

Hydrogen Research & Innovation Days

24-25 November 2025



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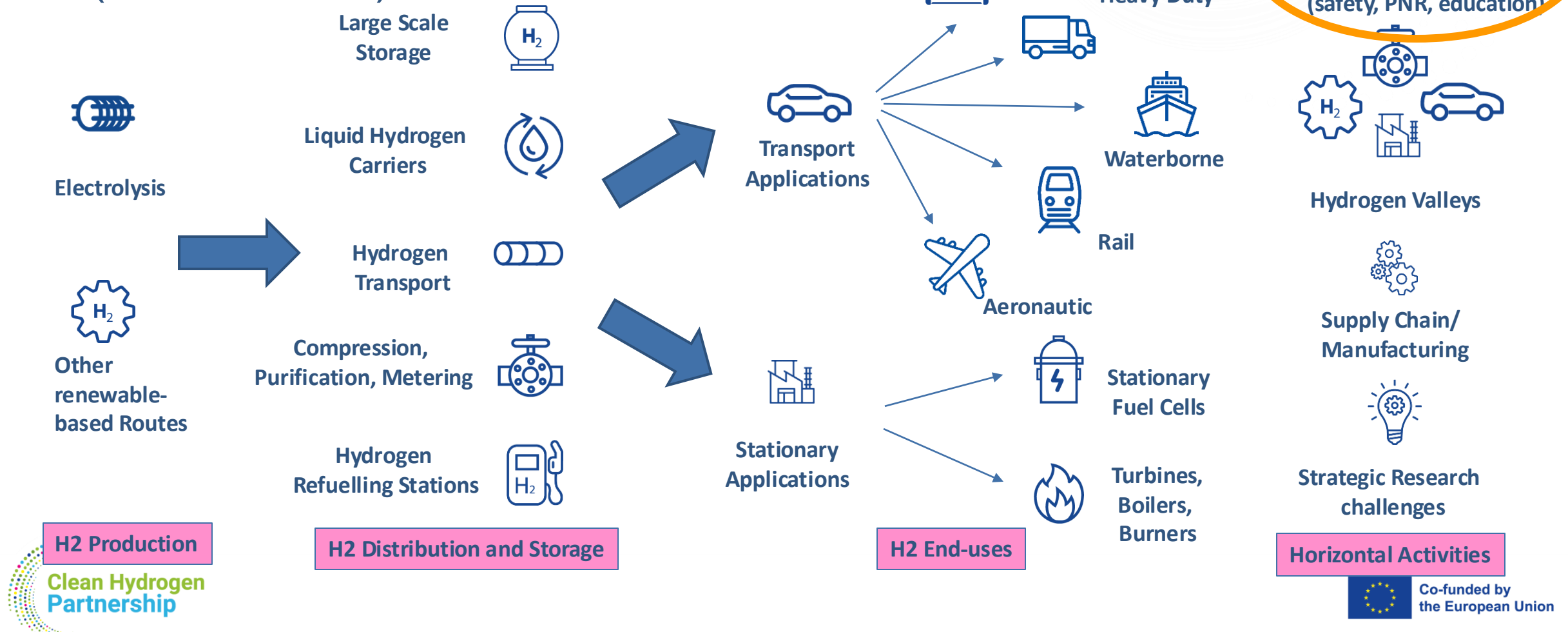
CROSS-CUTTING ISSUES

Safety and Pre-Normative Research for standardization

Alberto Garcia Hombrados – Project Officer



Strategic Research & Innovation Agenda SRIA (2021 – 2027)



Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS - Overview

JU support

- 1- Action Grants - Projects
- 2- European Hydrogen Safety Panel
- 3- Collaboration with the JRC
- 4- RCS Strategy Coordination
- 5- Clean Hydrogen Observatory



The collage includes several key elements:

