



EUROPEAN HYDROGEN SAFETY PANEL

2024-2030



Safety Matters:

Lessons and Guidance for Clean Hydrogen JU Projects

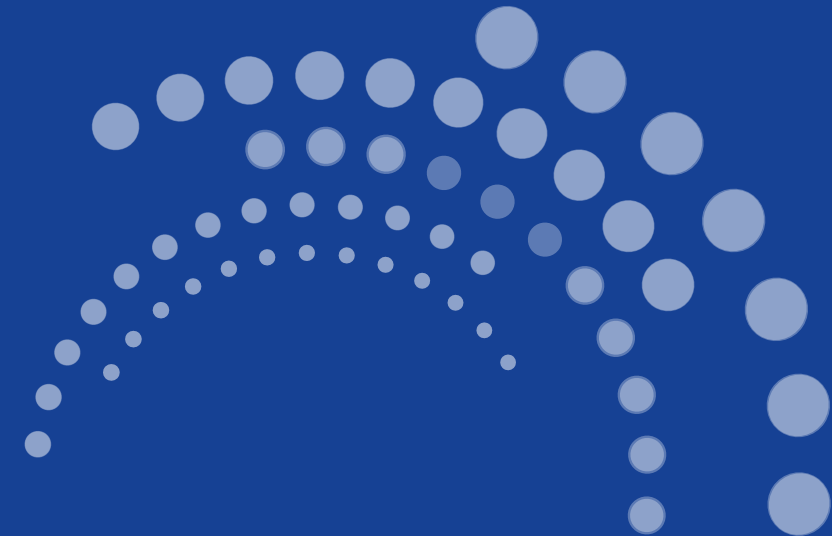


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the European Union

Welcome

Safety Matters:

Lessons and Guidance for Clean Hydrogen JU Projects



Involved organisations



Contracting authority



Coordination and Administration



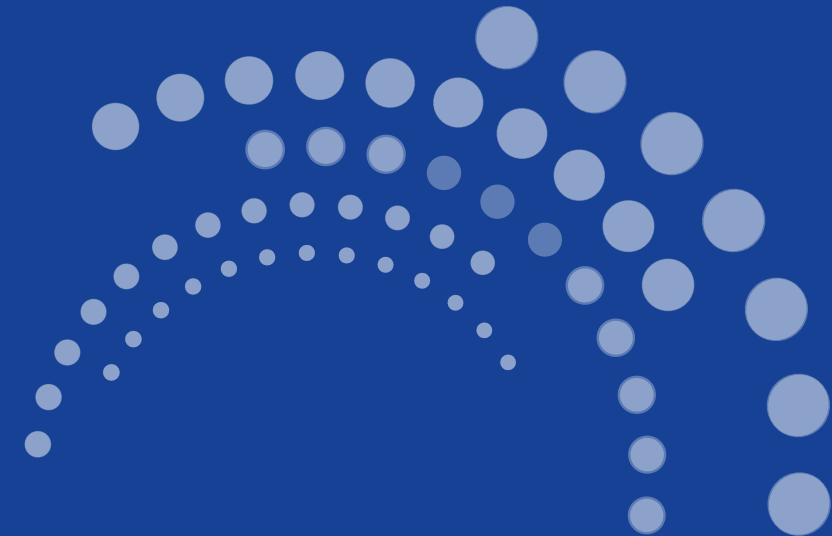
**Independent panel of 20 experts
providing guidance to the
Clean Hydrogen Partnership**



**Collaboration with EHSP for
safety matters**

House rules

- Please note that you will not be able to use your camera and microphone while attending this webinar.
- Proceed by posing your questions using the meeting chat, they will be addressed during the Q&A.



