

# Hydrogen Training

Training on the job  
and online

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OCTOBER 29  
30  
31

voestalpine Stahl,  
Linz, Austria

ESTEP 2024  
Annual Event



20 years together







Funded by the  
Erasmus+ Programme  
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Blueprint “New Skills Agenda Steel”:  
Industry-driven sustainable European Steel Skills Agenda and Strategy (ESSA)



Funded by the  
Erasmus+ Programme  
of the European Union

Skills Alliance for Industrial Symbiosis -  
A Cross-sectoral Blueprint for a Sustainable Process  
Industry (SPIRE-SAIS)





# H2 Qualification Demands in the Steel Industry

## What is changing and who is affected?

- **Supply chains**, e.g. commercial professions; logistics professions
- **Setting up and maintaining plants**, e.g. mechatronics engineer; industrial mechanic etc.
- **Production process**, e.g. process technologist metal; chemical laboratory technician etc.
- **Health and Safety** (incl. safety regulations) because of new H2 characteristics, e.g. specialist for H2 protection and security

## Energy Turnaround Needs Skilled Workers!

- Vocational training is still neglected in hydrogen discourse
- Shortage of skilled workers must also be taken into account
- First Mover qualify themselves

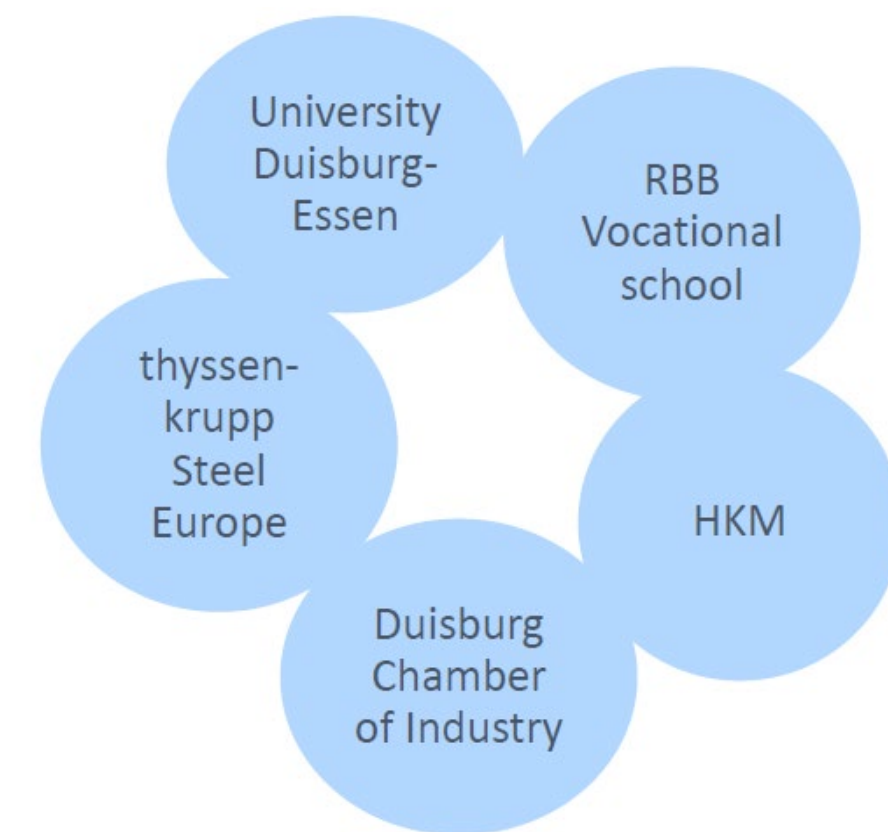
➤ Strategies for adjusting qualifications for hydrogen are mainly found at the regional/local level



# Additional Qualification Hydrogen (Germany)

25-day-training-curriculum for *additional qualification hydrogen*  
practice-oriented approach with excursions

Nr	Training modules (3-4 days)
1	Hydrogen fundamentals and socioeconomic relevance
2	Production, transprt, storage and use of hydrogen
3	Dangers associated with hydrogen
4	Occupational safety at handling hydrogen
5	Hydrogen as a reducing agent in the steel industry
6	Handling and maintanance of gas carrying systems
7	Economical and ecological aspects of hydrogen





# Online Training Ecosystem Solution

SKILLS4PLANET<sup>HUB</sup>

steelHub TRAINING PROVIDERS

Platforms to facilitate coordination, communication and collaborative partnership between stakeholders of the Eco-System.

