

Pre-normative research for safety of hydrogen driven  
vehicles and transport through tunnels and similar  
confined spaces

Fuel Cells and Hydrogen Joint Undertaking (FCH JU)  
Grant Agreement Number 826193

## **Deliverable 7.3**

### **Project Quality Plan**

Lead authors: FHa (Miguel Zarzuela, Mercedes Sanz)  
Contributing authors: UU (D. Cirrone, D. Makarov)  
PS (J. Grune)

Version: 190619  
Delivery Date: 20 May 2019  
Due Date: 30 June 2019  
Dissemination level: Confidential



**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

Deliverable administration					
Work Package	WP7 Management				
N. and title	D7.3 Project Quality Plan				
Type	Public				
Status	Draft/Working/ <b>Released</b>	Due	M4	Date	30-06-2019
Comments					
Development and revision					
Version N.	Date	Authors	Description		
190528	28-05-2019	M. Zarzuela, FHa	1 <sup>st</sup> document draft		
190531	31-05-2019	M. Sanz, FHa	1 <sup>st</sup> internal FHa revision		
190613	13-06-2019	D. Cirrone, UU D. Makarov, UU	Review of deliverable		
190614	14-06-2019	J. Grune, PS	Review of the summary		
190619	19-06-2019	M. Zarzuela, FHa	Final version		

## Disclaimer

Despite the care that was taken while preparing this document the following disclaimer applies: the information in this document is provided as is and no guarantee or warranty is given that the information is fit for any particular purpose. The user thereof employs the information at his/her sole risk and liability.

The document reflects only the authors' views. The FCH JU and the European Union are not liable for any use that may be made of the information contained therein.

## Acknowledgments

This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (JU) under grant agreement No 826193. The JU receives support from the European Union's Horizon 2020 research and innovation programme and United Kingdom, Germany, Greece, Denmark, Spain, Italy, Netherlands, Belgium, France, Norway, Switzerland.



**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

## Summary

To monitor and ensure a successful execution of the project, a Project Quality Plan (PQP) is developed and presented. This PQP specifies the measures regarding the quality monitoring and its supervising activities taken during the project definition of the HyTunnel-CS project.

This PQP ensures that the content of the defined work packages, including the coordinator's performance, is in accordance with the budget and the technical progress proposed. The presented PQP allows the analysis and constant evaluation of the risks, and reviews the status and the information shown in the internal and external deliverables according to specific project templates.

Introductorily, the organizational structure of the project members, the project bodies and their responsibilities are described in detail. There, the coordinator role, General Assembly (GA) tasks, the Executive Committee (tEC), Stakeholders Advisory Board (SAB), Work Package (WP) leaders and tasks leaders' commitments are given and specified.

The PQP is based on four main elements, which are covering the important aspects of the project: the **monitoring of the project** from both technical and financial point of view, a complete methodology for **risk analysis**, **quality technical part** and **quality form**.

For this, the general **monitoring of the project** is implemented, which includes the technical and financial aspects. The main contents are: delays on deliverables, control of expended budget and human resources, the number of meetings, dissemination actions, stakeholders and patents. The **technical part** will be quality ensured by a strict reviewing and rating of the deliverables that the project will produce. A **risk analysis** and its complete methodology are presented in order to be prepared for any situation that could compromise in any sense the proper development of the project. The provision of series of templates will ensure **quality form**, so that the whole communications of the project will follow the same structure, form and view.

On the base of this PQP, all the indicators and quality processes will be periodically reviewed and documented following the timing described in the definition of the HyTunnel-CS project. This will support the project's accurate achievements, results and developments.

## Keywords

Project Quality Plan, Deliverables, Quality Management

## Nomenclature

CO	Coordinator
D	Deliverable
DoA	Description of Actions
DR	Deliverable Responsible
EC	European Commission
FCH JU	Fuel Cell and Hydrogen Joint Undertaking
GA	General Assembly
IPR	Intellectual Property Rights
MM	Man Month
PMI	Project Management Institute
PQP	Project Quality Plan
UU	University of Ulster
WP	Work Package
tEC	the Executive Committee
SAB	Stakeholders Advisory Board