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01

Opening Remarks (5 mins)

02

Collaboration between JRC and JU (10 mins)

03

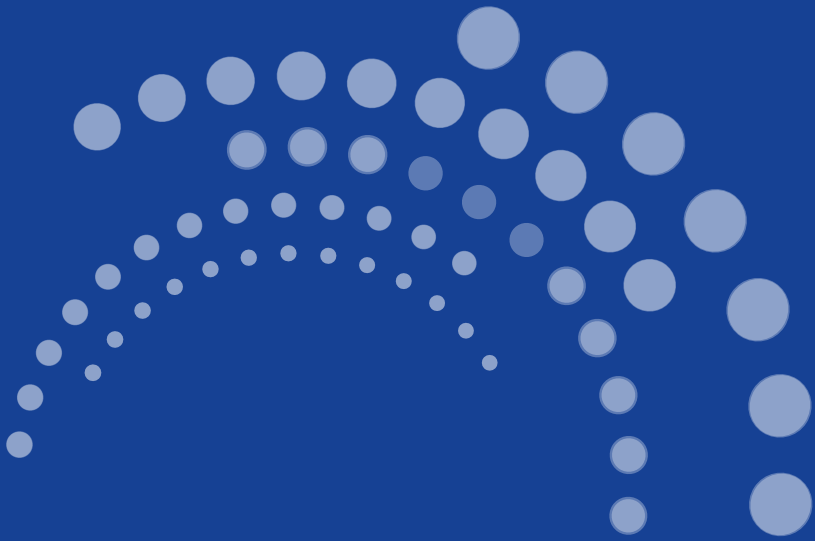
EHSP – Overview of its activities (10 mins)

04

Safety plan guidance and supporting documents
(25 mins)

05

Q&A (10 mins)



01

Opening remarks from the
Clean Hydrogen Partnership



NOW SPEAKING

Mirela Atanasiu

Head of Unit – Operations
and Communication

Clean Hydrogen Partnership

Opening remarks from the Clean Hydrogen Partnership

02

Setting the Scence -
Collaboration between JRC
and JU



NOW SPEAKING

Pietro Moretto

Senior Scientific Adviser

JRC Joint Research Center

Collaboration between JRC and JU

NOW SPEAKING

Thomas Jordan

Chair

European Hydrogen Safety
Panel

03

European Hydrogen Safety
Panel (EHSP) – Overview of
its activities



The European Hydrogen Safety Panel (EHSP)

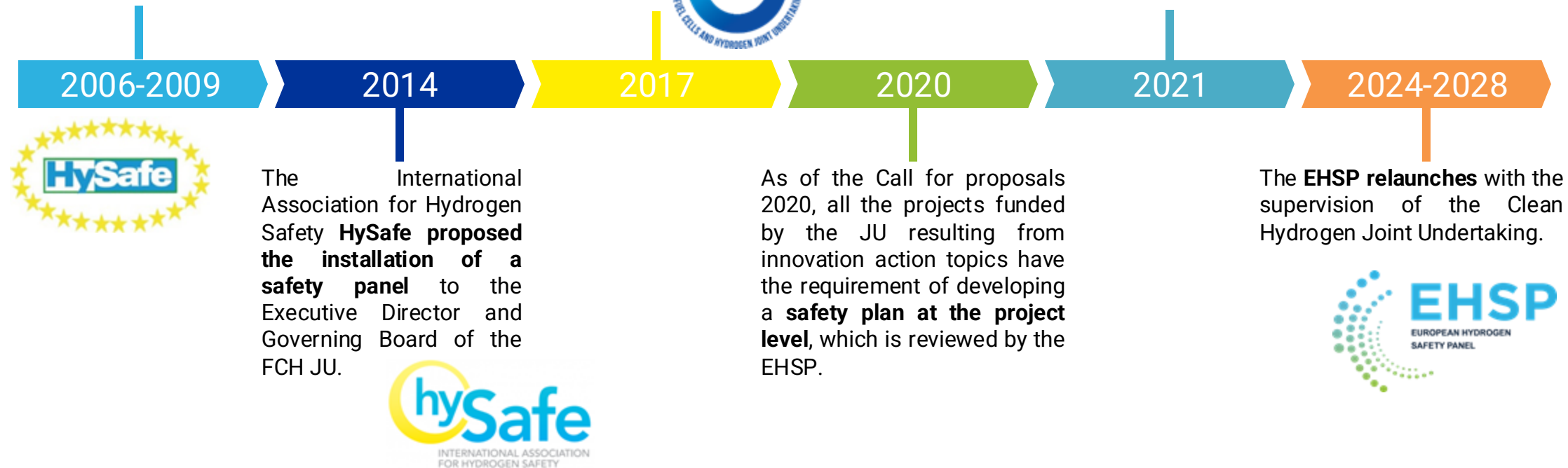
Background and history



NoE HySafe was suggesting an activity for **sharing lessons learned** and hydrogen safety **experience across project boundaries** and to maintain this expertise eventually even beyond program terms.