VET SYSTEM

INDUSTRY

GOVERNMENTS

RESEARCH CENTERS

ASSOCIATIONS

EQUIPMENT AND SERVICE PROVIDERS

STRATEGY

Develop highly qualified, specialized and multi-skilled workforce



# Learning Solution Directory – Publishers of the Ecosystem

## Industry



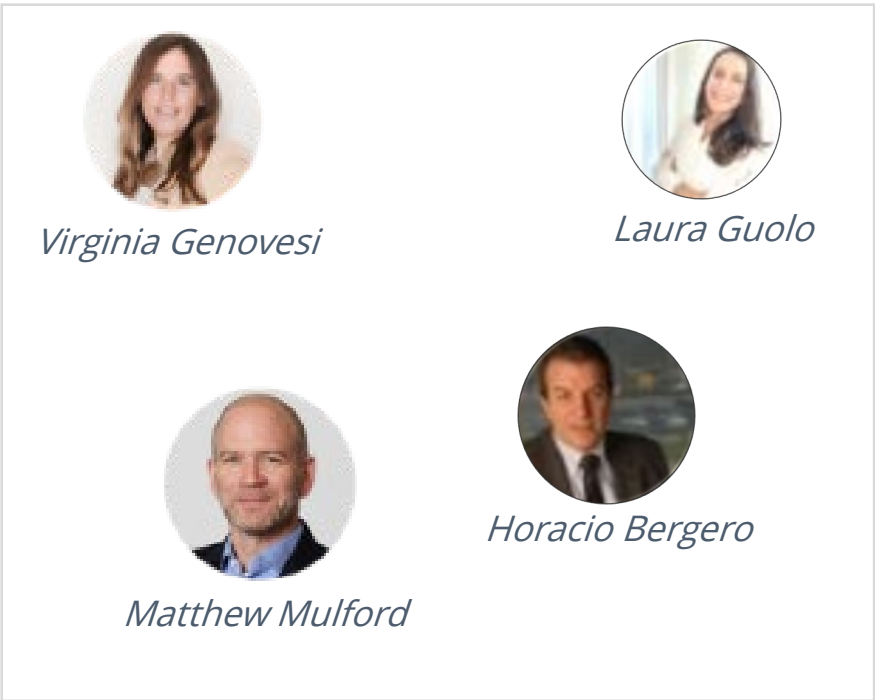
## Associations and social partners



## Equipment providers



## Subject Matter experts



## Education and training providers



## R&D institutions and Universities



## Service providers



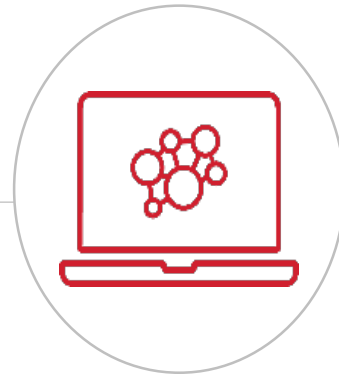


# Training Ecosystem Solution



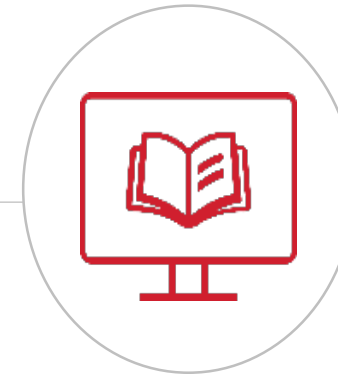
## Skill Directory

Skill and knowledge directory that represent the current and future training needs of the steel sector.