- Research and Innovation activities** and **Other activities** menu with sub-items: Sustainability and circularity, Education and public Awareness, Safety, Pre-Normative Research and Regulations, Codes and Standards, JRC, RCS SC, EHSP, EHS&CP.
- Cross-cutting Projects** and **Cross-cutting issues** sections.
- EUROPEAN HYDROGEN SAFETY PANEL** banner with an image of a hydrogen production and distribution system.
- Collaboration with JRC** document showing a list of activities:
 - RCS (A+B): Strategy, Harmonisation
 - TMA (C): Historical analysis, Programme assessment, TIF
 - Sustainability (D): LCA project support and deliverable assessment, LCA, H2 delivery, Data network
 - Safety (E): HELLEN, MADIEHSP, Transfer of databases
- RCS Strategy Coordination Group - Background** document.
- Original: HE/HER members only. Widened to external members** list of partners including ITM POWER, ENGIE, AREVA H2-Gen, ENEC, DAIHLER, UNIVERSITY OF BRISTOL, etc.
- RCS Strategy Coordination Task Force Scope of activities** document:
 - Task Force to define, coordinate and monitor the JU strategy related to RCS**
 - Needs of RCS development > Priorities (focus on PNR)**
 - Batch of measures to strengthen the impact of the JU Programme in RCS dev.**
 - Focus: PNR activities (research activities and desk research activities) to support RCS dev.**
 - Concretisation Activities:**
 - Follow up of RCS development: continuous global watch function in cooperation with standardization and regulatory bodies (ISO, IEC, IEC, etc.)
 - Assessment of RCS dev. needs of strategic importance in Europe to foster a regulatory fit-to-market EU-wide hydrogen market -> lay down the RCS-related strategy
 - Identification and prioritization of the requirements and needs for R&I and coordination actions to support the RCS dev. -> support the Connector RWPs dev.
 - Follow up and support the R&I and coordinative actions conducted in the JU contributing to ensure to best possible the actual use of PNR results in RCS dev.
 - Dissemination of results: Strengthening the transfer of RCS-relevant results in regulatory and standardization bodies; targeted communication actions, awareness workshops, etc.
- European Hydrogen Observatory** website showing "New data available" and "hydrogen landscape at a glance" with statistics: 75 national hydrogen production, 178 hydrogen refueling stations (H2S) in Europe.
- EU Policies and Legislation** and **Codes and Standards** sections.
- Co-funded by the European Union** logo at the bottom right.

Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS – Projects

*“Addressing key safety aspects to support a frictionless roll out”
“Supporting and facilitating adequate/ enabling frameworks for market uptake”*



JU support



30 Projects




Funding
54,7 M€




21+
countries


Cross-cutting
Projects



Hydrogen sensors
Guidelines to select /use the best sensor for a particular app.




CFD for safety analysis
Development of best practices, HYMEP evaluation protocol





Safety in confined spaces
Safe use of H₂ in semi/confined spaces





Cross-cutting
Projects



Pre-normative
Research
Addressing knowledge gaps to support RCS development



Legal and administrative
processes
Identifying barriers and sharing best practices across Europe




Guarantees of origin
framework
Providing truthful information about the origin of hydrogen



Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS – Projects

“Supporting and facilitating adequate/ enabling frameworks for market uptake”