After several discussions about formal aspects, terms of reference, vision, mission, mandates, etc. the European Hydrogen Safety Panel was **launched** by the FCH 2 JU

The EU will support the Clean Hydrogen JU with €1 billion euro for the period 2021-2027, complemented by at least an equivalent amount of private investment (from the private members of the partnership. Moreover, in the REPowerEU communication, EU intends to additionally support the JU with €200 million for further developing the Hydrogen Valleys in Europe.



European Hydrogen Safety Panel (EHSP)

Mission

European hydrogen safety panel



European Hydrogen Safety Panel (EHSP)

Key objectives

Support Clean Hydrogen JU Projects:

Through expert reviews, guidance, and risk mitigation strategies.

Enhance Safety Standards & Regulations:

Contribute to EU policies and align with evolving regulatory frameworks.

OUR KEY OBJECTIVES

Enable Safe Market Deployment of Hydrogen Technologies –

Address risks in hydrogen production, storage, transport, and applications.

Engage Stakeholders & Strengthen Safety Culture:

Conduct training, workshops, and educational initiatives for project developers, first responders, and industry leaders.

Develop Data-Driven Risk Management:

Expand and analyze the European Hydrogen Incident and Accident Database (HIAD 3.0).

Current EHSP Members

Composition of the pool of experts by early 2026



Thomas Jordan



Daniele Melideo



Elena Vyazmina



Jennifer Wen



Jan Strybol



Ernst-Arndt Reinecke



Etienne Studer



Pratap Sathiah



Vladimir Molkov



Marta Maroño



Ulrich Schmidtchen



Georg Wilfried Mair

New EHSP Members

Extended panel since mid 2026



Agata Godula-Jopek



Maxim Bragin



Michele Capobianco



Benno Weinberger



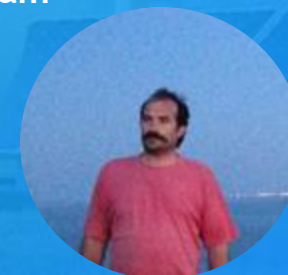
Nirmal Gnanapragasam



Zhe (Rita) Liang



Dmytro Vynohradov



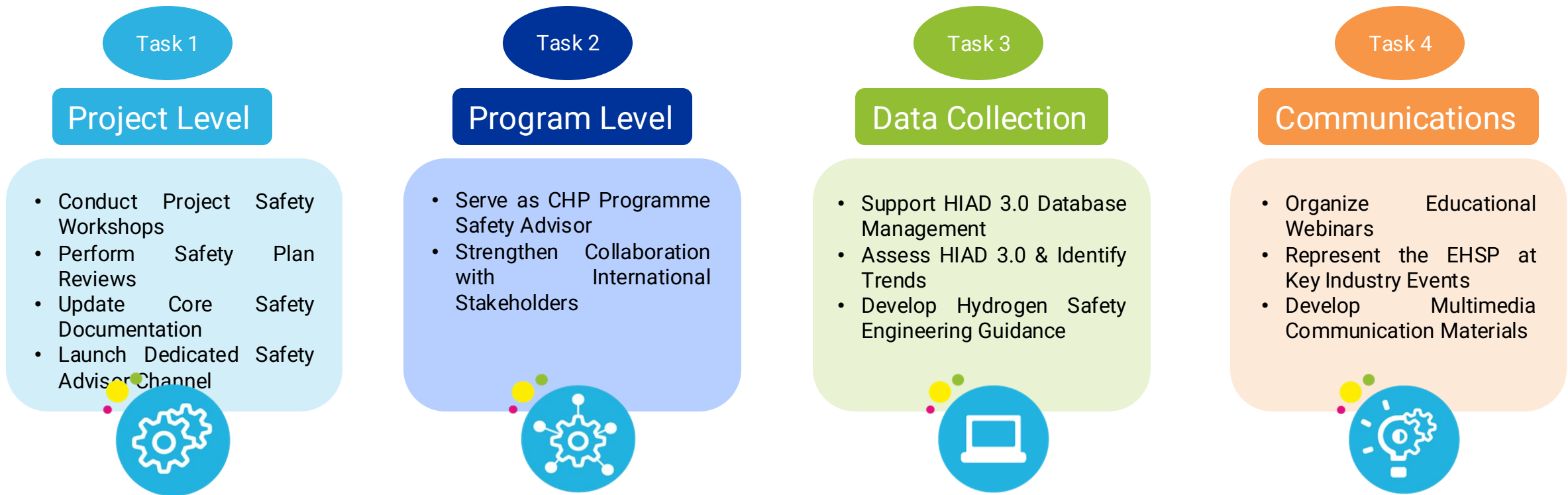
Eusebiu Ilarian Ionete

Tasks

Overview of the activities under each task

The European Hydrogen Safety Panel (EHSP) provides crucial support to the Clean Hydrogen Joint Undertaking (JU) at both the **programme** and **project** levels.

This support is based on 4 pillars reflected in the activity structure with corresponding 4 Tasks



Chair of the EHSP & Task Leaders



CHAIR

Thomas Jordan
EHSP Coordination



Task 1 LEADER

Daniele Melideo
Support at Project Level



Task 2 LEADER

Elena Vyazmina
Support at Programme
Level



Task 3 LEADER

Jennifer Wen
Data Collection and
Assessment



Task 4 LEADER

Jan Strybol
Communication

What has been done?

Outcomes of Task 1 – Project Level

Safety Planning and Management

Guidance Document – Updated Version Sept 2026

Available at the EHSP website



8 SEP 2026

Guidance document for the Safety Planning and Management in EU hydrogen and fuel cell projects (2026 update)

English (1 MB - PDF)

[Preview](#)

[Download](#)



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"To bring the benefits of hydrogen to society, hydrogen technologies must be safely developed and used across a variety of applications and sectors."

Outcomes of Task 1 – Project Level

Available at the EHSP website

No.	Topic	Explanation	Input	Responsibility, if not "safety officer"
A.	Operations Management			
1a.	Norms and limit values of critical process parameters	Provide a list of controlled or key-to-safety process parameters like filling status of a liquid, pressure, pH or temperature and their corresponding range and trend, when parameter violation of 100% fails is desirable for shut out and shut down, operation instructions (operator actions) of 75% and possibly affected to 50%		
1b.	Procedures for operation			
1c.	Emergency plans, evacuation and rescue plans	Provide (and attach them to it) and evaluate the time		
1d.	Personal education and training	Describe in list all measures where workers perform operations, that emergency... (are participating in exercise and make clear this is documented)		
1e.	Monitoring and Periodic Reviews	Describe the parameters and periodicity of checking whether everything allows in place and lower the 10% critical points		
1f.	Reporting of safety events and losses reported in HELLER and RAO	Provide plans for dealing safety critical reduction		

What has been done?

Outcomes of Task 3 – Data Collection and Assessment

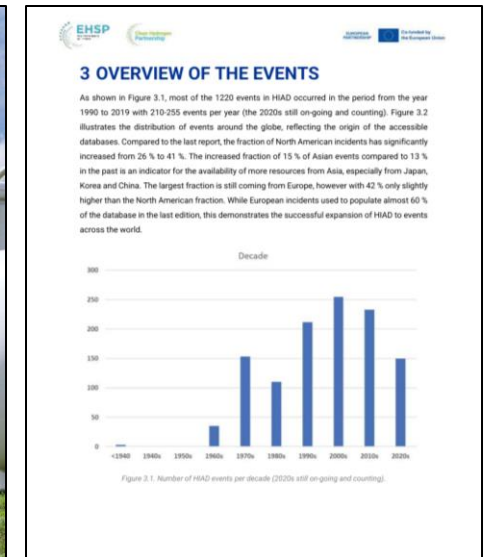
Statistics, lessons learnt and recommendations from the analysis of the Hydrogen Incidents and Accidents Database (HIAD 2.4)

"Hydrogen systems can be as safe as systems based on conventional energy carriers, provided the specific properties of hydrogen and the hydrogen system are properly addressed."

Available at the EHSP website

HIAD 2.4 (developed by JRC) is a database collecting systematic data on hydrogen-related incidents, accidents or near misses publicly available from JRC-PTT-H2SAFETY@ec.europa.eu

- Assessed 898 events (out of 1,220 total events)
- Statistics are generated on causes, operational modes, severity, and violated safety principles
- Derived lessons learnt and recommendations published across three reports and scientific publications
- Used for risk assessment, extracting safety principles, and updating the European Emergency Response Guide for first responders and safety personnel
- HIAD dataset incorporates historical and recent international datasets (including NASA, US DOT PHMSA, and KHK) across Europe, North America, and Asia



What has been done?

Available at the EHSP website

Outcomes of Task 3 – Data Collection and Assessment



8 SEP 2026

EHSP Guidance document on Hydrogen Safety Engineering (2026)

English (2 MB - PDF)

Preview

Download



8 SEP 2026

Hydrogen Safety. Regulations, codes, and standards (RCS)

English (982 KB - PDF)

Preview

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Safety Engineering

New Guidance document and creation of a new RCS

"Hydrogen systems can be as safe as systems based on conventional energy carriers, provided the specific properties of hydrogen and the hydrogen system are properly addressed."





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What has been done?

Outcomes of Task 4 – Communications

Communication Strategy Updated document – 2025



7 Key Messages

“The EHSP provides impartial expertise and objective information to relevant stakeholders, including the general public”

“The EHSP supports stakeholders on hydrogen safety issues, including advice, reviews, and accident investigations”

“The EHSP supports and promotes the development of strong safety cultures in organisations engaged in hydrogen technologies”

“Hydrogen will play an essential role in energy systems as a clean and sustainable energy carrier”

“To bring the benefits of hydrogen to society, hydrogen technologies must be safely developed and used across applications and sectors”

“Hydrogen systems can be as safe as conventional energy carriers, provided their specific properties are properly addressed”

“Hydrogen safety is an active area of research that supports implementation and operation of hydrogen systems”

NOW SPEAKING

Daniele Melideo

Task 1 Leader

European Hydrogen Safety
Panel

04

Task 1: Safety plan
guidance and supporting
documents



Task 1. Support at Project Level

Improving hydrogen safety in Clean Hydrogen JU projects



Assess & evaluate

- ☐ Safety Plan assessments
- ☐ Technical risk evaluations
- ✓ Identification of gaps, weaknesses and improvement actions



Guide & standardise

- ☐ Templates, checklists and guidance documents
- ☐ Recommendations based on recurring review findings
- ☐ Promotion of consistent safety planning practices



Train & support

- ☐ Tailored guidance for project coordinators
- ☐ Interaction with project safety teams
- ☐ Support in addressing review comments and strengthening implementation

Task 1 does not replace the project safety responsibilities: it provides independent expert review to strengthen them

Safety Plan as living document

Prepared early, implemented throughout the project, and updated whenever evidence, design, or operations evolve

The Safety Plan is not a one-off deliverable: it is the backbone of project safety management

- **1 PREPARATION**
Define the safety organisation, responsibilities, applicable requirements, hazards, risk assessment approach and initial safety measures from the beginning of the project
- **2 IMPLEMENTATION**
Translate the Safety Plan into concrete actions, procedures, technical measures, responsibilities and project-level safety practices
- **3 MONITORING**
Track safety performance, emerging risks, design changes, testing activities, incidents, near misses and the implementation of mitigation measures
- **4 REPORTING**
Document safety-related decisions, findings, deviations, lessons learned, corrective actions and progress in closing identified gaps
- **5 REGULAR UPDATE**
Revise the Safety Plan whenever significant technical, organizational or operational changes occur, and at key project milestones

Practical implication

Safety evidence should evolve together with the project: from concept and design to testing, operation and final reporting

EHSP Safety Plan Review Process

A structured, independent and multi-step review

European hydrogen safety panel



JOINT REVIEW



The Lead Reviewer and Co-Reviewer independently assess the Safety Plan, identify gaps and formulate technical recommendations

REPORT CONSOLIDATION



The Lead Reviewer consolidates all findings into a single draft review report

INTER-REVIEWER AGREEMENT



The Lead Reviewer and Co-Reviewer discuss the draft, resolve any differences and agree on the final findings and recommendations

COMPLETENESS CHECK



A third independent expert verifies the coherence, completeness and overall robustness of the review.

