



Skills for Safety Management in the UK Hydrogen Economy

Essential skills for a safe hydrogen
energy future

Background: Cogent Skills & the Process Safety Management Competence Programme Board



**PROCESS SAFETY FOR
INDUSTRY**

Setting the standard for workforce competence and
process safety compliance.



Hydrogen Skills

Alliance





Hydrogen Skills Alliance

Empowering the Future

A Strategic Skills Plan

for the

UK Hydrogen

Economy



The Hydrogen Skills Alliance

Governing Body

Hydrogen Skills Alliance Thought Centre



Labour Market Intelligence gathering, analysis and modelling



Maintain a live Hydrogen Workforce and Skills strategy



Government engagement - amplify a single voice for Hydrogen Economy



Regional engagement - shared & consolidated view of regional activities



Industrial engagement



Hydrogen Skills Framework



Foresighting future skills

Insight and intelligence shapes delivery

Insight and intelligence informs strategy

Hydrogen Skills Academy



Regional deployment of Hydrogen skills needs



Establishing and maintaining provider networks across FE and HE



Development and delivery of open-source curriculum



Provider capacity development



Careers outreach and facilitation

Convene to establish need

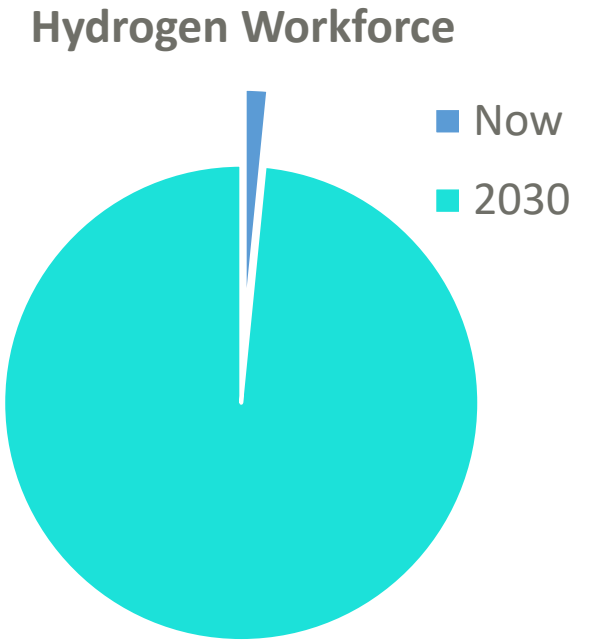
Curate and create resources

Catalyse, deliver and diffuse



What is the challenge?

“the current workforce is estimated at just 1,600 in the ‘alternative fuels’ marketplace (including hydrogen and other fuels)”



Estimated workforce demand across the hydrogen value chain by 2030

	Production	Transmission (e.g. project union)	Transportation & distribution	Storage	Transport (usage)	Industrial processes	Heat	Power	Total
Direct	8,500	6,000	1,500	3,000	3,500	2,500	175	3,500	28,675
Indirect	24,000	13,500	3,000	6,000	7,500	3,500	300	6,000	63,800



(HUK - Hydrogen Uk, Hii - Hydrogen Innovation Initiative, Cogent Skills/HSA - Hydrogen Skills Alliance)

The case for strategic coordinated action

almost any other, presenting a unique set of challenges to skills development.

It is evident there is significant market failure, meaning that if the development of hydrogen skills is left to market forces, critical training will not be available when and where it is most needed.”

- Lack of workforce and labour market intelligence
- Workforce and skills shortages
- Nascency means skills demand signals are lost
- Lack of provider capacity and capability to deliver training
- Higher level skills are lacking
- Lack of a single industry voice on hydrogen competencies
- Cross-sector collaboration on common skills challenges



Where is the need?

Construction Jobs Heatmap





BUILDING A SAFER TOMORROW

Process safety partner to high-hazard industries

[Find out more](#)

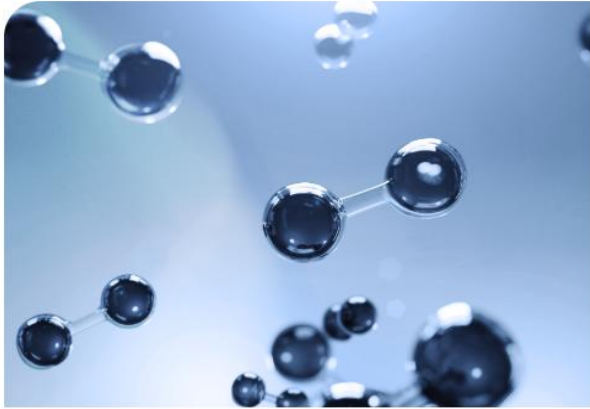
EMPOWERING THE FUTURE:
A Strategic Skills Plan for the
UK Hydrogen Economy



Need more information?



www.cogentskills.com



1. HYDROGEN FUNDAMENTALS



2. HYDROGEN PRODUCTION



3. HYDROGEN STORAGE AND DISTRIBUTION



**4. HYDROGEN ENERGY USE:
DOMESTIC AND INDUSTRIAL**



**5. HYDROGEN ENERGY USE:
FEEDSTOCK**



**6. HYDROGEN EN
TRANSPORT**



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Hydrogen Skills Framework

Cogent Skills, on behalf of the Hydrogen Skills Alliance, has brought together stakeholders to help identify the new hydrogen-specific knowledge and skills (the hydrogen 'delta') that key occupations will require to operate safely and effectively.

The aim of this work is to provide a clear line of sight to all stakeholders, including employers, training providers, and awarding organisations across the UK, free of charge, to enable the development of quality training that meets industry needs through the creation of a Hydrogen Skills Framework.