## Table of contents

Summary .....	3
Keywords .....	3
Nomenclature .....	4
1. Introduction and scope .....	6
2. Project Quality Plan main concepts .....	6
2.1 Management structure and procedures .....	7
2.1.1 Project Coordinator .....	7
2.1.2 General Assembly .....	8
2.1.3 The Executive Committee .....	8
2.1.4 Stakeholders Advisory Board .....	8
2.1.5 Work package leaders and Task leaders .....	8
2.2 Main project bodies and responsibilities .....	8
3. Quality control of the deliverables .....	10
3.1 Layout of the deliverables .....	10
3.2 Production process of the deliverables .....	11
3.3 Quality indicators .....	11
3.4 Reviewing and submission process .....	12
4. Monitoring and reporting .....	13
4.1 Monitoring of the project .....	13
4.2 Technical and financial reporting .....	13
5. Quality Form .....	13
6. Risk Management .....	14
6.1 Concepts .....	14
6.1.1 Plan Risk Management .....	14
6.1.2 Identification of risks .....	14
6.1.3 Perform qualitative risk analysis .....	15
6.1.4 Risk responses plan .....	15
6.1.5 Control of risks .....	16
6.2 First assessment .....	17
7. Conclusions .....	19
8. References .....	19
Annex 1 .....	20

## 1. Introduction and scope

HyTunnel-CS project consortium is deeply committed on assuring high quality results. In order to achieve these high standards, the project consortium has clearly defined the roles and responsibilities for each partner and the processes to be followed by them, creating a Project Quality Plan (PQP) with realistic objectives through the whole project's lifetime. For this reason, the plan has been prepared in the early stage of the project. The Coordinator leads this activity in close dialogue and cooperation with the other partners.

This plan specifies the measures taken during the project definition and, most importantly, the quality monitoring and supervising activities for HyTunnel-CS.

This document aims to be a guide for the quality requirements to be implemented in the activities carried out in the project, as well as for the evaluation processes and reviews that guarantee the achievement of the project goals and the adoption of the contractual links in the Grant Agreement.

The main objectives of the PQP are:

- Define the structure of the members of the project and their responsibilities.
- Establish the procedures to ensure the quality of the project and the project documents.
- Define the quality indicators of the project.
- Describe the methodology to ensure a good technical and financial monitoring and reporting of the project.
- State the bases of the risk management.

## 2. Project Quality Plan main concepts

To ensure and determine every aspect required in the project, the efforts will be focused in the control and verification of quality mainly based on the following requirements:

- Coherency: the information within the deliverable must be clear, reliable, real and easy to follow.
- Relevance: the used information must accomplish the requirements and the aims proposed as scope of the document, in order to provide useful and high-quality information.
- Precision: the information must answer the key topics, according to the specific research work and its targeted audience.
- Accordance to the design: the appearance of the deliverables must be uniform. For this aim, a deliverable template has been created.

Also, the PQP define a management structure that is designed to handle the following roles:

- Decision-making: handling contractual and confidentiality issues related with the consortium agreement or consortium structure.
- Technical and administrative operation: ensuring optimum communication and implementation of decisions taken by the decision-making bodies.
- Assessment: advising the consortium on critical topics and reviewing their activities.

In this section the organizational structure of the project is described. This will ensure that each partner and member of the consortium is aware of its responsibilities so as to ensure the quality of the project.

## 2.1 Management structure and procedures

HyTunnel-CS consortium consist of a core group of researchers, practitioners, regulators and SDOs from 11 countries, including 2 non-EU countries, from 13 key research laboratories and organisations with high level of competence in hydrogen safety, including confined spaces, and tunnel safety. The multidisciplinary character of the project and different level of experience of the partners in various aspects of the work plan requires clear operational management and decision-making to guarantee efficient and effective achievement of the proposed project goals and objectives.

The management structure of the project is organized as described in Figure 1.