QUALITY CHECK AND SUBMISSION

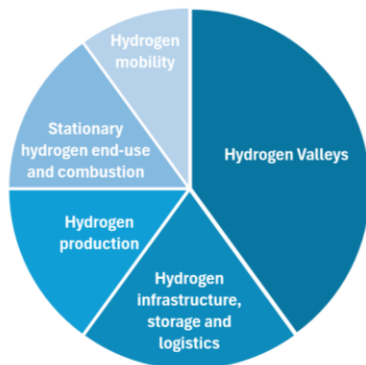


The Technical Secretariat performs the final quality check and submits the report to Clean Hydrogen JU for validation

Three levels of assurance: technical review, independent verification and final quality control

Project types covered by reviews

Aggregated Outcomes from Recent Safety Plan Reviews



What the reviews tell us

The recent EHSP reviews covered a broad range of hydrogen technologies, applications and project maturity levels

To preserve confidentiality, results are presented only in aggregated and anonymised form

20 Projects | Review period October 2025 – December 2025

Reviews focused on three main dimensions

Technology coverage

Hydrogen production, storage, transport, distribution and end-use applications

Project maturity

Projects ranging from early design and engineering activities to testing, demonstration and operation

Safety Plan quality

Assessment of completeness, consistency, traceability and alignment with the actual project activities

What was extracted from the reviews

- ✓ Recurring strengths across project Safety Plans
- ✓ Common gaps and areas requiring clarification
- ✓ Recurrent weaknesses in risk assessment and safety management
- ✓ Good practices that could be transferred to other projects
- ✓ Priorities for future guidance and reviewer support

The objective is not to rank individual projects, but to identify recurring patterns and improve safety planning across the Clean Hydrogen JU portfolio

What the reviews found: recurring strengths

A broad review of hydrogen Safety Plans across different project types and maturity levels

A solid starting point

- Most plans state a clear commitment to hydrogen safety
- Many use a clear structure and refer to relevant EHSP guidance
- Safety methods, standards and organizational principles are often introduced

Existing capability to build on

- Several projects show strong in-house safety expertise.
- An established safety culture is visible in a number of plans.
- These strengths provide a basis for more detailed, project-specific planning



The reviews recognise good foundations that projects can develop further

What the reviews found: gaps in completeness

The main challenge is turning a sound framework into evidence of project-level implementation

1

Plans remain too general

Some stay at draft or conceptual level, with limited site and asset detail

2

Intent is not implementation evidence

Planned actions are described, but proof of completed actions is often limited

3

Multi-site projects need asset-level plans

An overarching plan may not cover each facility, location or use case in enough detail

4

Technical references need to be available

Supporting documents are often missing or cited indirectly



Complete plan links each project activity to the safety evidence that supports it

Recommendations: make plans specific and accountable

Future updates should describe who does what, where and during which project phase



Describe the project in enough detail

1

- List each asset, site, use case and project phase.
- State hydrogen inventories, pressure, temperature, flow and operating limits
- Explain interfaces with neighbouring facilities, public areas and other project components

Assign clear safety responsibilities

2

- Name the safety team, managers and project focal points.
- Set responsibilities for partners, suppliers, operators and subcontractors
- Clarify who reviews, approves and verifies safety activities

Specificity makes the Safety Plan usable by the people responsible for design and operation

Recommendations: strengthen risk assessment

Methods and requirements should be selected, justified and connected to project decisions



Use a transparent risk method

3

- Define the applicable HAZID, HAZOP, QRA, LOPA or other method
- Select credible incident scenarios and explain why they matter
- State risk acceptance criteria and link hazards to prevention and mitigation

Clarify applicable RCS

4

- Identify European, national and site-specific rules, codes and standards
- Explain which requirements are legally binding

Assign compliance ownership

5

- Name who demonstrates compliance and maintains evidence
- Make reviews and approval points explicit

A risk assessment is useful when its results shape safeguards, procedures and project decisions

Recommendations: plan updates and reporting

A Safety Plan should follow the project as its design, evidence and operating context change



Set review points

6

- Define when the Safety Plan is reviewed and who takes part
- Schedule updates around design changes, commissioning and major milestones
- Revisit the plan when new hazards or operating conditions emerge

Track evidence and open actions

7

- Report findings, incidents, near misses and lessons learned
- Record corrective actions, owners and due dates
- Show progress and evidence for closing identified gaps

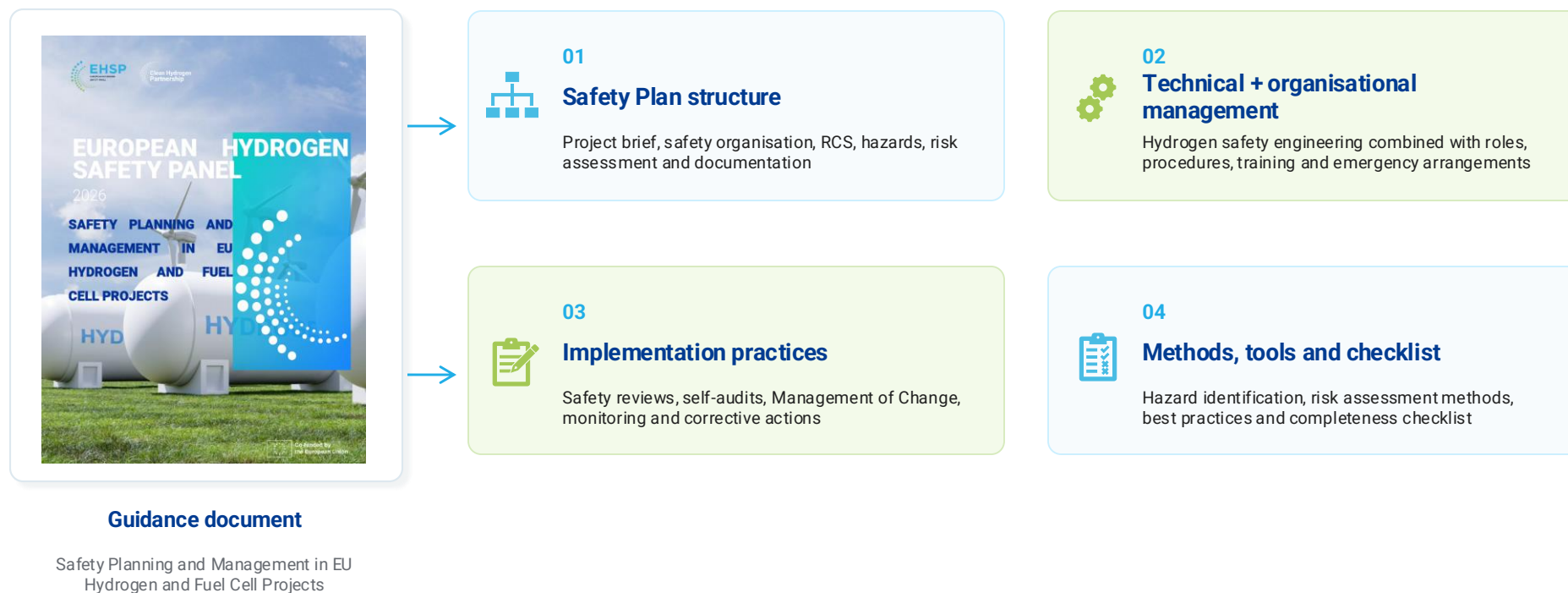
Each update should make progress and remaining gaps visible

Safety Planning and Management Guidance Document

A flexible framework to prepare, implement, monitor and report project safety management

Purpose

Assist projects in identifying hazards and risks, defining prevention and mitigation measures, and reporting safety findings and lessons learnt



Key principle: guidance is not a prescriptive checklist; it must be adapted to the project hazards, risk level and complexity

Key Messages for Clean Hydrogen Partnership Projects

What the EHSP expects from an effective safety plan

Start early

Prepare the first plan before key design and implementation decisions are fixed

Assign responsibilities

Name the people who implement, review and approve safety actions



Review and report

Update the plan and track open actions at defined milestones

Keep it project-specific

Describe the actual sites, assets, hazards and operating conditions

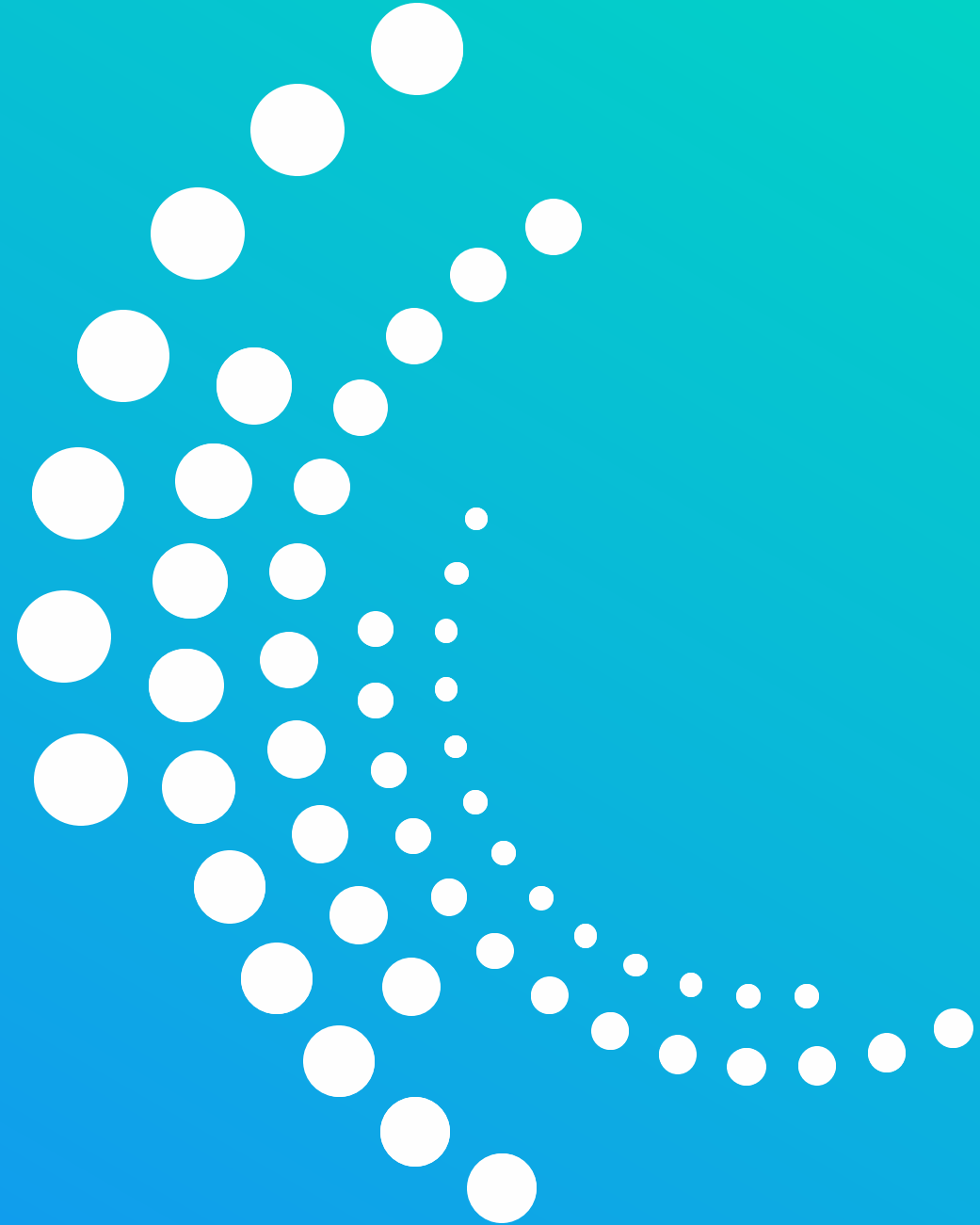
Prepare and learn

Test emergency arrangements and use findings to improve the plan

Connect hazards to evidence

Show how safeguards, procedures and records address identified risks

NEXT EVENTS



Next events Task 1

Tentative schedule



05

Q&A



Q&A

EUROPEAN HYDROGEN SAFETY PANEL

All info on:

- <https://ehsp.eu/>
- https://www.clean-hydrogen.europa.eu/get-involved/european-hydrogen-safety-panel-0_en



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