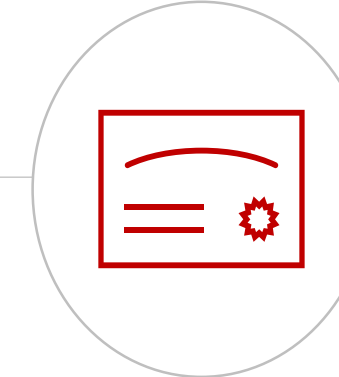
## Capability Assessor

Solutions to deliver capability assessments to organization and individuals to design customized development path.



## Learning solution Directory

Collection of learning solutions provided by experts and organizations into steelHub and SKILLS4Planet.



## Micro-Credentials

Enables learners to acquire, store, and share their credentials across platforms, enhancing their employability and professional development in a rapidly changing job market.



Technology infrastructure that facilitate communication and partnership between stakeholders of the Online Training Ecosystem.



# Learning Solution Directory

## Variety of hydrogen trainings

### Hydrogen Cataloge from American Institute of Chemical Engineers (AIChE)



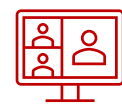
**Classroom and Practical training**



**E-learning**



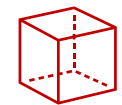
**Mentoring, Coaching and consultation**



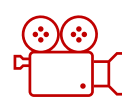
**Webinars**



**Game-based learning**



**3D Models**



**Animated Videos**



**VR/AR solutions**



**Peer-to-peer**



Hydrogen as an Energy Carrier



Properties and Hazards of Hydrogen



Safety Planning for Hydrogen Projects



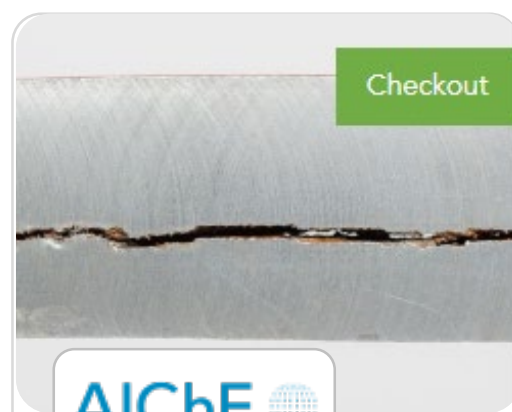
Safety Considerations for Hydrogen Facility Design and Construction