Hydrogen skills 'delta' for experienced recruits

	A	B	C	D	E	F	G	H	I
				Chemical/Process Engineer/ Hydrogen Process Engineer	Process Control Technician	Process Operator	Storage Technician	Pipeline integrity specialist	Process Safety Professional
1				Engineer	Technical & Trade			Specialists & Quality/H&S	
2	Area of Hydrogen Economy		Production=P	P	P	P	0	0	P
3			Transmission =T	0	0	0	0	0	0
4			Transport & Distribution =D	D	0	0	0	D	0
5			Storage=S	S	0	0	S	S	S
6			Usage (B=Boats, A=Aircraft, I=Industrial Decarbonisation, Au=Automotive)	I					I
7									
8	Skills/Knowledge Area		Competence statement						
9	1	Hydrogen Industry UK Net zero targets, alternative fuel sources, hydrogen usages, legal and compliance regulations	Understand the current position of the hydrogen industry within the wider net zero ambition. Awareness of the UK low-carbon hydrogen standard. Potential future uses for hydrogen (e.g. aviation, SAF etc). Legal and compliance regulations	✓	✓	✓	✓	✓	✓
10	2	Hydrogen Industry Background on hydrogen production, storage, distribution and use	Understanding of global need for hydrogen transition, how hydrogen can be produced, stored, transported - its benefits and its uses in the energy mix (including environmental impact and safety considerations).	✓	✓	✓	✓	✓	✓
11	3	Hydrogen Industry Recognition of hydrogen and waste product interchangeability in other industries	Understanding of how hydrogen and any associated waste products in its production process (e.g. oxygen, carbon) can be repurposed and provided to use cases (i.e.chemical processes) in other industries.	✓	✓	✓	✓	✓	✓
12	Hazards, Risk and Controls								
13	4	Hazards, Risks and Controls Understanding of risks and hazards	Understanding of the difference between risks and hazards and how to identify them; Simple (Dynamic) to Advanced Haz-Op and Predictive analysis	✓	✓	✓	✓	✓	✓
14	5	Hazards, Risks and Controls Understanding Hydrogen Properties	Understanding of the processes required to convert particular gases into others, and indicators of the interchangeability of various gases (in terms of heating or calorific value. General knowledge of hydrogen's chemical properties, its forms (gas & liquid), structure, volumetric and energy density, how it differs to other gases, how it interacts with other materials, and its property risks (including how it affects handling e.g. odourless, leaks quietly, rises quickly due to lightness).	✓	✓	✓	✓	✓	✓



Hydrogen skills 'delta' for experienced recruits

Hydrogen Industry

UK Net zero targets, alternative fuel sources, hydrogen usages, legal and compliance regulations

Background on hydrogen production, storage, distribution and use

Recognition of hydrogen and waste product interchangeability in other industries

Legislation & Regulation

Understanding relevant Legislation and regulatory requirements relating to the use of Hydrogen in an operational role;

Understanding relevant Legislation and regulatory requirements relating to the use of Hydrogen (for Managers)

Hazards, Risks and Controls

Understanding of risks and hazards

Understanding Hydrogen Properties

Knowledge of high-pressure gas systems and vessels

Knowledge of power electronics

Identifying and managing hydrogen hazardous areas

Identifying and managing hydrogen; substance interaction (hydrogen embrittlement)

Identifying and managing other hazards identified associated with hydrogen generation, storage, transportation and use

Identification of appropriate control measures for managing hydrogen"

Oversight of control measures for hydrogen processes"

Storing hydrogen for transportation using cryogenic materials"

Awareness of protocols for decommissioning Hydrogen installations"



Hydrogen Skills
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Hydrogen skills 'delta' for experienced recruits

Process Design & Safety

Process Safety

Management of incident prevention

Incident prevention

Incident management

Monitoring, testing and maintaining hydrogen equipment

Hydrogen Production

Fuel cells – Operating and maintaining fuel cells

Fuel cells – Operating and maintaining fuel cells

Understanding of cooling systems

Electrolysis, biofuels, photolysis

SMR (steam methane reforming)

Coal gasification

Co-firing in natural gas and hydrogen fuelled gas turbines



Hydrogen design

Reading and interpreting technical drawings with hydrogen equipment

Hydrogen storage

Compressed hydrogen

Liquid hydrogen

Conversion to hydrogen carriers

Hydrogen system maintenance

Inspect, maintain and modify hydrogen vehicles

Integrating hydrogen equipment from various OEMs into a process

Hydrogen Logistics

Managing hydrogen logistical movement across a supply chain



SIAS New Qualification(s) Development Consultation

Level 2 Award in the Introduction to Hydrogen Safety

Purpose:

To provide learners with a foundational understanding of the hydrogen industry, including its role in the transition to a low-carbon economy and relevant legislative frameworks. Learners will develop knowledge of process design principles and safety considerations essential for hydrogen production, storage, and utilisation. Additionally, the qualification will equip learners with the ability to identify hazards, assess risks, and understand how to implement appropriate control measures to ensure safe and compliant hydrogen operations.

Aligned with the Hydrogen Delta Framework, the qualification supports workforce development by providing individuals with the foundational knowledge needed for safe and compliant hydrogen operations, contributing to the transition to a low-carbon economy.

And finally...

Cogent Skills can help you, or partner with you, to develop and deliver training and consultancy solutions for businesses that need to improve their understanding and approach to the control of major accident hazards.

We have delivered to 24,000 delegates for process safety management alone, worked with over 300 businesses and have access to experts in their field to help to support and advise.

We are Not for Profit, here to help and specialise in:

- Process Safety Management
- Competence Management Systems development and implementation
- Human Factors development and implementation
- Competence Assessor training
- Permit to Work



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Hydrogen Skills Delta Framework

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