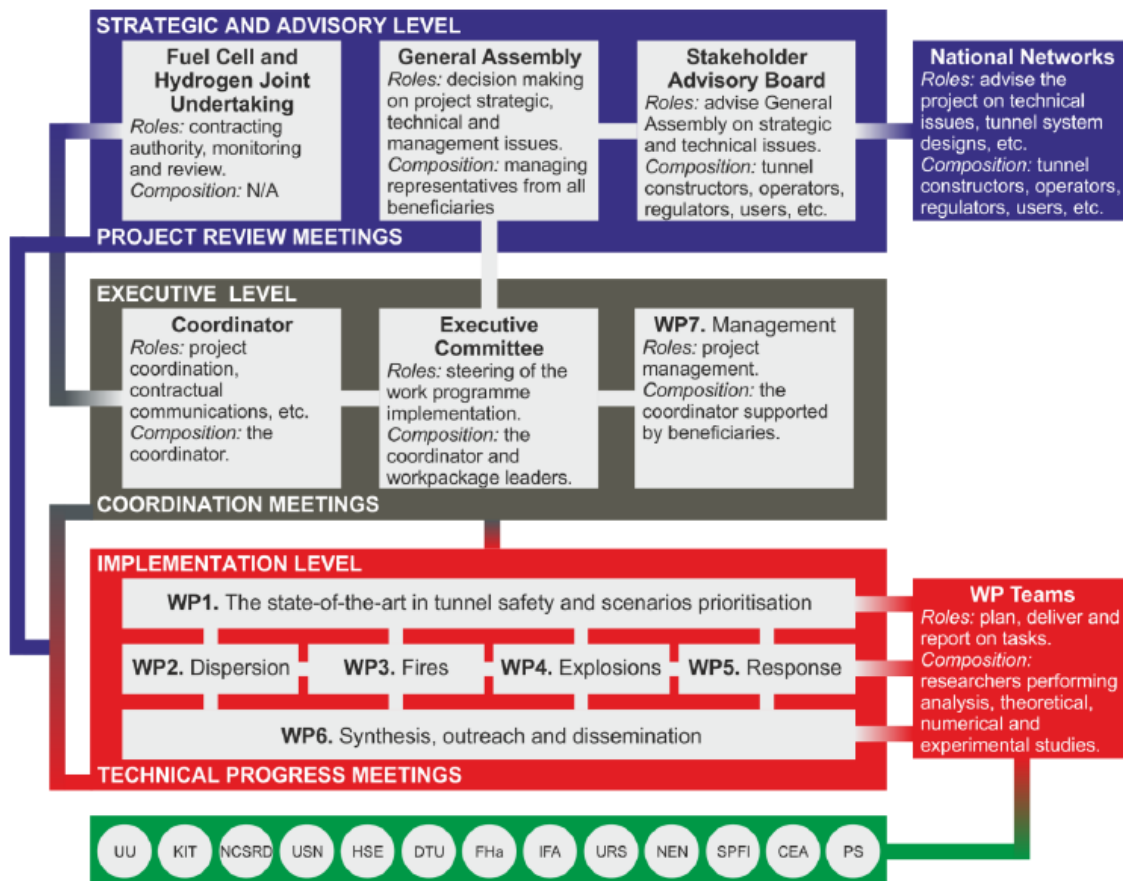


Figure 1. Management structure.

### 2.1.1 Project Coordinator

UU leads the management of the project. The coordinator will play the role of the interlocutor of HyTunnel-CS project and will be the contact point for the FCH-JU. The Project Coordinator will chair the General Assembly and the Executive Committee.

### 2.1.2 General Assembly

The General Assembly (GA) is the highest-level decision making body of the project. It is composed by one representative of each project partner. The Coordinator will act as a Chairperson on the meetings of the General Assembly. It executes the control and steering of the project.

All milestone decisions will be evaluated by The General Assembly, which will meet at least twice a year. The GA assumes overall responsibility for cooperation among the partners in relation to the project, for analysing and approving the results, for proper administration of the project and for implementation of the provisions contained in the Grant and Consortium Agreements. The persons appointed by each partner to be part on the General Assembly will be representative with capacity of decision inside its organization.

### 2.1.3 The Executive Committee

The Executive Committee, consisting of the Coordinator and WPs leaders executes the day-to-day management of the project, being the main execution body. To this purpose, the Executive Committee members have been selected based on their suitability to the work to be performed, but also on their previous experience in European collaborative projects. The Executive Committee, directed by the Coordinator has the overall responsibility of the project, and this body shall meet every three months through online or face-to-face meetings. When a General Assembly meeting is held, tEC issues will be treated and addressed as well. Due to the complexity of the technical solutions and the fact that they have to be properly integrated, the technical WP leaders are the ones composing this management body, in order to define from the very beginning the proper technical framework in which HyTunnel-CS has to be developed. These partners will be in charge of establishing the requirements, boundary conditions and ensure proper integration of the solutions in the final prototype.

### 2.1.4 Stakeholders Advisory Board

The consortium of 13 beneficiaries will be strengthened by the Stakeholder Advisory Board (SAB), that includes representatives of all four categories of stakeholders mentioned in Directive 2004/54/EC from participating countries and beyond. Members of SAB will be as well leading members of national tunnel operation and safety network.

The advisory role of SAB will be used to consult on the particularities of research programme formulation at the start and throughout the project, for the dissemination and outreach of the project outcomes during, at the end and beyond the project lifetime. SAB will be reinforced by leading representatives of international hydrogen safety community and hydrogen and fuel cell vehicles OEMs.

### 2.1.5 Work package leaders and Task leaders

WP leaders are responsible for the overall management and coordination at a WP level and the achievement of the defined results. Each WP leader will report periodically every 3 months to the Executive Committee.