Safety Considerations for Hydrogen System Components



Safety Considerations for Liquid Hydrogen Systems



Material Compatibility Design Considerations for Hydrogen Systems



Hydrogen System Operation



Hydrogen System Maintenance and Inspection



Introduction to Hydrogen Fuel Cell Vehicles for Incident Response



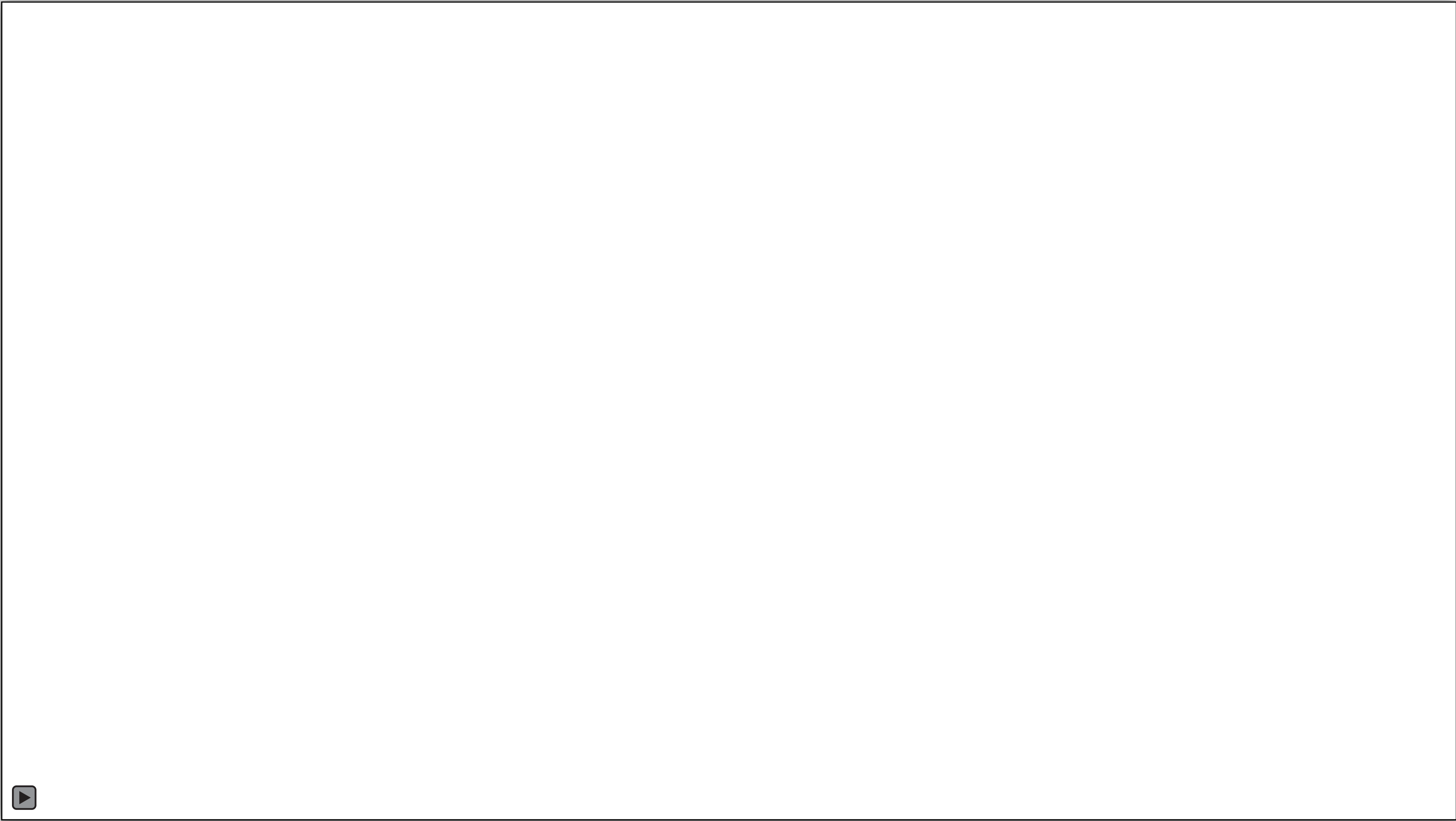
Fire Response & Extrication of a Hydrogen Fuel Cell Vehicle



Chemicals, Materials, Electric Vehicles

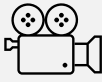








# Skill Directory - Occupation Directory





# Example: Hydrogen Combustion and Heat Transfer

Skill Definition	Proficiency Level	Learning Outcomes	European Qualification Framework		Learning solution Directory						
<b>Hydrogen Combustion and Heat Transfer</b>  Hydrogen Combustion and Heat Transfer involves understanding, managing, and optimizing the combustion and heat transfer processes associated with the use of hydrogen as a fuel in industrial applications. It encompasses knowledge of combustion dynamics, heat transfer mechanisms, safety protocols, and system optimization techniques to ensure efficient and safe utilization of hydrogen for heat generation and industrial processes.	1		Category	EQF Level							
	2	Proficiency in numerical methods and computational tools for simulating fluid flow, combustion, and heat transfer.	Theoretical	5	✓			✓		✓	✓
	3	In-depth knowledge of thermodynamic cycles and advanced heat transfer phenomena.	Theoretical	5			✓		✓		
		In-depth understanding of regulatory requirements and environmental standards related to hydrogen-based processes	Theoretical	5				✓	✓		
	4	Predict the impact of changes in combustion parameters on heat transfer efficiency and combustion stability.	Cognitive	4		✓	✓	✓			✓
		Validate computational models of hydrogen combustion and heat transfer against experimental data. ....	Cognitive	4	✓						