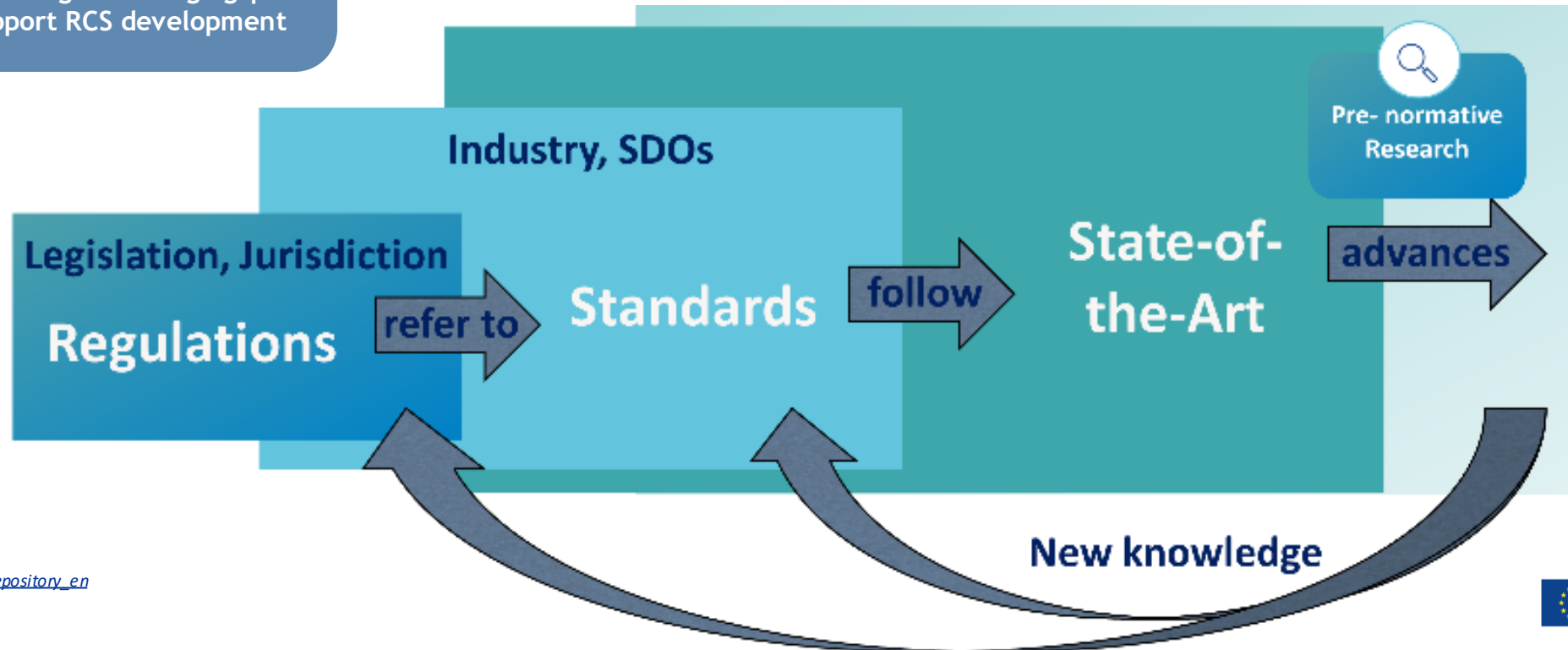
Cross-cutting Projects

Pre-normative Research

Addressing knowledge gaps to support RCS development

Pre-normative research (PNR) activities:
An essential step advancing Regulations, Codes, and Standards

Adapted from the PLESLHY project



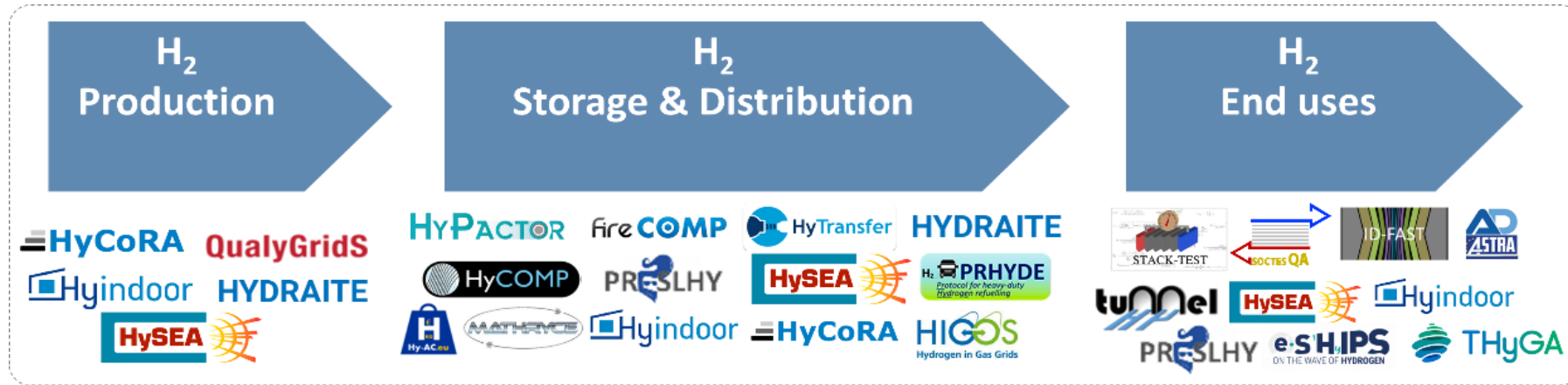
Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS – Projects