Task leaders are responsible for the execution and overall coordination of the tasks assigned to them in the Implementation Plan. Task leaders will have a frequent dialogue with the WP leader and report periodically to them, aiming at doing so at least every month.

## 2.2 Main project bodies and responsibilities

The main project bodies and their responsibilities are described in Table 1.



Table 1. Principal bodies and their responsibilities.

<b>Project Coordinator</b>	Partner	UU
	Reporting to	Fuel Cells and Hydrogen Joint Undertaking
<b>Responsibilities</b>		
<ul style="list-style-type: none"> <li>▪ Efficient coordination and management of the project activities, including legal, contractual, financial and administrative issues.</li> <li>▪ Provision of smooth progress, timely reporting and successful completion of the project.</li> <li>▪ Act as a single contact point between FCH JU and the consortium.</li> <li>▪ Assistance to partners in organisation of project meetings, workshops and the dissemination conference.</li> <li>▪ Control timely achievement of milestones and deliverables, report deliverables to the Project Officer.</li> <li>▪ Maintenance of the Consortium Agreement.</li> <li>▪ Responsible for the collection of partner progress and financial reports, and preparation of related reports to the EC.</li> <li>▪ Oversees the awareness, dissemination and training plans and their deployment.</li> <li>▪ Oversees the exploitation plan and management of knowledge &amp; IPR issues.</li> </ul>		
<b>General Assembly</b>	Partners	One representative per partner
	Chaired by	UU
	Meetings	Biannual project meetings on months 1, 6, 12, 18, 24, 30, 36
<b>Responsibilities</b>		
<ul style="list-style-type: none"> <li>▪ Approval of the management structure and project direction. Decisions on the management structure modification, if required.</li> <li>▪ Ensure the proper implementation and application of: Grant Agreement and Consortium Agreement.</li> <li>▪ Decision making on strategic issues and conflict resolution, as well as on the evolution of the Consortium.</li> <li>▪ Decisions on changes of the Consortium and Grant agreements.</li> <li>▪ Monitor overall project progress against objectives and milestones.</li> </ul>		
<b>The Executive Committee</b>	Partners	Coordinator and WP leaders
	Chaired by	UU
	Meetings	Online meetings every 3 months / face to face meetings on months 1, 6, 12, 18, 24, 30, 36
<b>Responsibilities</b>		
<ul style="list-style-type: none"> <li>▪ Continuous management of the project, ensuring the implementation of the decisions made by the General Assembly.</li> <li>▪ First body for the monitoring of the project execution according to the implementation plan.</li> <li>▪ Approval of the overall project work plan, budget, S/T reports and financial reports.</li> <li>▪ Monitoring of the project progress and revision of the achievements.</li> <li>▪ Approval of the awareness, dissemination and training plans and its deployment.</li> <li>▪ Approval of the knowledge management and IPR protection strategy.</li> <li>▪ Approval of networking activities with other EU related projects.</li> </ul>		

<ul style="list-style-type: none"> <li>To guide and apply corrective measures if some deviation affecting final integration is detected.</li> </ul>		
<b>WP leaders</b>	Partners	WP leaders
	Reporting to	Coordinator and the Executive Committee
	Meetings	Reporting to SC every 3 months // Continuous bilateral meetings with the coordinator
<b>Responsibilities</b>		
<ul style="list-style-type: none"> <li>Progress management (assuring all tasks are executed in line with the work programme).</li> <li>Project quality management (ensure achievement of technical objectives, assure excellence in execution).</li> <li>Review, approve and submit the deliverables from the WP to the Coordinator, including technical and periodic reports.</li> <li>Project dissemination.</li> </ul>		

### 3. Quality control of the deliverables

A procedure to ensure quality of all deliverables, reports and dissemination material, including both the content and the layout, is established at the beginning of the project. This procedure is set to ensure the quality of the documents to be transmitted out of the Consortium both towards the European Commission (EC) and the external audience.

#### 3.1 Layout of the deliverables

A set of official templates will be defined concerning all deliverables, technical specifications, spreadsheets, etc. covering file name, font and expected content. All approved documents will be compliant with templates defined in the project.

The layout for all the documents has been developed and shared with all the partners at the same time as it was uploaded to the members' area of the project website. It will use the logo of the project and both the EC and Fuel Cell and Hydrogen Joint Undertaking (FCH JU) ones at the cover. The layout will also include as minimum content for the deliverables:

- Cover page: the cover page will include the complete name of the project, Grant Agreement number, number and title of the Work Package (WP) associated, number and title of the Deliverable (D), status (draft, final draft or final) and dissemination level and the project, EC and FCH JU logos.
- Change control in which the version, date of issue, author and a brief description of the changes will be included.
- Summary: short summary of the contents of the deliverable; if possible, one page is preferred.
- List of figures, tables and abbreviations.
- Introduction.
- Contents.
- Conclusions.
- References (if needed).