# Example: Hydrogen Combustion and Heat Transfer

Skill Definition	Proficiency Level	Learning Outcomes	European Qualification Framework		Instrument and Tools for validation according European guidelines Evidences Center Design Methodology (ECD)							
<b>Hydrogen Combustion and Heat Transfer</b>  Hydrogen Combustion and Heat Transfer involves understanding, managing, and optimizing the combustion and heat transfer processes associated with the use of hydrogen as a fuel in industrial applications. It encompasses knowledge of combustion dynamics, heat transfer mechanisms, safety protocols, and system optimization techniques to ensure efficient and safe utilization of hydrogen for heat generation and industrial processes.	1		Category	EQF Level	Self-assessment	Multiple choice	Written tests	Interviews	Portfolio	Simulation	job practice	Peer Review
	2	Proficiency in numerical methods and computational tools for simulating fluid flow, combustion, and heat transfer.	Theoretical	5	✓					✓	✓	✓
	3	In-depth knowledge of thermodynamic cycles and advanced heat transfer phenomena.	Theoretical	5	✓						✓	✓
		In-depth understanding of regulatory requirements and environmental standards related to hydrogen-based processes	Theoretical	5	✓					✓		
	4	Predict the impact of changes in combustion parameters on heat transfer efficiency and combustion stability.	Cognitive	4	✓	✓		✓				
		Validate computational models of hydrogen combustion and heat transfer against experimental data. ....	Cognitive	4	✓	✓		✓				

[https://www.cedefop.europa.eu/files/3093\\_en.pdf](https://www.cedefop.europa.eu/files/3093_en.pdf)



# Integration in 3 Possible Ways

## **steeluniversity**

For Individual

Online learning platform that offers a vast selection of Learning Solutions on a variety of subjects related to steel sector and related business, including technology, business, and personal development at affordable and accessible to **individuals** and **small groups** worldwide.

## **steelLMS**

For Business

A white label learning management system (LMS) that allows **organization** to brand and customize **steeluniversity** platform with their own branding, logos, and colors. This means that the LMS appears to be a part of the organization's own software suite. Besides, the organization can get detailed tracking and reporting of employee progress.

## **steelHub**

For Business

The **steeluniversity**'s solutions are fully integrated into **organization**'s own software suite (SuccessFactor, SumTotal, Moodle, among others). The content, format, and delivery of the training can be customized to meet the organization's unique requirements and assure a better **fully integrated tracking** and reporting of employee progress.

# Added Value of Hydrogen Training

- The topic of hydrogen transformation also offers opportunities in terms of **image and recruitment**:
  - New incentives for applicants by ***highlighting green and digital aspirations of the steel industry***  
→ opportunity to change the narrative and the image of the steel industry and to attract talent
  - Opportunity for the ***establishment of new, modern job profiles*** against the background of hydrogen  
→ modernizing the steel industry, better reaching target groups (talents)





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# Paving the way for a clean **Hydrogen** economy in Europe

The **Green Skills for Hydrogen Project** (GreenSkillsforH2) is contributing to the development of a skilled workforce in Europe for the emerging hydrogen economy by addressing the skills gap and providing training to boost the industry.

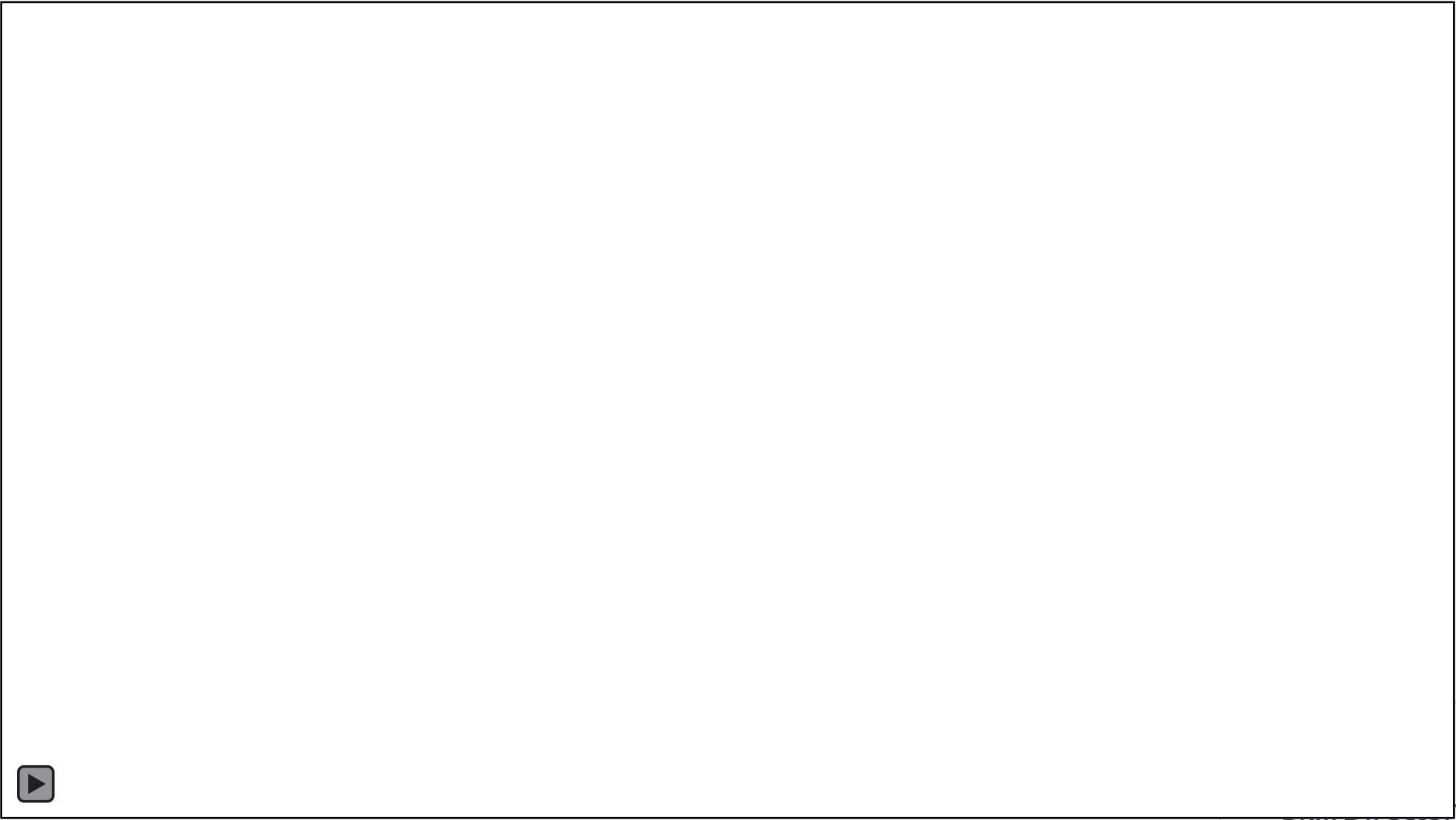
[JOIN THE COMMUNITY](#)

<https://greenskillsforhydrogen.eu/>

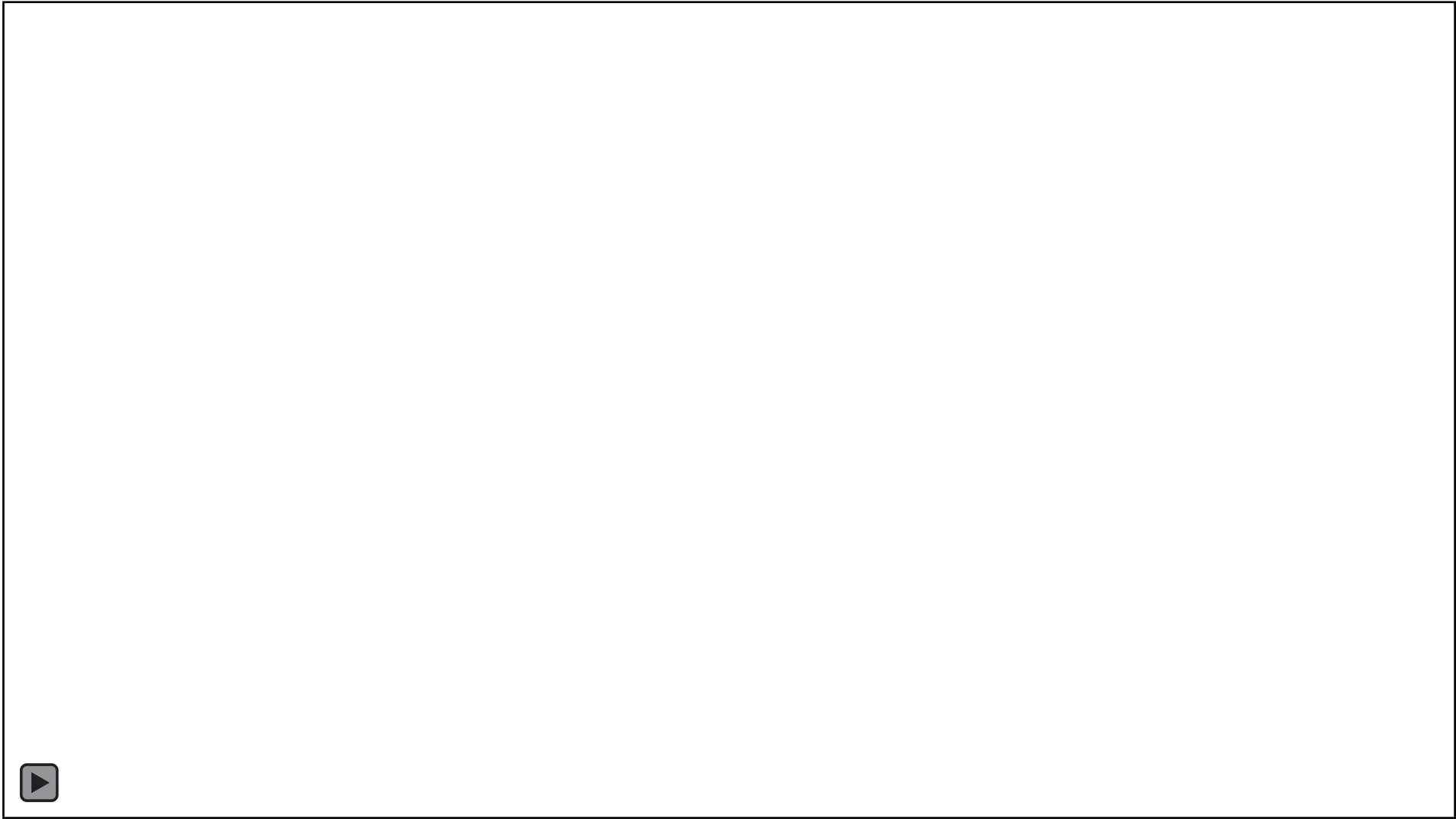




# Online Training Platforms



<https://hub.steeluniversity.org>



<https://hub.skills4planet.eu/>



## Capability Assessor

Solutions to deliver capability assessments to organization and individuals to design customized development path.



## Learning solution Directory

Collection of learning solutions provided by experts and organizations into skills4planet.



## Qualifications Directory

Qualifications curated with skill directory to enables detailed analysis of current skill sets versus industry requirements and support learners in finding relevant training programs.



## Micro-Credentials

Enables learners to acquire, store, and share their credentials across platforms, enhancing their employability and professional development in a rapidly changing job market. **Potential Integration with Europass**





FOR GREEN STEEL

3<sup>rd</sup> INTERNATIONAL CONFERENCE

*meets*

A CIRCULAR ECONOMY DRIVEN  
BY THE EUROPEAN STEEL



Thanks a lot for your attention