, WP3	Technical challenge: partners' experience has demonstrated that integrating low-grade renewables in DH sites across Europe is possible (e.g., in Denmark there are plenty of DHC sites fueled with solar thermal facilities). Also, the overwhelming technical capacities of the partners in the consortium ensure that technical solutions can be identified and properly assessed. For this, we count on high-pressure heat pumps ("the enabling technology"). Financial challenge: GNE Finance has extensive experience in financing RES and energy efficiency investments using a combination of financial solutions. This provides the required flexibility to model any financial structure that each participant may require.
Due to physical limitations (e.g. DH facilities located in populated areas), DHC sites find it difficult to build a large enough RES generation facility	WP6	The project will analyse several RES technologies, each of them with different location needs. Particularly, PV or wind technologies can be located far from the DH facility and sourced through the public grid.
A potential reduction of energy prices make investment in RES less attractive	WP6, WP2, WP4, WP3	Investment plans will be built under different scenarios, one of which will include pre-COVID and pre-energy crisis prices. All investment plans will be based on long-term, stable projections, able to accommodate low energy prices.
Budget is insufficient to provide support to all applicants	WP3, WP4, WP5, WP6	The budget is designed in detail and with enough buffer capacity to hedge against the risk. The project partners will implement clear and transparent criteria for prioritising applicants based on need, potential impact, or other relevant factors. This ensures that resources are allocated to those who will benefit the most. If needed, corrective actions will be taken and budget transfers made to ensure the fulfilment of the project's KPIs.
Insufficient local mapping and/or heat demand data	WP2, WP3, WP4, WP5, WP6	Eurostat data will be utilised. Additionally, if needed, local partners, such as municipalities, utilities, or community organisations will be involved with support from the respective national partners. Their local knowledge and data can provide valuable insights and help fill gaps in the Eurostat data. If partners themselves are not able to provide missing data, external experts will be consulted by local partners which can benefit from a consolidated network in the DH sector.

Insufficient cooperation by applicants selected	WP3, WP4, WP5, WP6	The project partners will clearly communicate the expectations towards the selected applicants regarding their roles, responsibilities, and the benefits of their cooperation. Additionally, they will foster a sense of ownership and involvement among the selected applicants by involving them in decision-making processes and tailoring the services to their national context and specific needs. All the concerns on the side of the selected applicants will be timely resolved.
Poor evaluation of support services received by selected applicants	WP3, WP4, WP5, WP6	The project partners will establish clear and measurable evaluation criteria at the outset of the project to assess the effectiveness and impact of support services. To ensure the quality of the provided services, regular feedback mechanisms, such as surveys, focus groups, or interviews, to gather input from selected applicants. If needed, corrective measures will be implemented.

Table 4. Low2High Project Initial Implementation related risk list

COMMUNICATIONS RELATED RISKS

Most of the partners within the Low2HighDH consortium have participated in prior EU proposals and projects, building on their communication and dissemination experience and establishing connections with stakeholders in the district heating sector. This experience is integral for implementing a good communication strategy and achieving the anticipated engagement of target groups.

Within WP5: Communication, Dissemination & Cross-EU Synergies, the efforts of the consortium will focus on raising awareness and interest among stakeholders. The project partners aim to effectively communicate project activities and results through various media and events to both national and international audiences. The Consortium has already identified different relevant target groups and selected appropriate channels for dissemination activities, which are further explained in D5.1 Communication Strategy, available in the project MS SharePoint: Deliverables.

Recognising the importance of engaging stakeholders in project activities and to mitigate associated risks, the Low2HighDH partners have compiled a list of specific initial networks and channels available in the Low2HighDH MS SharePoint: Low2High_Dissemination_Channels_Networks.xlsx

This list will be further developed throughout the project's lifetime.

The risks related to a possible low interest in the outputs resulting from the project are presented in Table 5.

Risk Description	WPs affected	Risk mitigation measures
Inability to reach the 10 DH pilots and 20 DH replication participants involved	WP6, WP4, WP3	The consortium includes key energy agencies (or similar) of the 3 target countries, which gives the consortium a direct access to the DHC industry: • KAPE for Poland: national energy agency, focused on renewables and energy efficiency. • LEI for Lithuania: leading energy public institute in the country • STU for Slovakia: Leading Technical University in the country, in permanent contact with the DHC industry (organises the major national DHC event). This guarantees that the number of interested sites to participate in the project is very high, as demonstrated by the Letters of Interest received from DHC sites from all 3 countries. This access capacity will be activated by the several engagement activities planned during the project, including roadshows, stakeholder dialogues, training programme webinars, and others. Through the active collaboration of our local partners, the project partners will tailor the support activities to precisely meet the needs of local stakeholders. This strategic adaptation will make the project appealing to prospective applicants.
Insufficient number of stakeholders participating in the training sessions	WP5, WP6	To enhance engagement and ensure that stakeholders recognise the relevance and benefits of the training sessions organized under the project, the project partners will employ targeted outreach campaigns and customise the training content to correspond to the training needs of the participants. Feedback will be gathered after each piece of training and based on the analysis of the results; improvement measures will be implemented.
Wider dissemination and replication outside the project consortium is slow due perception of complexity	WP5, WP6	To mitigate the slow dissemination and replication of project outcomes beyond the consortium, the project partners will: simplify and streamline the communication of project findings and methodologies to make them more accessible and understandable to external stakeholders; actively engage with potential adopters through targeted outreach campaigns, workshops, and networking events to showcase the practical benefits and ease of implementation of the provided solutions; the ambassador community involving relevant organisations will amplify our message and leverage their networks for wider dissemination.

Table 5. Low2High Project List of Communication-related risks

Risk Assessment Approach

Assessing the impact of identified risks is crucial for determining their influence on the project objectives, known as the risk level, and evaluating the likelihood of their occurrence. By understanding the potential consequences and probability of each risk, the project team can prioritise and implement appropriate strategies to mitigate or manage these risks.

RISK SCALE

The project will employ the Risk Likelihood/Impact Matrix as a tool for assessing and managing project risks (see Tools section). This matrix delineates various combinations of likelihood and impact of risks on a scale ranging from 1 to 5. The risk levels established through using the Likelihood/Impact Matrix serve as a guidance in the selection of appropriate risk response strategies.
This matrix will be introduced and utilised by Work Package (WP) Leaders and other project partners for registering open project risks. The likelihood scale assesses the probability of an event occurring, ranging from unlikely to probable, while the severity scale gauges the impact of an event, ranging from acceptable (hardly felt) to generally unacceptable (posing a threat to the project's fulfilment). The combination of likelihood and severity results in the overall risk level, a critical measurement used to prioritise potential issues and raise concerns when necessary.
WP Leaders will proactively identify risks in the 9-month Review reports and during internal reporting and meetings. All identified risks will undergo presentation, review, modification, and resolution processes at least on 6-month basis. To facilitate this, project partners should refer to the Risk Level scale detailed in the PM2 methodology and explained below, using it as guidance when completing the Likelihood/Impact Matrix.

Likelihood
Very low: less than 5% change of occurrence;
Low: between 5% to 10% chance of occurrence;
Medium: between 10% to 25% chance of occurrence;
High: between 25% to 50% chance of occurrence;
Very high: more than 50% chance of occurrence.

Impact
Very low: project baselines are nearly not impacted or/and easy and quick capacity to react and resolve the issue.
Low: low impact in other project baselines, or/and only one milestone/deliverable affected, or/and projects stakeholders may be affected, or/and sufficient project competencies to resolve the issue (if risk occurs).
Medium: 2% to 5% of project budget affected, or/and medium impact in other project baselines, or/and one or more milestones/Deliverables affected, or/and projects stakeholders will be to some extent affected, or/and project objectives may be affected, or/and limited project competencies to resolve the issue (if risk occurs).
High: 5% to 10% of project budget affected, or/and high impact in other project baselines, or/and several milestones/Deliverables affected, or/and projects stakeholders will be affected/concerned, or/and project

objectives will be affected, or/and formal and legal complaints, or/and insufficient project internal competencies to resolve the issue (if risk occurs).
Very high: more than 10% of project budget affected, or/and very high impact in other project baselines, or/and several milestones/Deliverables affected, or/and projects stakeholders will be very affected/concerned, or/and the overall project will be affected, or/and significant formal and legal complaints, or/and external competencies are needed to address the issue (if risk occurs).

RISK LEVELS THRESHOLDS

The following risk level thresholds will be adopted in the Low2HighDH project:
Green: risk level <=2;
Yellow: risk level >=3 and <=16;
Red: risk level >=20.