### 3.2 Production process of the deliverables

The most important part in relation to the deliverable is the core of the text that is going to be the valuable part of the deliverables. Accordingly, to ensure quality of the deliverable and the time to deliver it, the next process of production has been defined:

- At least two months prior to the report submission, the deliverable responsible will propose the rest of the contributing partners a list of contents covering the whole work and objectives.
- At least six weeks before the delivery date, all the partners contributing to one deliverable should send to the Deliverable Responsible (DR) their contribution. It is the responsible of the author to ask for these contributions and ask for further modifications if needed.

### 3.3 Quality indicators

To ensure a high quality of the deliverables produced and to help the internal reviewers (see section 3.4) a set of indicators has been defined. These indicators comply with the quality criteria defined in section 2. The indicators will allow to determine quantitatively if the deliverable can be submitted to the EC, external audience, etc., or if it needs additional improvements and in which field. The defined indicators are summarized in Table 2.

The indicators will be evaluated from 1 -worst score-, to 5 -best score-. (0.5 intervals are accepted). All the indicators should be above or equal to 3 for the deliverable to be approved. The final marks of the deliverable will be as follows:

- Fully accepted (all the indicators are  $\geq 3$ ).
- Minor changes needed ( $\leq 2$  indicators with mark under 3).
- Major changes needed ( $\leq 4$  indicators with mark under 3).
- Rejected ( $> 4$  indicators with mark under 3).

Table 2. Indicators for ensuring the quality of the deliverables.

Related to	Quality criteria	Score - Indicator
Contents	Relevance	1 - Missing content / bad level of detail 5 - Thorough contents / good level of detail
	Relevance	1 - Redundancy / irrelevant information 5 - Relevant contents and information
	Relevance	1 - Excess of information / excessive detail 5 - Adequate and satisfactory detail
	Coherency	1 - Error in content 5 - Correctness of the contents
	Precision	1 - Lack of references 5 - Accurate referencing
Language	Precision	1 - Spelling and grammar errors 5 - Precise spelling and grammar
	Coherency	1 - Bad understanding 5 - Clear exposition
Layout	Accordance to the design	1 - Missing template design features 5 - Compliance with the template's structure
	Accordance to the design	1 - Missing design features (logo, font, etc.) 5 - Compliance with design (logo, font, etc.)

### 3.4 Reviewing and submission process

A list of internal reviewers was arranged in the initial stage of the project. It identifies the partners responsible for evaluating the deliverables by the indicators' method. To complete the evaluation a template is provided in Annex 1.

The internal reviewer is involved in the task and is a partner with standing expertise in the subject treated by the deliverable. Two reviewing partners are advised for each deliverable. Exception is given by deliverables regarding SAB minutes, which are reviewed by a member of the coordination team, and deliverables on project meetings minutes, which shall be reviewed by all partners following Consortium Agreement.

The reviewing process applies to all the deliverables of the project but also to other relevant documents. As described in Figure 2, the final draft of the deliverable will be shared by the Deliverable Responsible (DR) to all the partners taking part in the deliverable and to the IQMT to contribute with their comments.

Mainly, the partners involved will take care of the technical part whereas the IQMT will take care of the following issues:

- Evaluate documents to be transmitted to the EC and to external audience by following the indicators described in section 3.3.
- Examination of technical contents in order to ensure the scientific quality and the achievements of the research objectives of the project.
- Language proof reading.
- Layout quality and suitability to the standard.

The procedure to be set up consists of submitting all reports and relevant project documents to the IQMT prior to the submission to the EC or the public domain. The IQMT will take time to evaluate the documents and then, if consider suitable, communicate to the Coordinator (CO) and to the partners involved.

The complete process and timing are shown in Figure 2.