Recent projects on Safety, PNR/RCS...



Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS – Projects

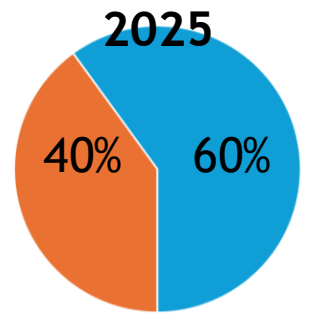
Covering the entire H₂ chain and targeting standards at European and International level



5 PNR projects ongoing in 2025



**European Committee for Standardization
European Committee for Electrotechnical Standardization**



International Standardization Organization

Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCS – EHSP



About Us

Hydrogen Safety

External Tools

Outreach

Events

ACCESS



EUROPEAN HYDROGEN SAFETY PANEL

Promoting hydrogen safety knowledge for a sustainable and secure energy transition in Europe

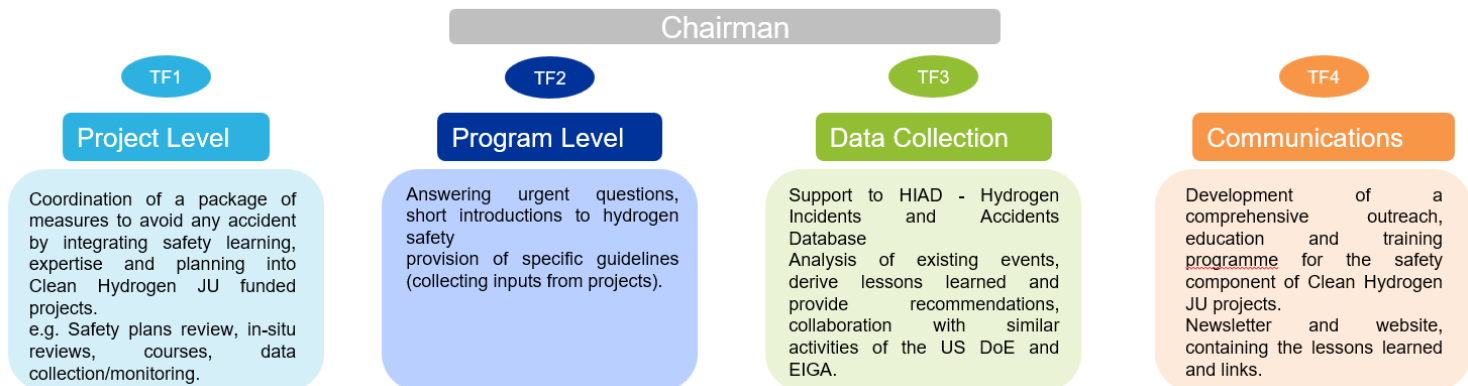
Taskforces & Objectives

Operative Structure. Task Forces.