ESCALATION

The following risk escalation measures will be taken in the Low2HighDH project implementation to ensure effective risk management throughout the implementation phase. In this regard, the following procedures will be implemented:

Approval and Inclusion in Risk Log

All new risks, proposed risk response strategies, and suggested actions are subject to approval by the PC. Upon approval of their relevance, the PM at EP includes them in the Risk Log. All the WP leaders will be informed about the emerging risk as soon as possible.

Risk Levels >= 2 (Green Zone)
If the risk level is greater than or equal to 2 (within the green zone), proposed risk response strategies and actions are approved by the PC. The responsibility for implementing these strategies lies with the respective Work Package (WP) leaders of the affected Work Packages.

Risk Levels >= 3 <= 16 (Yellow Zone)
For risks with a level greater than or equal to 3 and less than or equal to 16, proposed risk response strategies and actions are subject to approval by the PB. These risks will be tracked at least on a 6-month basis to monitor their evolution.

Higher Risks with Level >= 20 (Red Zone)
Risks with a level greater than or equal to 20 will be closely monitored on a monthly basis by the PB.
Upon the decision of the PB, these high-level risks should be reported to the European Commission (EC). In urgent situations, the PC has the authority to report to the EC without prior approval from the PB.

Risk Response Strategies

The selection of risk response strategies is based on risk assessments, considering factors like risk level, implications on other Work Packages or Tasks implementation and overall project objectives. These strategies are well-documented by the PM at EP and discussed with partners, contributing to the project's success. The risk response actions are updated in the PM2 Risk Log throughout the project lifecycle and

revisited in the Project Review Meetings. The risk response strategies employed in Low2HighDH project are as follows:

Avoid
This involves risk avoidance by working the project or adjusting the project plan to circumvent conditions or activities that introduce the risk.

Reduce
This strategy entails risk mitigation or reduction through the proactive implementation of activities designed to lessen the impact or likelihood of the risk.

Accept
Acceptance of the risk involves acknowledging the potential impact if the risk materialises.

The following table describes the risk response approach for this project:

Scenario	Risk Response Strategy
Red zone	Avoid or implement an immediate reduction
Yellow zone	Reduce
Green zone	Accept (monitor and plan contingency if deemed necessary)

Table 6. Low2High Project risk response scenarios

Risk Control Activities

The PM at EP will comprehensively record all risks in a Risk log, detailing individual project risks in the following sections:

- Risk Identification and Description Section – this section will include risk category, title, description, status, identified by and identification date.
- Risk Assessment Section – likelihood, impact, risk level (probability), risk owner and escalation.
- Risk Response Section – risk response strategy, action details (effort and responsible), target date, traceability/comments.

The objective is to continually monitor and control the implementation of risk response activities while analysing the possibility of occurrence of new risks or changes in the project environment. PB meetings, Project Review meetings, and Project Consortium meetings will serve to review the status of risks and associated actions, identifying potential impacts on project milestones, deliverables, or objectives.
Before each Project Review meeting, there is a procedure in place to collect the status of each risk and action and the comments related to the effectiveness, difficulties, potential problems and dependencies of the actions. The PM at EP will be responsible for documenting risk updates, including new risks or actions, updating response activity status, and adjusting risk levels based on mitigation actions. Additionally, the PM at EP reports to the Project Consortium and PB. The Project Consortium is responsible for escalating major risks to the EC if necessary.

Quality Management

In the Low2HighDH project, Quality Management is considered an integral component of the Risk Management Strategy due to its importance in enhancing project outcomes and reducing potential risks resulting from low quality of the project implementation. First and foremost, quality management ensures that processes and deliverables meet predetermined standards and specifications, thus mitigating the risk of low performance that could result in rework, delays, or stakeholder dissatisfaction. By creating clear quality control procedures and implementing them throughout the project lifecycle, the project partners can proactively identify and address potential risks before they escalate into issues, thereby safeguarding project success. This proactive approach not only minimises the likelihood of quality-related risks but also enhances overall project resilience and adaptability in the face of unforeseen challenges.

OBJECTIVES AND PROCESS

The Project Quality Management process is designed to ensure the achievement of high-quality project outcomes and the seamless implementation of all project activities within the specified time, budget, and scope, and under the contractual obligations with the EC. As an integral component of the overarching risk management process, the implementation of quality assurance and control procedures establishes a foundation for adherence to all relevant rules and provisions. The procedures and responsibilities outlined below are designed to guarantee that, throughout its implementation, the project efficiently achieves the expected results, and that all deliverables are developed with a high level of quality that is required for being accepted by the granting authority and are also valuable to the project stakeholders. Quality-related activities include identification and planning, execution, and monitoring and control of the project (Figure 3). The three steps are succeeded by a particularly crucial phase—the improvement of implementation—which encompasses all subsequent activities within Low2HighDH.

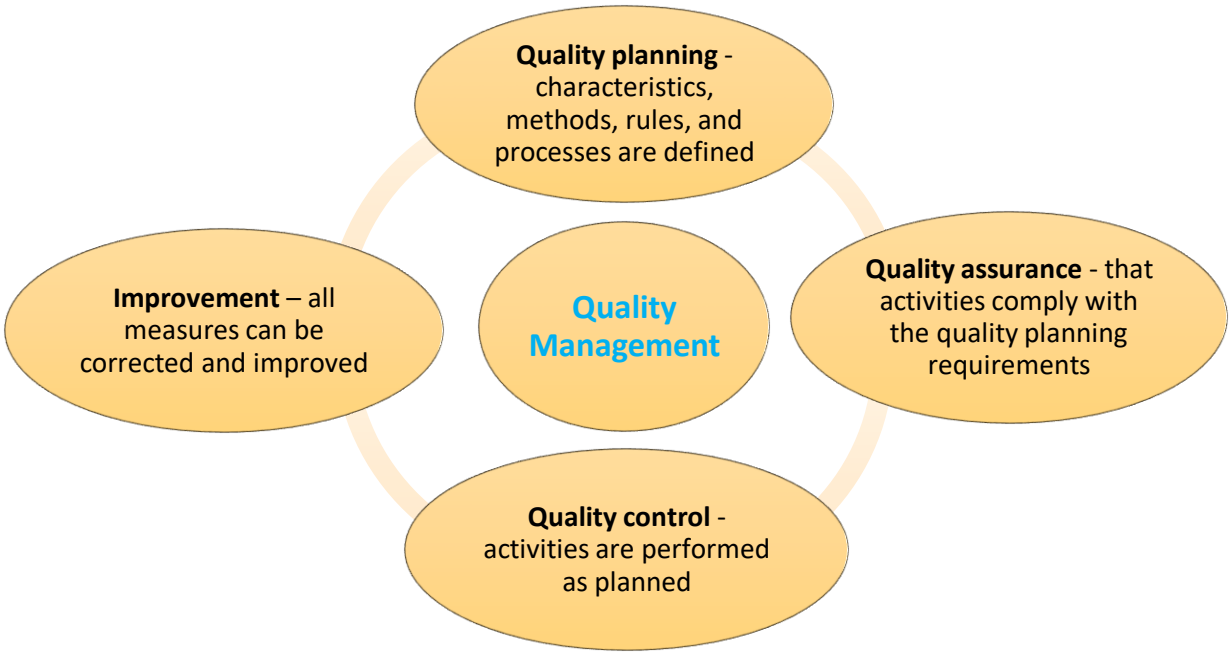

Figure 4. Phases of Quality Management

The next sections outline the Quality management processes within the Low2HighDH project in their immediate relation to Risk management, including:

Quality characteristics – to identify the objectives, approach, requirements, activities, and responsibilities of the project's quality management process. The plan is developed based on the project's objectives, approach, deliverables, expected benefits, and available resources, as stated in the Low2HighDH Grant Agreement. It encompasses the definition of quality standards, guidelines, tools, and techniques (e.g., Deliverables Acceptance Checklist, deliverables acceptance criteria and procedure, periodic reports and internal progress reporting criteria and procedures, templates of which will be further described in the following sections).

Quality assurance activities – these activities ensure compliance with EU and other relevant rules and regulations. This proactive control ensures that all activities are implemented in compliance with EU's regulations and the responsibilities outlined in the Grant Agreement, e.g., Project Review Meetings, activities reports, etc.,

Quality control activities this part of the plan outlines providing an opportunity for quality improvements. As part of the overall risk management, the internal project quality management aims to guarantee the successful completion of the project while maintaining a desired level of excellence.

RESPONSIBILITIES

All partners are intended to follow the procedures identified in the current document. The identification of responsibilities will follow the RASCI Model for Assigning Responsibilities explained above.

The following table defines the responsibilities of those involved in quality management:

Responsibility matrix	PB	PC	EAB	ERB	PM at EP
Quality Management Plan	I	C	I	-	**R**
Perform Quality Assurance	I	A	C	-	**R**
Perform Quality Control	I	A	-	-	**R**
Perform Deliverables Acceptance	**I**	A	-	C	**A**
Perform Final Project Acceptance	**I**	**A**	**-**	**C**	**R**

Table 7. Low2HighDH Risk responsibility matrix

The PC is accountable for the supervision of the quality assurance activities.

The PM at EP is responsible for the overall quality management process, including scheduling the reviewing and acceptance activities and ensuring that they are performed according to the plan, ensuring the correct and full completion of the quality assurance activities as well as assistance in performing quality control throughout the project. The PM at EP is responsible for providing and adjusting templates for all project and quality management procedures, including financial reports and supporting the PC in administrative tasks and during periodic reporting.

The respective WP, task, or deliverable lead are accountable for deliverables and outputs production and acceptance and for ensuring the availability of resources (including people) and providing guidelines.

The deliverable lead is responsible for completion of the respective deliverable, WP Leaders are responsible to review all deliverables within their work package. Task leaders are responsible for monitoring and achieving results within their respective tasks and completion on time.

TOOLS AND TECHNIQUES

The following tools and techniques will be used for project planning, management, and control:

Monthly WP Status Report – completed by WP leaders and provided to PM at EP and PC. Monthly reports should be prepared prior to monthly PB meetings and uploaded to the respective internal Monthly reports or presentations folder.

- 9-month Progress Reports – completed by WP leaders and provided to PM at EP and PC. The 9-month reports should be uploaded to the internal Nine -month reports folder.
- Deliverable Peer Reviews – assigned to different reviewers / review teams.
- Deliverable Review and Acceptance Checklist - completed by PM at EP and the PC for each deliverable.
- Project and Quality Review Meetings – incl., milestone review, as part of Project meetings or organised by PC, PM at EP, and other partners when needed.

The above-mentioned templates for monthly presentations and 9-month reposts are part of the project management toolkit developed by the project management at the very beginning of the project.

METRICS

This section includes the quality criteria to be collected and reported during the project, for project artefacts (i.e. project management outputs and deliverables).

Criterion Name	Frequency	Tolerance
Artefacts and deliverable review	Per project phase - once (or more if needed*)	No tolerance
Work Package Monthly Status reports (only for running WPs). Template is available in the shared folder Templates & visual identity	Monthly	One month (i.e. every two months in holiday period).
PB meeting	Monthly	One month (i.e. every two months in holiday period).
WP Progress Reports. Template available in the shared folder Templates & visual identity	Every 9 months	One month
WP Project Review Report (following completion of WP Progress Report and prepared by the PM at EP. The report should contain a section devoted to risk management)	Bi-annually	One month
Project Management Review Meetings performed as part of the Consortium meetings	Bi-annually	Two months

EAB meetings (as part of the Consortium meetings)	Annually	Two months
Reporting period reviews executed	Per reporting period[2]*	No tolerance

Table 8. Low2HighDH quality metrics

Quality Assurance and Control

The project quality assurance process is structured in such a way to comprise all levels and types of project activities and to ensure high-quality project communication, delivery, issue and risk management. The goal is to verify the performance and compliance of project - activities with the defined quality requirements. The quality assurance activities and requirements are defined based on the overall PM at EP approach as described in D1.1 Management Handbook. The results of the quality assurance activities will be documented in the relevant quality and status reports. The PC is the overall accountable of the quality assurance activities within the project. The PM at EP is responsible for scheduling and initiating all project quality reviews and procedures.
The quality assurance activities include, but are not limited to the following:

- Evaluating the design of the project controls, by confirming that they are implemented, and by assessing their operational effectiveness.
- Compliance verification with EU's policies, rules, and regulations, as well as with other relevant rules, regulations and legislation.
- Artefact / Deliverable reviews and approvals, review before it is considered finalised and submitted to EC for formal approval.
- Monthly Work Package Status Reports and 6-month Progress Reports.
- Project Review Meetings, Project PCT Meetings, other planned consortium meetings and communications.
- Milestone Reviews.
- Project Acceptance Review.

Deliverables Review and Approval

In the course of the Low2HighDH project implementation, a total of 29 deliverables are to be submitted to the European Commission, with 19 of them intended for public dissemination. All public deliverables will be uploaded to the project website upon approval by the funding authority, ensuring their accessibility well beyond the project's end. The success of subsequent project results also hinges on the quality of each preceding deliverable, directly influencing the project's overall success in meeting its objectives within the time, scope, and budget stated in the Grant Agreement.
Consequently, an integral aspect of the Low2HighDH project risk management strategy involves a comprehensive review process at the final stage of deliverable preparation. This strategic approach is designed to ensure that each output aligns with the standards and quality expectations for the project. The systematic scrutiny and validation of deliverables are proactive measures to mitigate potential risks

[2] Rejections by the EC of deliverables, achieved milestones, periodic reports are possible. In such situation partner will need to re-work, perform the requested changes and review again until the work is accepted.

and enhance the likelihood of seamless project implementation. This commitment to quality assurance provides a robust foundation for the success of subsequent project phases, ensuring optimal outcomes.

Deliverables Requirements

Low2HighDH project will produce deliverables that are in the form of (1) R - document, report (2) DEC — Websites, patent filings, videos, etc, (3) DEM — Demonstrator, pilot, prototype, (4) DMP — Data Management Plan, and (5) Other. For all kinds of deliverables that do not take the form of a written report, a written record will nevertheless be prepared to include supporting material for the output/outcome.

All report deliverables must be prepared in the Microsoft Word format – docx. To ensure consistency, a template has been prepared by the PM at EP at the very start of the project implementation and is available to all project partners in the Low2HighDH MS SharePoint space, PM templates (Deliverables template, Reporting templates, etc.) folder. All deliverables must use the template provided, be written in English and proofread. The deliverables are to have a uniform appearance, structure and referencing scheme. When submitting the final deliverable, it must be converted to the PDF format, before uploading to the Funding and Tenders portal Continuous reporting. All deliverables will be submitted by the PC.

The content of each deliverable depends on the type of deliverable itself. It should cover all the information relevant to the activity that it results, and all the information needed by other Partners for performing subsequent project activities. The responsibility for this belongs to the respective deliverable's author(s). All deliverable should meet a set of general requirements, based on the following aspects:

- Requirements regarding deliverables' content:

Relevance. Presented information should be true to the original objectives set out in Annex A of the GA and is relevant for the achievement of the project goals and focused on the key issues.

Accuracy. Information presented must be reliable - all claims need to be proven and/or supported by relevant references.

Completeness. The deliverable should include all the necessary information to achieve its purpose.

Concision. The deliverable should include only necessary and relevant information and eliminate redundancies.

- Requirements regarding deliverables' appearance, structure and overall presentation:

Clarity. Sentences should be short, engaging, and correct. The layout and formatting of the document should help readers follow along and make sense of the content. Abbreviations are used only when necessary and clearly outlined at the beginning of the document using the table available in the beginning of Deliverables template.
Consistency. Consistency should be ensured between different sections, internal document references, related requirement, documents and other deliverables. All tables and figures should be properly referenced and listed using the table available in the beginning of the Deliverables template.
Use of language. Language used should be specific, definite and concrete.
Spelling, grammar, and punctuation should be checked before sending to reviewers.

All the requirements described above are transferred into a Deliverables Reviewing Checklist to be used on different review levels (at least on the second round) by PC and PM at EP.

Roles and responsibilities

The Low2HighDH project quality procedures define the following responsibilities:
Progress on deliverables is monitored on a monthly basis by the PC and the PM at EP and discussed during the PB monthly meetings, which include a section on reviewing the upcoming deliverables and milestones and discussion on their progress. The status of upcoming and eventually pending deliverables should be monitored by the WP leaders within WP meetings and reported to the PC. Any problems or expected delays should be flagged immediately providing an explanation, any planned mitigation action and the anticipated completion date.
WP Leaders are responsible to review all deliverables within their work package,

- At least one additional reviewer/review team will be invited to contribute with recommendations and inputs (preferably participant outside (not actively participating in the production/writing) the relevant task or WP).
- PC will be submitting the deliverable on the Portal Continuous Reporting, Deliverables Section.
- Final acceptance - PC approve all project deliverables before final submission. The PC may return them for additional refinement if necessary.

At least two rounds of review are foreseen for the planned deliverables:

- 1st review round – the document will be sent for an internal review by Review Team 1 consisting of the WP Leader and PC, to approve the structure of the deliverable. Deliverable's lead and authors are responsible for completion.
- 2nd review round - the first complete draft of the deliverable must be sent to Review Team 2: PM at EP, WP Leader, additional reviewer appointed by the PB, PC. If not accepted, it is returned for alterations to the deliverable's lead.

The additional reviewers can be suggested by the deliverable's lead, WP Lead, or the PC. They will be assigned for each deliverable and approved by the PB members at least 2 months before final submission in the Deliverables List table in shared workspace.

Reviewing Timeline

The Low2HighDH project will follow the following timeline to assure timely quality delivery and approval of the deliverables:

When	What
At least 45 days before the deadline	High-level skeleton expected length must be submitted to the Review Team 1
Up to 40 days before the deadline	Review team 1 responds, approving or guidance for improvement/changes

At least 25 days before the deadline	The first complete draft must be submitted to the review team/s – Review Team 1 (PC) and Review Team 2 (project partner with expertise in the field).
At least 15 days before the deadline	Review team 1&2 respond with potential additional requests for revisions, allowing ten more days for revisions
At least 5 working days before the deadline	Final Deliverable must be forwarded to the Coordinator
Before the deadlines / on the last working day of the month indicated in the GA	PC gives final approval and submits

Table 9. Low2HighDH Deliverables reviewing timeline

Deliverables Reviewing Checklist

The deliverables reviews are performed in three stages based on the Deliverables Reviewing Checklist, available at MS SharePoint shared space.
The deliverables reviews are performed in 2 phases (for the 1st and the 2nd round of review) by the PC, PM at EP and assigned partner based on the Deliverables Reviewing Checklist (Figure4).
The findings, recommendations and remediation/improvement actions are directly provided to the Deliverable's lead.

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Document Information	
Organisation / Department:	<Name of the organisation and department.>
Reviewer Name:	<Name of the reviewer>
Review Date:	<dd/mm/yyyy>
Deliverable lead:	<Name of the Deliverable Lead>
Deliverable title:	<Title of the Deliverable>
Deliverable Nr:	<Number of the Deliverable as defined in the GA>
Overall Score:	72%
Overall Deliverable Quality Assessment	

Scoring Legend:	
0	"No" answer: does not meet the requirements
5	"Yes, Partially" answer: some work done, but not to the required/expected level.
10	"Yes" answer. Meets requirements and expectations as per the requirements
1 to 10	The questions started by "How well...?" should be answered by scoring the
N/A	This check is not applicable to this deliverable

Overall Assessment Key:	
	Critical /significant issues or major deliverable non-compliance.
	Deliverable needs to be revised
	Minor/No issues encountered

Deliverables Review Checklist

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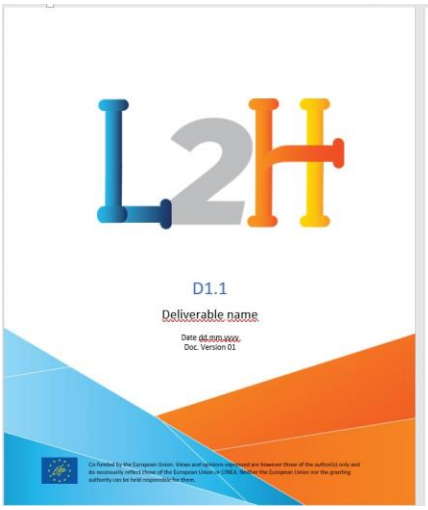
Deliverables Review Checks		% of Compliance	97%	
#	Description	Answer		Comments
	General			
1	**Concision**: Does the deliverable follow a clear and concise structure? Does it include only necessary and relevant information and eliminate redundancies?	Yes	10	
2	**Relevance**: Presented information should be true to the original objectives set out in Annex A of the GA and is relevant for the achievement of the project goals and focused on the key issues. Are the results clearly related to original propositions, hypotheses, research questions, and data analysis?	Yes, Partially	10	
3	**Accuracy**: Information presented must be reliable, all claims need to be proven and/or supported by relevant references. Is the document well referenced, claims proven and references well used? Are findings adequately and accurately described? Is the report free of any confidential information?	No	8	
4	**Completeness**: The deliverable should include all the necessary information to achieve its purpose. Do tables, charts and graph (or any other visual supporting material) provide sufficient and accurate data to allow the reader to reach independent conclusions? Are figures and appendixes used effectively? Are related documents well identified?	N/A	-	
	Appearance, Structure and Overall Presentation			
5	**Clarity**: Are abbreviations used only when necessary and clearly outlined at the beginning of the document? Are the layout and formatting of the document assisting readers in following along and making sense of the content?	Yes	10	
6	**Consistency**: Is there consistency between different sections, internal document references, related requirement, documents and other deliverables. Are all tables, figures and charts properly referenced?	Yes, Partially	10	
7	**Language use**: There are no spelling, grammar and/or punctuation errors.	No	10	
	Any Additional Comments			

Figure 5. Low2HighDH project deliverables checklist

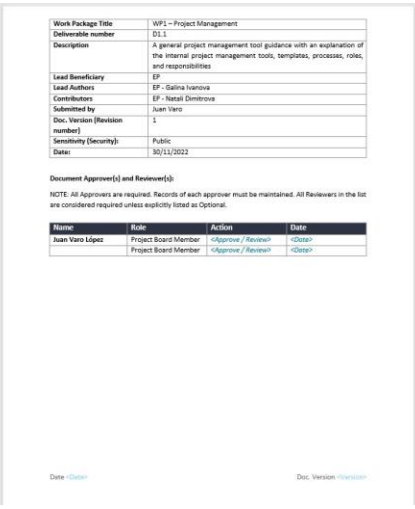
Deliverables Template

Low2HighDH Deliverable Template is presented below. The final title of the file should include name of the project _ number of the deliverable _short title.


D1.1

Deliverable name

Date dd.mm.yyyy
Doc. Version 01



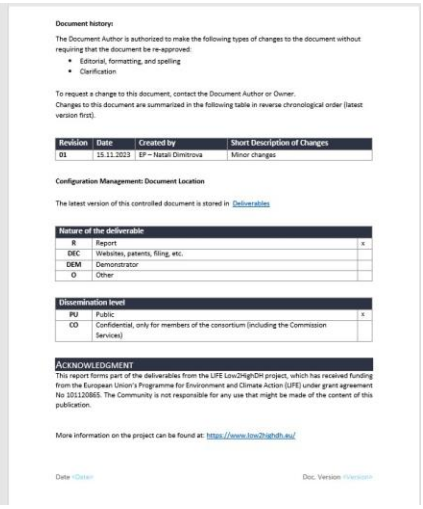
Work Package Title	WP1 – Project Management
Deliverable number	D1.1
Description	A general project management tool guidance with an explanation of the internal project management tools, templates, processes, roles, and responsibilities
Lead Beneficiary	EP
Lead Authors	EP - Galina Ivanova
Contributors	EP - Natali Dimitrova
Submitted by	Juan Varo
Doc. Version (Revision number)	1
Sensitivity (Security):	Public
Date:	30/11/2022

Document Approver(s) and Reviewer(s):

NOTE: All Approvers are required. Records of each approver must be maintained. All Reviewers in the list are considered required unless explicitly listed as Optional.

Name	Role	Action	Date
Juan Varo López	Project Board Member	<Approve / Review>	<Date>
	Project Board Member	<Approve / Review>	<Date>

Date <Date> Doc. Version <Version>


Document history:

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- Editorial, formatting, and spelling
- Clarification

To request a change to this document, contact the Document Author or Owner.
Changes to this document are summarized in the following table in reverse chronological order (latest version first).

Revision	Date	Created by	Short Description of Changes
01	15.11.2023	EP – Natali Dimitrova	Minor changes

Configuration Management: Document Location

The latest version of this controlled document is stored in Deliverables

Nature of the deliverable		
R	Report	x
DEC	Websites, patents, filing, etc.	
DEM	Demonstrator	
O	Other	

Dissemination level		
PU	Public	x
CO	Confidential, only for members of the consortium (including the Commission Services)	

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More information on the project can be found at: https://www.low2highdh.eu/

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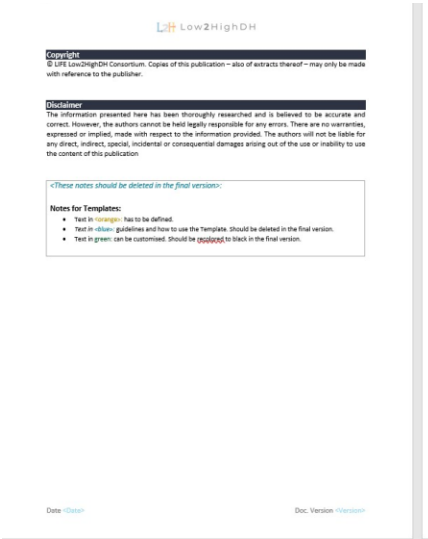
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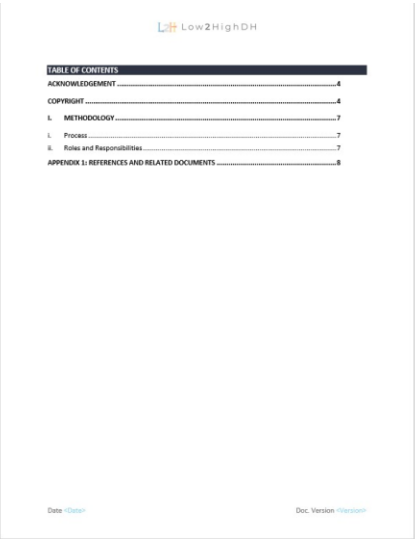
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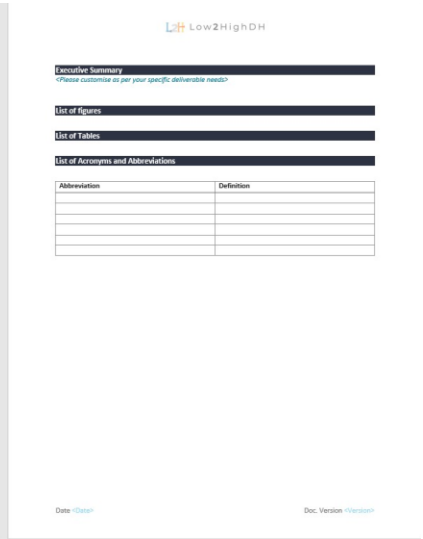
Low2HighDH

Executive Summary

<Please customize as per your specific deliverable needs>

List of figures

List of Tables

List of Acronyms and Abbreviations

Abbreviation	Definition

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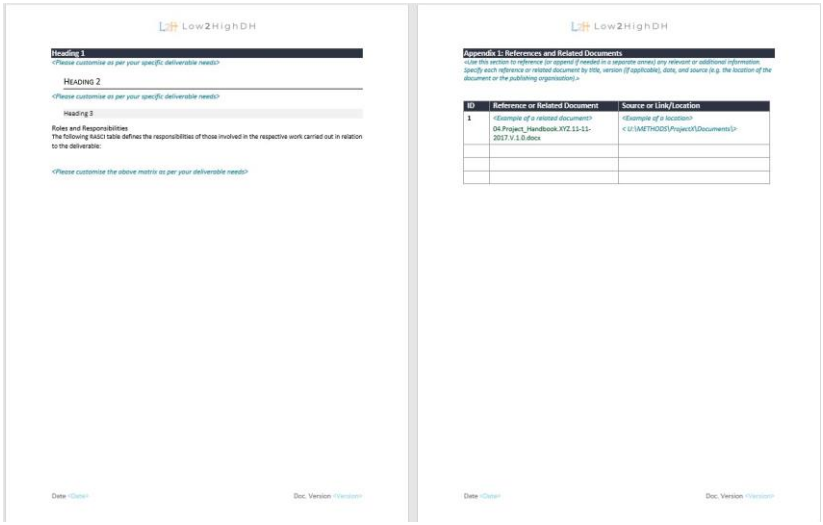


Figure 6. Low2HighDH project deliverables template

PROJECT PROGRESS MEASUREMENT

Work Package Status Reports

The project quality will be monitored and managed also through periodic reporting on the work package status, use of resources, risk and issues encountered and activities planning.

Every month each Work Package leader will complete a concise PP presentation. To ensure timely submission, the PM at EP will send reminders to Work Package Leaders at least 3 days in advance.

The information contained in the Monthly Work Package Status Report will be briefly reviewed during the monthly PB meetings. Any emerging risks and issues will be addressed promptly to maintain effective project management.

The template for the report is available on MS SharePoint in the respective dedicated template folder PM templates (Deliverables template, Reporting templates, etc.)

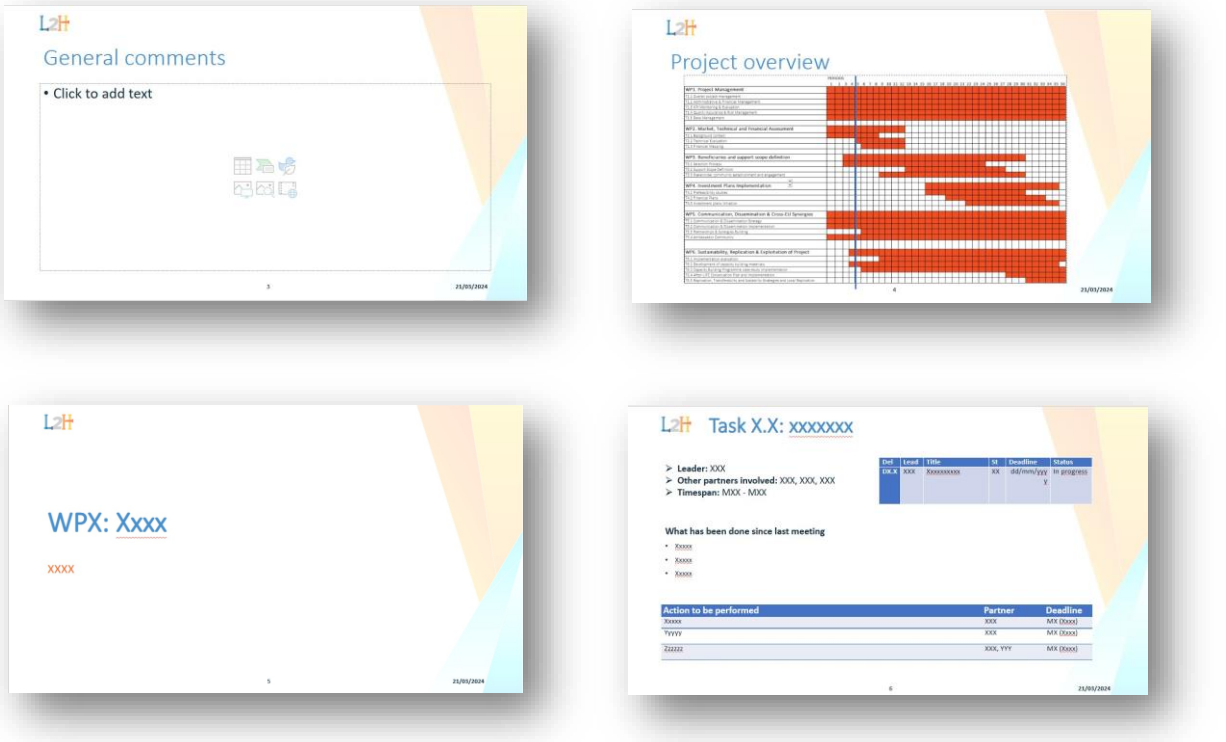


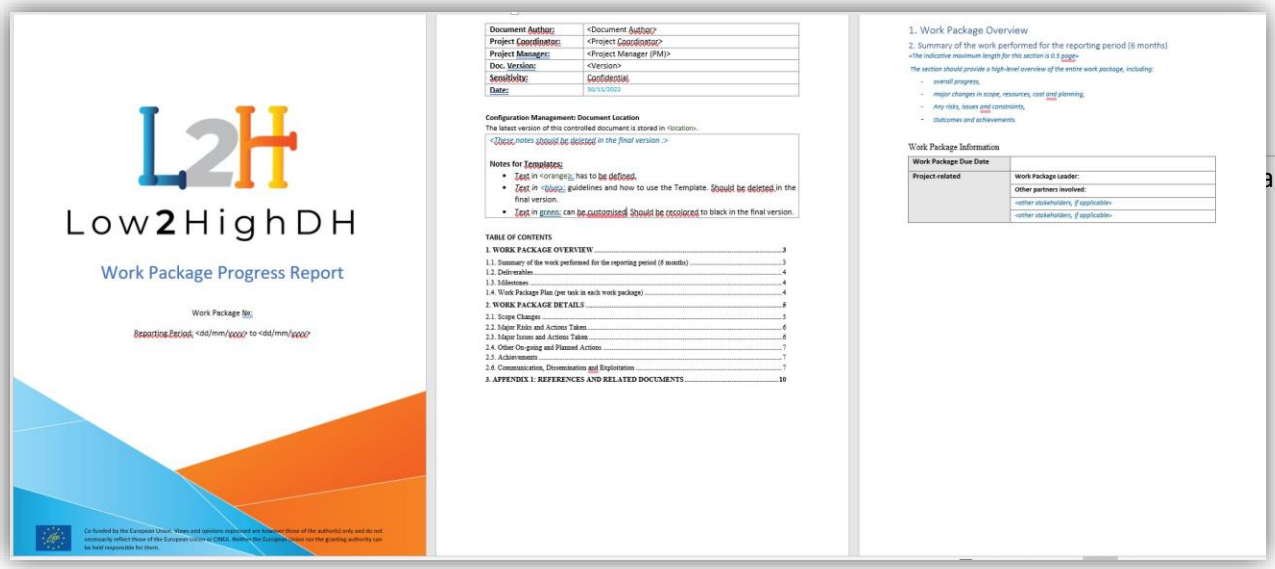
Figure 7. Low2HighDH monthly presentation template

Work Package Progress Report

In addition, Work Package Leaders (WPLs) are required to submit a comprehensive Work Package Progress Report every 6 months. This report should encompass all activities undertaken, as well as any risks or issues encountered within their respective work packages, utilising the provided Work Package Progress Report template. To facilitate timely submissions, the PM at EP will send reminders to each Work Package Leader 15 days before the deadline.

It is the responsibility of the Work Package Leaders to collect information on the progress within their work package from the task leaders and compile a thorough Work Package report. Subsequently, they are required to submit the report to both the PC and PM at EP. This structured reporting approach ensures an overview of the project's status and aids in proactive risk and issue management providing timely information about the development of all project activities.

The Work Package Progress Report template is accessible on MS SharePoint: PM templates (Deliverables template, Reporting templates, etc.).



Low2HighDH

Work Package Progress Report

Work Package №:

Reporting Period: <dd/mm/yyyy> to <dd/mm/yyyy>

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1. Work Package Overview

2. Summary of the work performed for the reporting period (6 months)

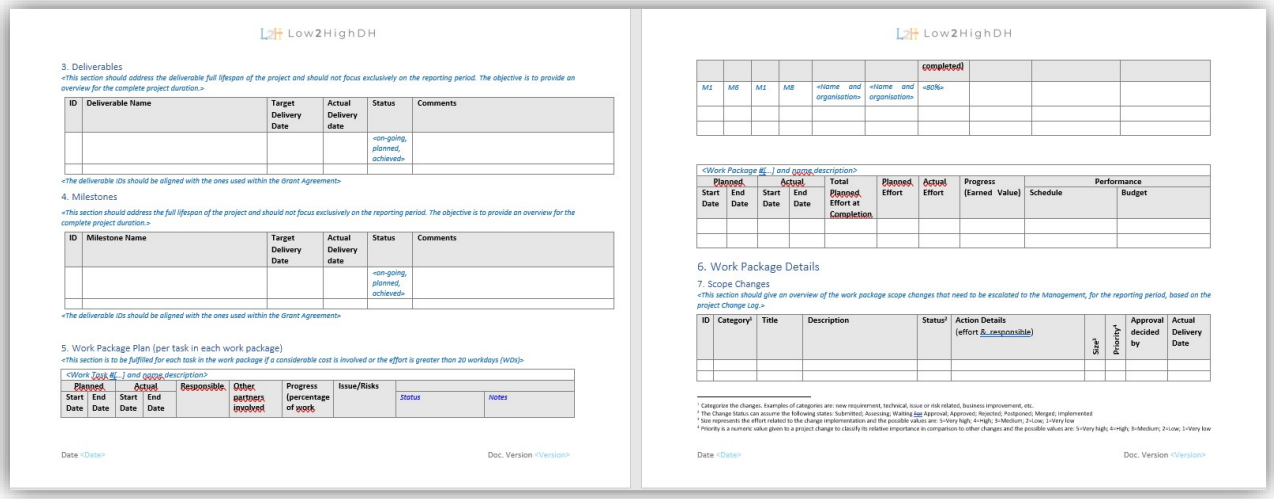
«The indicative maximum length for this section is 0.5 page»

The section should provide a high-level overview of the entire work package, including:

- *overall progress,*
- *major changes in scope, resources, cost and planning,*
- *Any risks, issues and constraints,*
- *Outcomes and achievements.*

Work Package Information

Work Package Due Date	
Project-related	Work Package Leader:
	Other partners involved:
	«other stakeholders, if applicable»
	«other stakeholders, if applicable»



3. Deliverables

«This section should address the deliverable full lifespan of the project and should not focus exclusively on the reporting period. The objective is to provide an overview for the complete project duration.»

ID	Deliverable Name	Target Delivery Date	Actual Delivery date	Status	Comments
				«on-going, planned, achieved»	

«The deliverable IDs should be aligned with the ones used within the Grant Agreement»

4. Milestones

«This section should address the full lifespan of the project and should not focus exclusively on the reporting period. The objective is to provide an overview for the complete project duration.»

ID	Milestone Name	Target Delivery Date	Actual Delivery date	Status	Comments
				«on-going, planned, achieved»	

«The deliverable IDs should be aligned with the ones used within the Grant Agreement»

5. Work Package Plan (per task in each work package)

«This section is to be fulfilled for each task in the work package if a considerable cost is involved or the effort is greater than 20 workdays (WDs)»

«Work Task #[…] and name description»

Planned		Actual		Responsible	Other partners involved	Progress (percentage of work	Issue/Risks		
Start Date	End Date	Start Date	End Date					*Status*	*Notes*

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							completed)			
M1	*M6*	*M1*	*M8*	*«name and organisation»*	*«name and organisation»*	*«80%»*				

<Work Package #[…] and name description>

Planned		Actual		Total Planned Effort at Completion	Planned Effort	Actual Effort	Progress (Earned Value)	Performance	
Start Date	End Date	Start Date	End Date					Schedule	Budget

6. Work Package Details

7. Scope Changes

«This section should give an overview of the work package scope changes that need to be escalated to the Management, for the reporting period, based on the project Change Log.»

ID	Category[1]	Title	Description	Status[2]	Action Details (effort & responsible)	Size[3]	Priority[4]	Approval decided by	Actual Delivery Date

[1] Categorize the changes. Examples of categories are: new requirement, technical, issue or risk related, business improvement, etc.
[2] The Change Status can assume the following states: Submitted; Assessing; Waiting for Approval; Approved; Rejected; Postponed; Merged; Implemented
[3] Size represents the effort related to the change implementation and the possible values are: 5=Very high; 4=High; 3=Medium; 2=Low; 1=Very low
[4] Priority is a numeric value given to a project change to classify its relative importance in comparison to other changes and the possible values are: 5=Very high; 4=High; 3=Medium; 2=Low; 1=Very low

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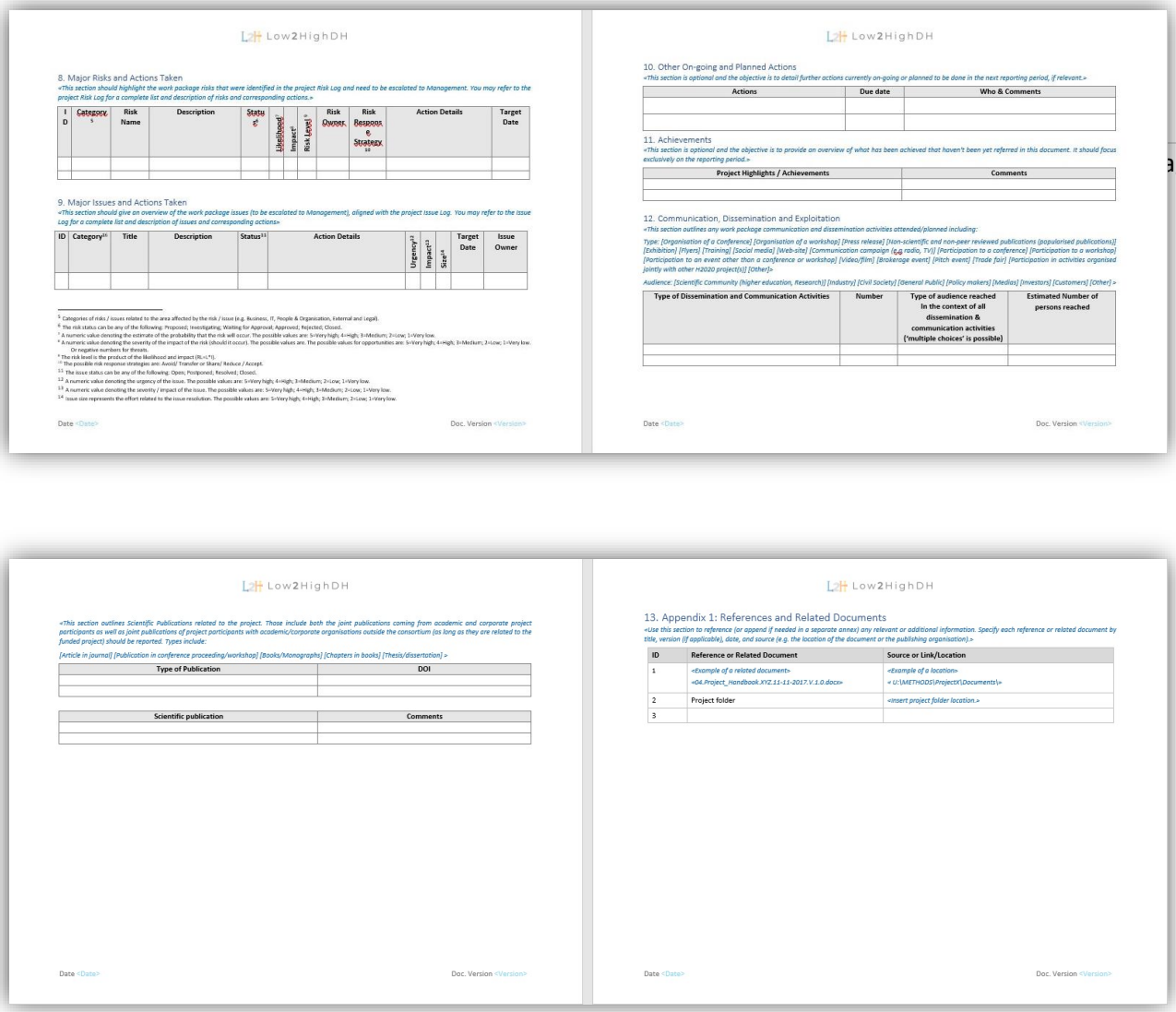


Figure 8. Low2HighDH 6-month report template

All Work Package Progress Reports will be integrated into the Project Quality Review reports by the PM at EP, providing a holistic overview of project implementation. These Quality Reviews will serve as a mechanism for ongoing monitoring, facilitating the timely:

- evaluation of project status and implementation to determine if the project is being executed within the defined scope, ensuring that the work within the WPs is consistently delivered at the desired quality standards, and verify the adherence to the pre-defined Gantt Chart.
- risk and issue assessment to ensure that all risks and issues are continuously monitored with the active support off all consortium members throughout the project lifecycle and enable the active identification of emerging challenges that may impact project success.
- implementation of corrective actions when necessary.

By incorporating the Work Package Progress Reports into Quality Review Reports, the project team gains a comprehensive understanding of its status, allowing for informed decision-making and timely interventions to address any deviations or challenges.

Project Quality Reviews

Project Quality Reviews will be conducted semi-annually by consolidating information obtained from the 6-month Work Package Progress Reports. This involves a comprehensive analysis of the collected data to formulate recommendations for improvement. The purpose of these reviews is to validate the execution of project plans and processes, ensuring they align with the established standards of quality.

The Quality Review process serves as a summary of completed activities, progress on ongoing work, and an explanation for any deviations, if any, from the objectives, schedule, or scope defined in the GA. The findings derived from the Quality Review will be presented to the PB by the PM at EP during the scheduled Project Consortium meetings planned on 6-month basis.

The results of the Quality Review process will be consolidated in Quality Review report by the PM at EP providing clear overview of the project's performance. The reviews and related quality assurance activities may lead to change requests, encompassing corrective or preventive actions, updates in project documentation, and improvements in the quality of project activities. This iterative process ensures continuous improvement and optimisation of project processes to enhance overall project performance and outcomes.

Quality Control Records

Quality Control will be conducted based on the regular monitoring and consolidation of results from the quality assurance activities. PM at EP is responsible for quality monitoring and controlling. The quality records (evidence that QM activities have been performed) are archived in the project workspace and archived in the Low2HighDH project MS SharePoint), under the "Monitor & Control" folder. The different versions of the project artefacts (created at each artefact update) will provide evidence of the performance of these activities.

Quality Control will be systematically carried out through continuous monitoring and the consolidation of results derived from quality assurance activities. EP as leading Task 1.4 Quality Assurance & Risk Management will be responsible for the implementation of all quality monitoring and control activities. All records substantiating the execution of these activities will be stored in the project workspace and archived in the dedicated Low2HighDH project MS SharePoint.

Evidence of the performance of these activities is established through the different versions of project artefacts, generated at each update. This process ensures keeping a trail and provides proof of the project's adherence to established quality standards. This proactive approach will ensure that deviations from quality standards are identified promptly, enabling timely corrective measures and contributing to the overall success of the project.

Periodic reporting to EC and Final Closure

Periodic reporting to EC

Low2HighDH reporting periods and related responsibilities

The project will be split in two different reporting periods:

- RP1: M1-18, to be followed by additional prefinancing,
- RP2: M19-36, to be followed by final payment.

Periodic reporting should be organised by the PC with the support of the assigned PM at EP for administrative and financial matters. All WP Leaders are responsible to provide relevant progress information for their respective WP, they organise the communication with their WP participants. Payment schedule and rules are described in section 7. Financial provisions within Low2HighDH Consortium Agreement. EC may suspend payments and ask for changes, improvements, additional explanations on any technical, administrative, financial aspect of the submitted reports.

Two project reviews with the EC are scheduled at the start of the project

1. At month 18 - Project review 1 (PR1)
2. At month 36 - Project review 2 (PR2)

Continuous and informal reporting

In addition to the obligation of submitting periodic reports to the EC, partners must regularly complete the Portal Continuous Reporting tool and to inform the PO (through the PC) about: status, progress, any potential risks and delays, questions and issues and other project related topics.

Periodic report – 1) financial and 2) technical part

Each project partner - beneficiary is obligated to complete and submit financial statement to the EC. The technical report is collaborative document consolidated for all partners (who provide relevant information) and submitted by the PC. Reporting rules are described in Article 21 – Reporting within the Grant Agreement.

Closure and final acceptance

The administrative closure of the project involves obtaining final acceptance from the PC and generating official reports summarising the project's performance throughout its lifecycle. These reports should provide insights into the main risks, issues, constraints, opportunities, and lessons learned over the course of the project. The administrative closure process includes updating, reviewing, organising, and archiving all project documentation and records, which will be performed by the PM at EP. Additionally, they will provide information on stakeholders' satisfaction and document best practices and solutions implemented. This valuable information will be maintained in a project repository, ensuring accessibility for future projects.

At the end of the project, EP will produce a final report detailing the work and results of the Low2HighDH project, along with its long-term environmental benefits. This final publishable report will highlight key results, lessons learned, and recommendations for the future. The report will be professionally designed, attractive, and tailored to the target audience of the project to maximise dissemination. Prior to publication, the content and final draft of the report will undergo discussion with CINEA. As a significant project output, the report will be translated into multiple languages (Spanish, Italian, Polish, Slovak, and Bulgarian) and published on the project website.

Additionally, UNIPARTHENOPE will produce an After-LIFE Conservation Plan as a separate deliverable. This plan will outline how the initiatives launched in the Low2HighDH project will be continued and developed in the years following its end. The After-LIFE Plan will provide an overview of the project, assess the situation at its end, define after-LIFE objectives and methodology, identify funding needs and sources, and meet all contractual requirements for this task.

ISSUE MANAGEMENT

Issue management within the Low2HighDH project aims to ensure that all issues having a potential impact on project scope, time, cost, quality, risk, or stakeholder satisfaction are assessed and acted upon. Relevant issues, follow-up and key decisions will be documented to bring visibility and accountability. Issue management process falls under the responsibilities of the PM at EP.

Issue management within the Low2HighDH project is designed to systematically address and assess any concerns that may impact project scope, time, cost, quality, risk, or stakeholder satisfaction. The primary objective is to identify, evaluate, and take appropriate actions to mitigate the impact of these issues. The process includes the proper documentation of relevant issues, follow-up actions, and key decisions to enhance visibility and accountability throughout the project.

As previously mentioned, the responsibility for overseeing the issue management process lies with the PM at EP. This entails actively monitoring, tracking, and facilitating the resolution of identified issues. For this purpose, all identified issues will be timely reported to the PC and the PB.

IDENTIFYING ISSUES

Any issues arising should be documented (e.g., disagreements on the interpretation of requirements, difficulties achieving the set goals in terms of time, resources or quality); external effects that influence the project in a negative way). Issues can be identified and raised by any Project partner and stakeholder throughout the project lifecycle, using different communication channels as meetings, emails, reports etc. Issues will be regularly monitored during the Project Reviews.

In the Low2HighDH project, any issues that arise, such as disagreements on the interpretation of requirements, challenges in achieving set goals (e.g., related to time, resources, or quality), or external factors negatively influencing the project, will be diligently documented. This documentation process serves to capture the essence of the issues, enabling thorough analysis and resolution.

Various communication channels, including PB monthly meetings, emails, and reports, can be utilised for issue identification and reporting. This approach ensures that issues are timely shared with the PC, PM at EP, and all the partners involved in the project.

To maintain proactive approach, issues will be regularly monitored during Project Reviews. This will allow timely intervention and resolution of all emerging issues. By fostering an open and collaborative environment for issue identification and documentation, the Low2HighDH project management team aims to ensure a systematic approach to addressing all concerns and facilitate project success. This approach encourages transparent communication and the sharing of insights regarding potential challenges.

ASSESSMENT AND MEASURES

Any issue should be assessed regarding its urgency and impact and its resolution. When an issue arises, an initial assessment (informal) will be performed by the person who raised the issue. This informal assessment will consider dimensions like relation to a specific area, possible consequences, level of urgency and size/scope. PM at EP will eventually assign the detailed analysis of the issue to a project partner and document the proposed solution and decisions made.

In the Low2HighDH project, any identified issue will undergo a systematic assessment that takes into account its urgency, impact, and the necessary steps for resolution. When an issue is raised, the person

bringing it to attention of the consortium will conduct an initial, informal assessment. This preliminary evaluation will consider several dimensions, including its association with a specific project area and possibilities to affect other WP and Tasks and affect the time, scope, or quality of their implementation, other potential consequences, level of urgency, and the size or scope of the issue.

As a next step, the PM at EP will play a crucial role in the issue resolution process assigning a detailed analysis of the issue to a specific project partner/s. This assignment will be done with the aim of thoroughly understanding the issue, exploring potential solutions, and making informed decisions. The outcome of this analysis, including the proposed solution and any decisions made, will be documented and presented to the PB.

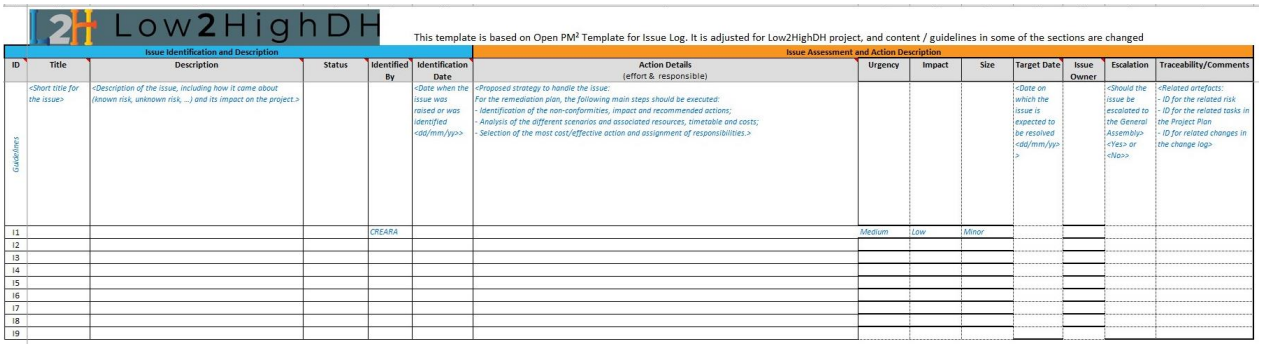
CONTROL

The Low2HighDH project will use an issue log to systematically record and capture all details related to identified individual project issues. It has been developed by the PM at EP and is based on the Open PM2 template. The issue log comprises two main sections:

- Issue Identification and Description Section – this section includes issue ID number, title, description, status, identified by and identification date.
- Issue Assessment and Action Description – this section includes action details, urgency, impact, size, target date, issue owner, escalation, traceability/comments.

The issue control measure includes the regular monitoring and control of identified issues throughout the project lifetime. This facilitates the process of communicating them to the project decisional levels, for remediation action approval or status updates. The PM at EP will be responsible for documenting and monitoring all reported issues, and discussions about actions to be taken will be made during Project Consortium and PB meetings. Additional meetings can be organised as necessary, depending on the nature of the issue, its urgency, size, and impact on the project.

Issue owners will provide regular updates to the PM at EP, PC, who include issue updates as a separate point in the agenda of PB meetings.



Low2HighDH

This template is based on Open PM² Template for Issue Log. It is adjusted for Low2HighDH project, and content / guidelines in some of the sections are changed

Issue Identification and Description						Issue Assessment and Action Description							
ID	Title	Description	Status	Identified By	Identification Date	Action Details (effort & responsible)	Urgency	Impact	Size	Target Date	Issue Owner	Escalation	Traceability/Comments
Guidelines	<Short title for the issue>	<Description of the issue, including how it came about (known risk, unknown risk, ...) and its impact on the project.>			<Date when the issue was raised or was identified <dd/mm/yy>>	<Proposed strategy to handle the issue: For the remediation plan, the following main steps should be executed: - Identification of the non-conformities, impact and recommended actions; - Analysis of the different scenarios and associated resources, timetable and costs; - Selection of the most cost/effective action and assignment of responsibilities.>				<Date on which the issue is expected to be resolved <dd/mm/yy> >		<Should the issue be escalated to the General Assembly> <Yes> or <No>>	<Related artefacts: - ID for the related risk - ID for the related tasks in the Project Plan - ID for related changes in the change log>
I1				CREARA			Medium	Low	Minor				
I2													
I3													
I4													
I5													
I6													
I7													
I8													
I9													

Figure 9. Low2HighDH Issue log

Related Documents

PROJECT HANDBOOK

The Project Handbook establishes the high-level approach for implementing the project goals, which includes required documentation, standards to be considered and clarification on all roles and bodies within Low2HighDH project. The location of this artefact is referred in the Appendix 1.

CONCLUSION

The Risk management strategy for the Low2HighDH project adopts a comprehensive approach to identify, assess, and mitigate potential risks throughout the project lifecycle. Proactive risk identification is a key focus and in the process of project implementation, it will be achieved through regular risk assessments and continuous monitoring. This approach allows for timely responses to emerging threats, ensuring a dynamic and adaptive risk management process.

Quality management within the project is perceived as an ongoing effort to maintain project implementation within the defined timeline, scope, and budget. This assurance is facilitated through periodic reporting mechanisms, such as the Monthly Work Package Status Reports and Project Quality Reviews. These processes enable systematic monitoring and evaluation of project activities, and resource utilisation, which results in minimising the internal project risks.

Simultaneously, the issue management strategy underscores the importance of an open and collaborative environment for issue identification and documentation.

The Risk strategy of the Low2HighDH project contributes significantly to the overall success of the project. By fostering proactive identification, structured assessment, and effective resolution of challenges, it enhances project performance and outcomes, ensuring an adaptive management framework throughout the project's lifecycle and involving all consortium partners.

Appendix 1: References and Related Documents

	Reference or Related Document	Source or Link/Location
1	Low2HighDH project Grant Agreement No 101120865	Low2HighDH Project SharePoint, Reference Documents folder
2	Low2HighDH project Consortium Agreement	Low2HighDH Project SharePoint, Reference Documents folder
3	D1.1. Management Handbook	Low2HighDH Project SharePoint, Deliverables folder