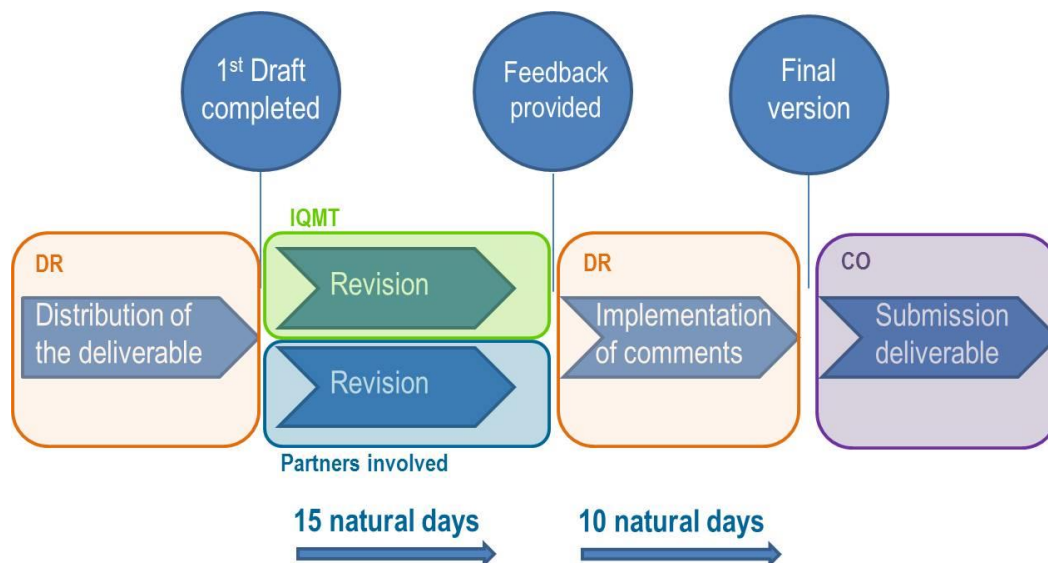


Figure 2. Scheme of the reviewing process for deliverables or project documents.

## 4. Monitoring and reporting

In order to ensure that all work packages are performing to budget and are complying with the planned technical progress, thus, the project is following a satisfactory development, several tasks have been defined to monitor and report the advancements both in the technical and financial parts.

### 4.1 Monitoring of the project

Different internal indicators of progress have been defined for controlling project's impacts and outputs, in order to help identifying the problems that can hamper the achievement of quality project's objectives. They are listed below:

- Delays on deliverable (days). Check every 7 days after the deadline is passed.
- Budget control and expenditure (%). Review at mid-term and end of project.
- Human resources invested (MM). Review mid-term and end of project.
- Number of meetings (n°). Accounted for after every meeting.
- Number of dissemination actions (n°). Accounted for after every action.
- Number of stakeholders involved (n°). Review every month.
- Number of patents (n°). Accounted for after every new patent.

### 4.2 Technical and financial reporting

WP leaders will be responsible for preparing individual reports covering WP progress, deliverables, milestones and compliance with the plan. The Coordinator will have the final responsibility for drafting the report, summarize the project status looking for inconsistencies, further elaborating reports and taking care of the final distribution. The progress of the tasks will also be reported every six months in terms of percentage of completion, resources spent and expected.

The project will be divided in two reporting periods (from 1-18 and 19-36) and the coordinator will submit full progress reports to the EC according to the guidelines defined by FCH 2 JU (Month 18 and Month 36). Besides, a Midterm Review Meeting will take place between coordinator, WP leaders and the FCH 2 JU (Project Officer and reviewers) in order to check the progress of the project (technical and economical).

## 5. Quality Form

To provide quality in the form issue, a set of documentation has been developed to ensure this quality in the visual part not only of the documents but also presentations, articles, etc.

The following are the formats defined in the project for use in the partners communication, reporting and deliverable production and which are also uploaded to the internal intranet of the project:

- Project logo.
- Press kit (newsletters, project leaflet, etc.).
- Agenda template.
- Deliverable or report template.

- Minutes of meeting template.
- Power point presentation template.

Additionally, for any dissemination or communication activity Articles 29.4 and 38 of the Grant Agreement will be applied.

## 6. Risk Management

Project Risk Management includes the processes of conducting risk management planning, identification, analysis, response planning, and controlling risk. The objectives of the project risk management are to increase the likelihood and impact of positive events, and decrease the likelihood and impact of negative events in the project. This section follows the Project Management Institute (PMI) Standards<sup>1</sup>, adapted to the characteristics of HyTunnel-CS.

### 6.1 Concepts

#### 6.1.1 Plan Risk Management

It defines the approaches, tools, and data sources that will be used to perform risk management of the project. The project is very well defined in terms of scope, schedule and cost. This structure will be used as the reference to estimate the impacts of any risk. It has to be highlighted that the WPs have been structured in such a way to have easy tracking of milestones and objectives consecution, which also contributes to facilitate the risk management linked to those WPs and their interdependencies.

Project Coordinator and WP leaders will be responsible for the follow-up of the plan, as well as for proposing corrective measures, with a dedicated section in the Executive Committee meetings. At quarterly intervals, each task and WP leader will review the status of each task's achievement for risks identification.