The EHSP assists the Clean Hydrogen JU both at programme and at project level:

- in assuring that hydrogen safety is adequately managed, and
- to promote and disseminate hydrogen safety culture

Activities structured in **4 Task Forces**



Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCSS – Collaboration with the JRC

The scope of the JRC - JU Framework Contract



Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCSS – Collaboration with the JRC

Strategy

- JRC informs Clean Hydrogen JU:
- standardisation activities and events
 - International collaboration


European standardization strategy	IEA H2 TCP	• Analysis and modelling • Underground storage • Safety large scale H2 applications
SFEM Hydrogen	UN ECE GTR 13	• JRC provides the scientific/technical support to the European positions
CEN/CLC JTC6	HYSAFE	• JRC is member of the Scientific and the Organisation Committees of the International Conference on Hydrogen Safety (ICHS)
CEN/CLC Joint Task Force H2 quality	IPHE RCSS WG	• co-chaired by the US DOE and the JRC
ISO/TC197		
IEC/TC105		

Tests harmonisation

Harmonisation of water electrolysis tests

https://data.europa.eu/doi/10.2760/13898 JRC TECHNICAL REPORTS EU harmonised terminology for low-temperature water electrolysis for energy-storage applications	https://data.europa.eu/doi/10.2760/17950 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised polarisation curve test method for low-temperature water electrolysis	https://data.europa.eu/doi/10.2760/8984 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised test procedure: electrochemical impedance spectroscopy for water electrolysis cells	https://data.europa.eu/doi/10.2760/14068 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised cyclic voltammetry test method for low-temperature water electrolysis single cells
https://data.europa.eu/doi/10.2760/73280 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised terminology for hydrogen generated by electrolysis	https://data.europa.eu/doi/10.2760/58880 JRC TECHNICAL REPORT EU harmonised protocols for testing of low temperature water electrolyzers	https://data.europa.eu/doi/10.2760/31803 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised testing protocol for high-temperature steam electrolysis	https://data.europa.eu/doi/10.2760/34979 JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT EU harmonised testing procedure: Determination of water electrolyser energy performance

Testing hardware



Mendeley Data

The JRC ZEROCELL design documentation

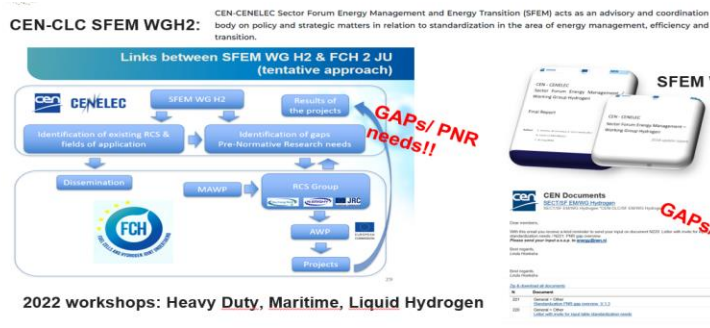
Published: 26 October 2021 | Version 1 | DOI: 10.17632/c7bfb97y1b.1
Contributor: Tomasz Bednarek

[The JRC ZEROCELL design documentation - Mendeley Data](#)

Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCSS – RCS Strategy Coordination



Task Force Mission: definition, coordination and monitoring of the strategy related to PNR/RCS within the Programme with the focus on Standards



Needs for standardization!! (and PNR needs)

1. Executive Summary	1
2. Introduction	1
3. Objectives	1
4. Scope of the roadmap	1
5. Stakeholders	1
6. Key findings	1
7. Recommendations	1
8. Conclusions	1
9. Annexes	1
10. Bibliography	1
11. Glossary	1
12. Abbreviations	1
13. Acronyms	1
14. Revision history	1
15. Approval and authorization	1
16. Distribution	1
17. Contact information	1
18. Disclaimer	1
19. Copyright	1
20. Acknowledgements	1
21. Funding	1
22. Other relevant information	1
23. Final version	1
24. Final approval	1
25. Final publication	1
26. Final distribution	1
27. Final archiving	1
28. Final review	1
29. Final update	1
30. Final version	1
31. Final approval	1
32. Final publication	1
33. Final distribution	1
34. Final archiving	1
35. Final review	1
36. Final update	1
37. Final version	1
38. Final approval	1
39. Final publication	1
40. Final distribution	1
41. Final archiving	1
42. Final review	1
43. Final update	1
44. Final version	1
45. Final approval	1
46. Final publication	1
47. Final distribution	1
48. Final archiving	1
49. Final review	1
50. Final update	1
51. Final version	1
52. Final approval	1
53. Final publication	1
54. Final distribution	1
55. Final archiving	1
56. Final review	1
57. Final update	1
58. Final version	1
59. Final approval	1
60. Final publication	1
61. Final distribution	1
62. Final archiving	1
63. Final review	1
64. Final update	1
65. Final version	1
66. Final approval	1
67. Final publication	1
68. Final distribution	1
69. Final archiving	1
70. Final review	1
71. Final update	1
72. Final version	1
73. Final approval	1
74. Final publication	1
75. Final distribution	1
76. Final archiving	1
77. Final review	1
78. Final update	1
79. Final version	1
80. Final approval	1
81. Final publication	1
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87. Final approval	1
88. Final publication	1
89. Final distribution	1
90. Final archiving	1
91. Final review	1
92. Final update	1
93. Final version	1
94. Final approval	1
95. Final publication	1
96. Final distribution	1
97. Final archiving	1
98. Final review	1
99. Final update	1
100. Final version	1

Identification of PNR needs

Measures to increase JU impact (programme/ project)

- 1 Intellectual Property Rights (IPR), background and results, access rights and rights of use (article 16 and Annex 5 of the Model Grant Agreement (MGA)).**
 - An additional information obligation has been introduced for topics including standardisation activities: 'Beneficiaries must, up to 4 years after the end of the action, inform the granting authority if the results could reasonably be expected to contribute to European or international standards'. These concerns the topics below:
- 2 Activities developing test protocols and procedures for the performance and durability assessment of electrolysers and fuel cell components proposals should foresee a collaboration mechanism with JRC (see section 2.2.4.3 "Collaboration with JRC"), in order to support EU-wide harmonisation. Test activities should adopt the already published EU harmonised testing protocols⁵⁸ to benchmark performance and quantify progress at programme level.**

Reporting up to 4 years after the project end

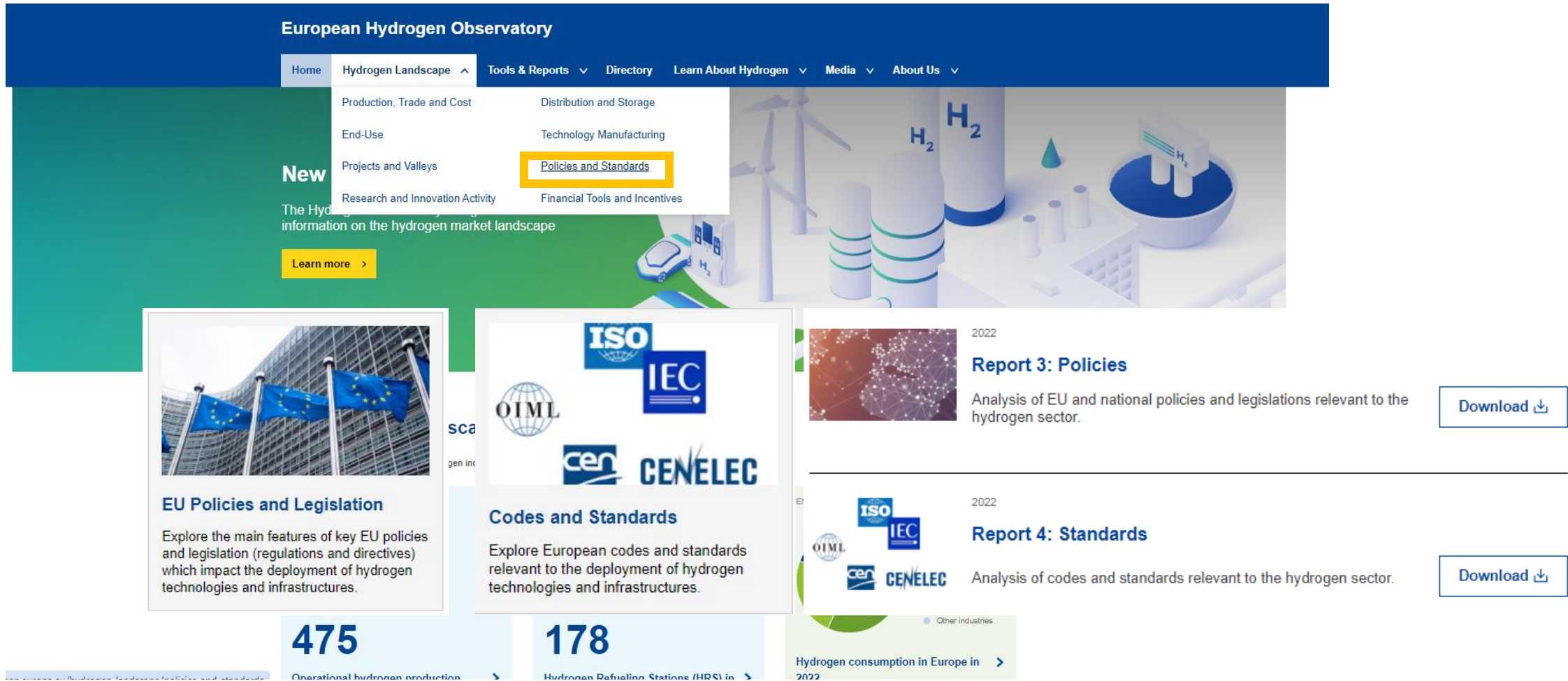
Harmonised testing protocols (JRC)

Public report on RCS/LAPs: gaps, challenges...

- 3 Contribution to Regulation, Codes and Standards**

For Innovation Actions, proposals should consider a public report with both the Legal and Administrative Processes (LAP) and the Regulations, Codes and Standards relevant to the technologies and/or applications at the project scope, and the barriers and/or gaps identified during the project implementation alongside any other relevant information in order to share the lessons learned and provide recommendations to support the update and/or development of suitable and enabling legal and regulatory frameworks for hydrogen and fuel cell technologies and applications.

Clean Hydrogen Partnership JU Activities on Safety, PNR/ RCSS – Clean Hydrogen Observatory



European Hydrogen Observatory

Home | **Hydrogen Landscape** | Tools & Reports | Directory | Learn About Hydrogen | Media | About Us

Production, Trade and Cost | Distribution and Storage
End-Use | Technology Manufacturing
Projects and Valleys | **Policies and Standards**
Research and Innovation Activity | Financial Tools and Incentives

New
The Hydrogen Observatory provides the most up-to-date information on the hydrogen market landscape
[Learn more >](#)

EU Policies and Legislation

Explore the main features of key EU policies and legislation (regulations and directives) which impact the deployment of hydrogen technologies and infrastructures.

Codes and Standards

Explore European codes and standards relevant to the deployment of hydrogen technologies and infrastructures.

2022

Report 3: Policies

Analysis of EU and national policies and legislations relevant to the hydrogen sector.

[Download](#)

2022

Report 4: Standards

Analysis of codes and standards relevant to the hydrogen sector.

[Download](#)

475 Operational hydrogen production

178 Hydrogen Refueling Stations (HRS) in Europe

Hydrogen consumption in Europe in 2022



CONCLUSIONS



Safety, PNR... Sustainability, circularity, education, public awareness, are cross-cutting aspects essential for mass-market commercialization



Cross-cutting projects and other activities are contributing to a safe and frictionless deployment of hydrogen technologies



Comprehensive portfolio of activities strengthening the whole hydrogen sector and supporting the market uptake

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Thank you for your attention!