The risk management processes will be performed every 3 months.

The categories of risk (which provides means for grouping potential causes of risk) to use in HyTunnel-CS are technical, impact/replication and coordination.

The quality and credibility of the risk analysis require that different levels of risk probability and impact are defined specifically to the project context. The definitions of negative impacts to be used in evaluating risk impacts are given in Table 3.

#### 6.1.2 Identification of risks

The identification of risks is the process of determining which risks may affect the project and documenting their attributes. This will be done by the Project Coordinator and WP leaders, using information gathering tools like brainstorming, interviewing, root cause analysis, assumptions analysis, and expert judgment. The output of this process will be a document where the results of risk analysis and risk response planning are registered.

---

<sup>1</sup> The Standard for Risk Management in Portfolios, Programs, and Projects (2019).

Table 3. Definition of impact scales.

Impact on Project Objective	Very low (0,05)	Low (0,1)	Moderate (0,2)	High (0,4)	Very high (0,8)
Cost	Insignificant cost increase	< 10 % cost increase	10 - 20 % cost increase	20 - 40 % cost increase	> 40 % cost increase
Time	Insignificant time increase	< 5 % time increase	5 - 10 % time increase	10 -20 % time increase	> 20 % time increase
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor approval	Quality reduction unacceptable to sponsor	Project end item is effectively useless

### 6.1.3 Perform qualitative risk analysis

The qualitative risk analysis enables project managers to reduce the level of uncertainty and to focus on high-priority risks. The main tool to use is the probability and impact matrix, which is a grid for mapping the probability of each risk occurrence and its impact on project objectives if that risk occurs. Risks are prioritized according to their potential implications for having an effect on the project's objectives. The specific combinations of probability and impact lead to a risk being rated as 'high', 'moderate' or 'low' importance.

The project team will determine which combinations of probability and impact result in a classification of unacceptable, considerable, tolerable, and acceptable.

### 6.1.4 Risk responses plan

The risk responses plan addresses the risks by their priority, inserting resources and activities into the Budget, Schedule and Project management plan as needed. The usual strategies that can be followed are:

- *Avoid*: the project team acts to eliminate the threat or protect the project from its impact.
- *Mitigate*: the project team acts to reduce the probability of occurrence or impact of a risk.
- *Accept*: project team acknowledges the risk and does not take any action unless risk occurs.

### 6.1.5 Control of risks

The control of risks is the process of implementing risk response plans, tracking identified risks, identifying new risks, and evaluating risk process effectiveness throughout the project. This will be done by the project team in periodic status meetings. As result of these activities, changes can be requested to some parts of the projects (corrective or preventive actions).



## 6.2 First assessment

Table 4 shows the risks identified during the proposal phase ordered according to their likelihood of occurrence and their consequences in case they happen (last column). The first column refers to the order of appearance in the Description of Actions (DoA).

Table 4. Evaluation of the risks.

ID	Risk description	WP Number	Probability		Project Objective	Impact		P x I
			Kind	%		Kind	Value	
4	Delay in experimental results	WP2, WP3, WP4	Moderate	45%	TIME	10 -20 % time increase	0,4	0,18
13	Conflict inside the consortium (Medium)	WP7	Moderate	30%	TIME	Moderate 5 - 10 % time increase	0,2	0,06
17	Delays in deliverables	All	Moderate	30%	TIME	Moderate - 5 - 10 % time increase Major areas of scope	0,2	0,06
2	Unexpected loss of a key staff	All	Moderate	20%	QUALITY	Quality reduction requires sponsor approval	0,2	0,04
5	Delay of experimental data causing "domino effect" in causing "domino effect" in provision of further research results	WP2, WP3, WP4	Unlikely	10%	TIME	10 -20 % time increase	0,4	0,04
7	Implementation of main research outcomes into "Recommendations on intervention strategies and tactics for hydrogen accidents" is difficult due to its complexity	WP5	Moderate	15%	QUALITY	Quality reduction requires sponsor approval	0,2	0,03
11	Insufficient contribution to the project from National Networks and/or SAB due to insufficient motivation	WP6	Moderate	30%	SCOPE	Low - Minor areas of scope affected	0,1	0,03
15	Partner systematically does not fulfil its commitment	WP7	Unlikely	7%	TIME	High - 10 - 20 % time increase	0,4	0,026
8	Scientific results cannot inform Recommendations for RCS due to incorrect research focus and misunderstanding of RCS needs	WP5	Unlikely	10%	QUALITY	Moderate - Quality reduction requires sponsor approval	0,2	0,02
9	Lack of project visibility and promotion in the main stakeholder groups, i.e. the Administrative Authorities, Tunnel Managers, Safety Officers, Emergency Services, etc.	WP6	Unlikely	10%	SCOPE	Major areas of scope affected	0,2	0,02
10	The quality of outreach and dissemination campaign implementation is below expectations	WP6	Unlikely	10%	QUALITY	Quality reduction requires sponsor approval	0,2	0,02
12	Loss of a partner from the project (Low)	WP7	Unlikely	5%	QUALITY	Quality reduction unacceptable to sponsor	0,4	0,02
16	The quality of reporting and dissemination of the results may not be according to the requirements or expectations of FCH JU	WP7	Unlikely	10%	QUALITY	Moderate - 5 - 10 % time increase Major areas of scope affected	0,2	0,02
6	Experimental facility damage or failure	WP2, WP3, WP4	Rare	4%	COST / TIME	20 - 40 % cost increase 10 - 20 % time increase	0,4	0,016
1	Selected accident scenarios in tunnels and confined spaces miss important scenarios	WP1	Unlikely	7%	SCOPE	Major areas of scope affected	0,2	0,014
3	Project budget proves to be insufficient for full research programme	All	Unlikely	5%	COST	10 - 20 % cost increase	0,2	0,01
18	Confidential information disclosed	All	Rare	4%	QUALITY	Low - Only very demanding applications are affected	0,1	0,004
14	Problems with the IPR management	WP7	Rare	2%	QUALITY	Low - Only very demanding applications are affected	0,1	0,002

These risks were evaluated during the proposal phase and a contingency/mitigation plan was identified (see Grant Agreement). The probability/impact matrix obtained is shown in Table 5.

Table 5. Probability/impact matrix of the risks of the project.

		Consequences				
		Very low	Low	Moderate	High	Very high
Likelihood	Certain >90%					
	Likely 50%-90%					
	Moderate 15%-50%		3	16		
	Unlikely 6%-15%		1, 2, 4, 10, 11	5, 8	7, 9, 17	
	Rare ≤ 5%		14, 18	6, 12, 13	15	

## 7. Conclusions

This report collects all the information related to the Quality Management Plan of the HyTunnel-CS project. With the PQP, the project guarantees that all the developments and processes of the project are going to meet the established quality requirements.

The PQP is based on four pillars that cover all the aspects of the project. The main bodies of the project have been previously defined including the description of their roles and responsibilities.

Afterwards, the internal methodology for reviewing the deliverables and relevant documentation of the project that will be shown to the external audience has been established. The defined indicators, such as missing content or error in content, will be employed for a final calcification, for approving or not the documents, and for ensuring a good technical quality, content and form.

All the risks of the project will be evaluated periodically internally in the consortium. This procedure will allow firstly to avoid the risks, in a second phase to mitigate or accept them in case the risk does not represent a real threat to the project.

The monitoring of the project and the reporting will ensure that HyTunnel-CS is being developed under quality conditions, meeting with the timing and the technical milestones.

## 8. References

1. The Standard for Risk Management in Portfolios, Programs, and Projects (2019).

## Annex 1

### Quality indicators revision for deliverables

Deliverable title: \_\_\_\_\_ Date: \_\_\_\_\_

Work Package: \_\_\_\_\_

Deliverable responsible: \_\_\_\_\_ Reviewer partner: \_\_\_\_\_

Indicators: (1 is the worst score – 5 is the best score)

Related to	Quality criteria	Score - Indicator	Mark
Contents	Relevance	1 - Missing content / bad level of detail 5 - Thorough contents / good level of detail	
	Relevance	1 - Redundancy / irrelevant information 5 - Relevant contents and information	
	Relevance	1 - Excess of information / excessive detail 5 - Adequate and satisfactory detail	
	Coherency	1 - Error in content 5 - Correctness of the contents	
	Precision	1 - Missing content / bad level of detail 5 - Thorough contents / good level of detail	
	Language	Precision	1 - Spelling and grammar errors 5 - Precise spelling and grammar
Coherency		1 - Bad understanding 5 - Clear exposition	
Layout	Accordance to the design	1 - Missing template design features 5 - Compliance with the template's structure	
	Accordance to the design	1 - Missing design features (logo, font, etc.) 5 - Compliance with design (logo, font, etc.)	

**Final score of the deliverable** (FA: Fully Accepted (all the indicators are  $\geq 3$ ), MiC: Minor changes needed ( $\leq 2$  indicators with mark under 3), MaC: Major changes needed ( $\leq 4$  indicators with mark under 3), R: Rejected)  $> 4$  indicators with mark under 3):

Comments: