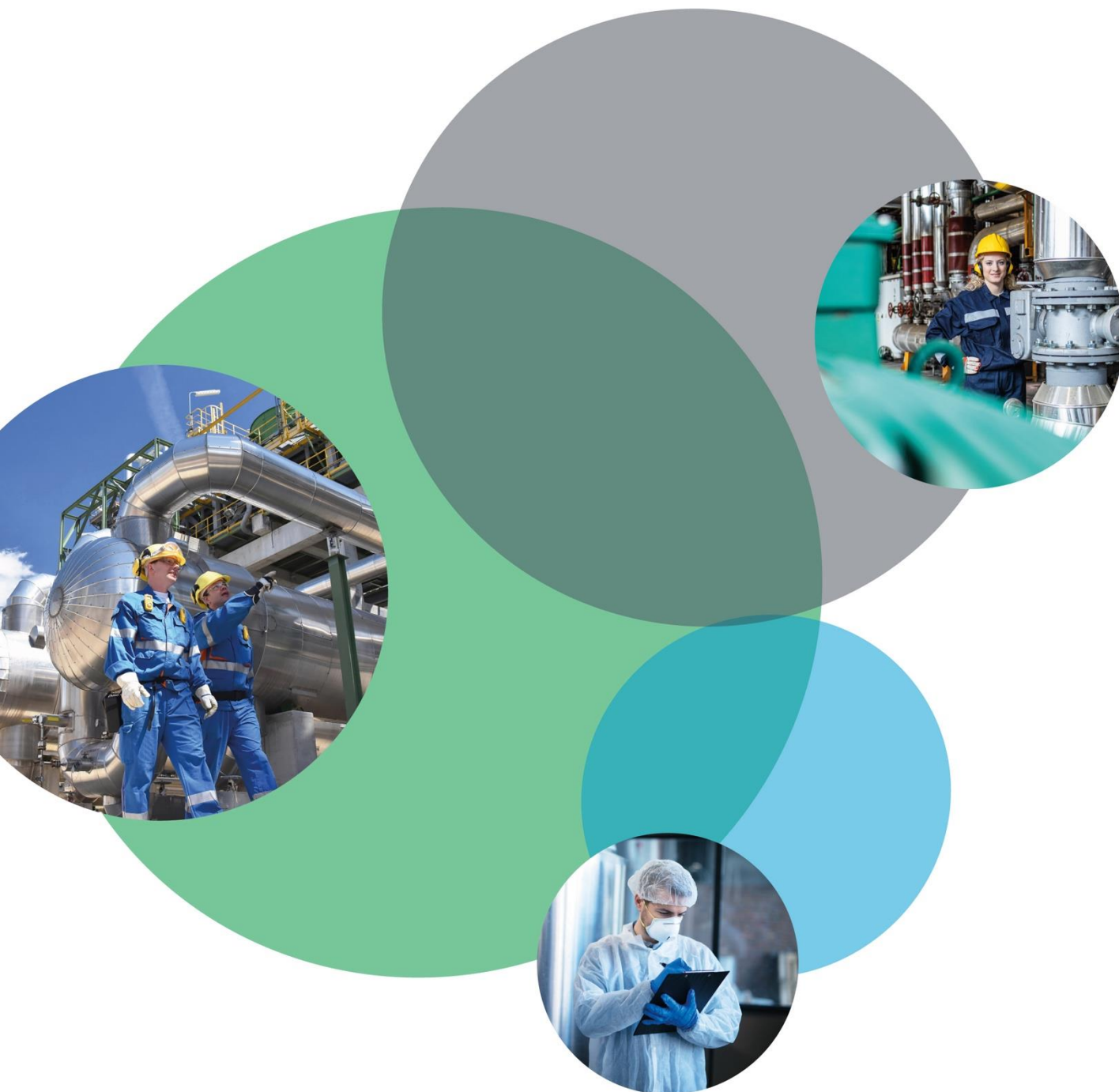




**Hydrogen Skills**  
Alliance

# Green Jobs Delivery Group – Hydrogen Task and Finish Group

Findings and Recommendations  
Executive Summary



## Introduction

Understanding the future labour market is vital for the smooth transition to a net zero economy. To deliver a robust future talent pipeline, both industry stakeholders and the government must not only identify the challenges employers face but also understand their root causes.

This report is an executive summary of the Hydrogen Skills Workforce Assessment undertaken by the Hydrogen Skills Alliance, on behalf of the Green Jobs Delivery Group Task and Finish Group. The assessment consists of three parts; Workforce Data Assessment, Key Industry Issues, and Industry Data Collection.

The Workforce Assessment is based on the questions presented in the Green Jobs Delivery Group Workforce Assessment Tool.

## Background

The UK Hydrogen Strategy, published in August 2021, envisioned that the UK hydrogen economy could support 9,000 jobs by 2030 and 100,000 by 2050. However, the current production capacity is limited, necessitating a 10,000-fold increase for the targeted 10GW output by 2030. Due to the industry's small base and uncertainty in production capacity, workforce forecasting remains indicative, and revised figures have been calculated as part of this assessment.

To complete the assessment, the follow activities were undertaken:

- Extensive desk-based research exercise, including a review of international studies from Australia, Canada, and Europe, as well as Cogent Skills' catalogue of science industry skills research
- Employer input and feedback to Cogent Skills in developing the National Occupational Standards for Hydrogen Production, Storage and Usage
- Industry-wide workshop specifically to garner input to these questions
- Hydrogen UK employer workshops (including live poll results)
- Interrogation of data and research undertaken to date by IDRIC
- Data available on existing projects and capital expenditure
- Online surveys
- Dialogue with hydrogen industry bodies in Australia and South Africa

## Scope of Assessment

The Workforce Assessment data includes the production, storage, distribution, and usage aspects of hydrogen, and only considers the supply chain in relation to the pre-construction and actual construction of facilities in these parts of the hydrogen chain.

Out of scope are any specific analysis of the size of the workforce relating to UK content of the supply chain. As yet, there isn't sufficient certainty over the UK content for hydrogen and therefore, these job numbers are excluded.

It's important to note that the workforce assessment may underestimate the roles requiring training in hydrogen-related skills across the entire hydrogen economy. As the industry evolves, continuous review and reassessment are essential, with future assessments aiming to encompass a broader representation of usage and the supply chain. This underscores the need for a more long-term dynamic model for jobs forecasting in this developing industry.

**Note:** This report is an assessment, and not an action plan.

## Summary of Workforce Numbers

The Hydrogen Skills Alliance investigated several different sources to attempt to determine a magnitude of workforce demand. Each analysis method gives a slightly different figure; however, they are largely of a similar magnitude and similar to models used elsewhere.

The methodology selected is research undertaken by IDRIC which takes Capex spend and calculates jobs per £m of Capex. This was identified in the government's "Enabling the Transition to a Green Economy" report and serves as a singular reference point for calculating workforce demand.

Using this method, the following workforce figures have been calculated:



**Total jobs to 2030 for all areas of hydrogen  
- 29,000 direct and 64,500 indirect.**

	Production	Transmission (e.g. project union)	Transportation & distribution	Storage	Transport (usage)	Industrial	Heat	Power	Total
<b>Direct</b>	8,500	6,000	1,500	3,000	3,500	2,500	175	3,500	28,675
<b>indirect</b>	24,000	13,500	3,000	6,000	7,500	3,500	300	6,000	64,500

( HUK, Hii, Cogent Skills/HSA)

## Key Industry Issues:

### Skills and Labour Shortages

*Labour is required in three distinct phases: preconstruction, construction, and operations (including maintenance). The scarcity of skilled workers hampers scalability, hindering sector growth. A significant 84% majority of employers surveyed believe that the UK's current workforce doesn't adequately serve the sector's needs, indicating a pressing skills gap that has immediate impacts. There are specific shortages in many construction and engineering trades, many of which are on the 'Skilled Worker Visa: Immigration Salary List' <sup>[1]</sup>.*

Roles requiring experience can only come from adjacent industries where there are similar skillsets. In the case of hydrogen, such industries include the chemical and oil industries. Research reports for these sectors reveal significant shortages in the same job roles identified as lacking in the hydrogen sector. According to the Green Jobs Taskforce, over 90% of the UK's oil and gas workers can transfer their skills to other energy sectors, but this is more limited for hydrogen.

There are several challenges faced with transitioning the workforce:

- Ageing workforce
- High competition for skills
- Reissuing of North Sea Licences
- ED&I
- Timescales and Asset Management

### Key Recommendations:

- Develop a system to identify, assess, and map transferable skills from the Oil and Gas sector and other sectors to the Hydrogen industry.
- Design and implement training programs tailored to up-skill and retrain other industry workers for roles in the Hydrogen sector.
- Advocate for, and introduce incentives such as training funding, employer subsidies, and adjustments to the Apprenticeship Levy to support workforce transition.
- Design and execute awareness campaigns to highlight opportunities within the Hydrogen sector and to raise awareness among other industrial workers.

### Uncertainty around workforce demand

Workforce demand in such a nascent industry is extremely challenging to accurately predict, in particular, workforce Policy and political factors emerge as significant hurdles. Ambiguities in timing alignment, policy shifts, and political dynamics create an uncertain foundation for prospective employees. Investment too, stands out as a prominent theme. From direct funding for operations to investing in skill development, the industry has challenges with where and how to channel resources. The interconnected nature of investment with training is evident, with appeals for "funding training" and creating infrastructures that foster talent growth.

Whilst projects have had detailed workforce models, the assessment was not able to access all of them due to data protection. Additionally, the projections themselves have not been consistent and demonstrate the lack of certainty around the actual demand and requirements for jobs in the future.

### Key Recommendations:

- Development of a Dynamic Modelling Tool for Hydrogen Workforce Planning
- Advance the establishment of a data-sharing platform for dynamic modelling of workforce demand and skills forecasting.
- Streamline guidelines and ensure consistency with IfATE's occupational maps, simplifying integration for training providers and employers.
- Enhance the predictive capacity of LSIPs with tools like the workforce foresighting hub to effectively anticipate future industry needs.

### Sector and technology awareness and attractiveness

Many of the roles needed to fulfil the needs of a hydrogen economy are STEM roles. Engineering, and other STEM industries remain a major area of skills shortage throughout the UK. According to UCAS<sup>[2]</sup>, acceptances to engineering courses are up 21% from 25,995 in 2011 to 31,545 in 2020, however 'STEM learning' have estimated there is a shortfall of over 173,000 workers in the STEM sector<sup>[3]</sup>. Some of the key challenges faced by the hydrogen industry (as well as many other STEM industries) are as follows:

- Sector Awareness and Attractiveness
  - Employers during the engagement activity stressed the urgent need to integrate renewables and hydrogen topics into primary and high school education.
- Compensation and company dynamics with salary expectations
- Engineering shortages

Specifically, the roll-out of T-Levels, while intended to benefit the educational framework, has encountered obstacles, and the Apprenticeship Levy's rigidity in usage is another concern. The current system does not support its application for shorter, more targeted courses, which are sometimes more apt for reskilling or bridging minor skills gaps.

Skills Bootcamps have garnered attention in the hydrogen sector, yet their uptake has been low with only 8%, on the consideration list for nearly a third (29%) of the respondents. This indicates potential growth in their adoption in the near term. However, a substantial portion (42%) remains unaware or uncertain of the potential benefits of Skills Bootcamps.

#### Key Recommendations:

- Implement a UK-wide campaign to promote green jobs, highlighting the hydrogen sector's opportunities within existing national campaigns and through employer engagement activities.
- Launch an accessible careers campaign to support hydrogen employers to recruit and raise awareness of careers in hydrogen technology.
- Create a dedicated hydrogen sector section on the National Careers Service (NCS) website and develop digital outreach programs in partnership with the Careers & Enterprise Company (CEC).
- Create a hydrogen in schools industry pledge supported with accessible campaign materials

#### Lack of EDI within industry

Gender balance – whilst hydrogen as a sector is still young, it is fair to assume that without a very different approach to other sectors, the gender and EDI disparity currently found within construction and manufacturing & production will be repeated during the development of the hydrogen economy.

#### Key Recommendations:

- A collaborative effort to create flexible work environments and targeted initiatives, such as scholarships and mentorship programs, to attract and support women and underrepresented groups in STEM fields.
- Leverage government-backed incentives and partnerships with educational institutions to promote diverse talent recruitment and establish clear workforce pathways in STEM jobs with significant wage gaps.
- Consider a major recruitment drive to support Hydrogen Gender parity.

#### Unknown usage supply chain requirements due to nascent technology

Supply Chain Jobs: As yet, there isn't sufficient certainty over the UK content for hydrogen and therefore, these job numbers are difficult to predict and plan for.

Usage: The extent of the usage of hydrogen is not yet fully known and therefore it is challenging to quantify the workforce size, and therefore these job numbers are difficult to predict and plan for.

#### Lack of clarity of hydrogen specific related roles

There is an ongoing rapid evolution of the hydrogen sector without a structured approach to identify and train for skills. This leads to a key challenge of a lack of training benchmarks. Hand in hand with policy challenges is the industry's urgent need for specialised training and skills. A significant number of stakeholders emphasised the lack of standardised training, qualifications, and recognised benchmarks in the hydrogen sector.

Many roles are not unique to hydrogen but require additional knowledge and skills for traditionally trained employees to be able to work in a hydrogen context (Skills for Hydrogen).

This is a nascent industry and as it develops there is no clear description of the changes required to occupational competence when working in hydrogen roles.

### Key Recommendations:

- Develop a dynamic Hydrogen Skills Framework that is adaptable and responsive to the changing needs of the industry.
- Articulate the hydrogen 'delta' that differentiates between roles in other industries to aid the identification of the hydrogen specific training
- Promote the 'skills value chain' approach, ensuring a skilled workforce is developed in line with the hydrogen sector's demands.
- Propose the formation of an authoritative board with key industry and educational stakeholders to drive cohesive strategies and policies.

### Additional challenges identified

Additionally, since the initial workforce assessment activities, there are two further key challenges that have been identified, with recommendations proposed:

#### **Lack of capacity in trainer provider network**

##### *Key Recommendations:*

- Convene and develop learning curriculum for all providers to access, modelled on learnings from the National Electrification Framework and Forum.
- A develop once use many times approach will derisk delivery for providers who need scale
- Upskilling train the trainer development to support delivery
- Development of a network of excellence of hydrogen training provision

#### **Lack of regulator capacity and expertise**

##### *Key Recommendations:*

- Create targeted upskilling opportunities for regulators to ensure they possess a deep understanding of the hydrogen industry's intricacies.
- Engage with regulators to expedite discussions and activities within the Control of Major Accident Hazards (COMAH) forums.
- Foster international cooperation to assimilate global best practices in hydrogen safety and regulation.
- Update training to align with current industry standards, and involve safety specialists and regulators in collaborative policy development

## Industry Data Collection

The industry collects data to understand the existing workforce. Specifically, it collects data on:

- Demographic characteristics (including protected characteristics)
- Flexible working
- Qualifications (and other training) – both public and private
- Use of Shortage Occupations List to recruit (migration)
- Pay
- Previous occupation (in SOC or otherwise)
- Skills and level
- Use of Skilled Visas route to recruit (migration)
- Length of service in current and previous roles

There are a number of challenges faced by the sector when collecting the data above, and also workforce forecasting data, specifically:

1. Time Intensity
2. Willingness and Cooperation of Employers around data sharing
3. Employee-Based Data Collection distribution challenges
4. Data Diversity & Collation – Data from different sources is inconsistent
5. Reliance on National Statistics
6. Lack of Visibility

## Conclusion

In conclusion, the Hydrogen Skills Workforce Assessment underscores the urgent need for a strategic and dynamic approach to workforce development, emphasizing collaboration between industry stakeholders and the Government to address skills shortages, enhance sector attractiveness, and establish robust training standards, thereby ensuring the UK's hydrogen economy can thrive and meet its ambitious targets.

## Appendix 1: List of Consultees:

- Advanced Technology Institute
- Alstom Group
- Arup
- ATOME
- Barassie Engineering Systems
- Bowman Power
- BP
- Briggs Equipment
- British Solar
- Business West
- Cadent Gas
- CATCH
- Cogent Skills
- Commercial Fuel Solutions
- CPH2
- Cranfield University
- Croysdale
- De Courcy Alexander
- Dundee and Angus College
- Efectis
- Element Materials Technology
- Energy & Utility Skills
- Enginuity
- EnQuest
- Equinor
- ESB (Electricity Supply Board)
- Finning
- Ford
- Fuzzy Logic Studio
- Gemserv
- GeoPura
- Greenergy
- Greenfold Systems
- HiiROC
- Hoyer Group
- Hydrasun
- Hydrogen Energy Association
- Hydrogen UK
- ID Systems
- INEOS
- Ingersoll Rand
- Loughborough University
- MES International
- National Composites Centre
- National Grid
- Net Zero Technology Centre
- Northern Gas Networks
- Offshore Renewable Energy Catapult
- Optimat
- Parker
- Phillips 66
- Renewable UK
- Reynolds Training
- Road Haulage Association
- RWE
- SDS (Skills Development Scotland)
- SGN (Scotia Gas Networks)
- Shell
- Siemens Gamesa
- Source Galileo
- SSE (Scottish and Southern Energy)
- Statera Energy
- Statkraft
- Swagelok Manchester
- Tevva
- The Blair Project
- TSA (Tenant Security Authority)
- UK Department for Education
- UK Department for Energy Security
- UK Higher Education Academy
- Ulemco
- Uniper
- University of Birmingham
- University of Strathclyde
- Vinci Construction
- Wales & West Utilities
- WAWWA
- WEIoT (West of England IoT)
- Wincanton

## References

- [1] <https://www.gov.uk/government/publications/skilled-worker-visa-immigration-salary-list/skilled-worker-visa-immigration-salary-list>
- [2] <https://educationhub.blog.gov.uk/2021/02/09/more-young-people-are-taking-stem-subjects-than-ever-before/>
- [3] <https://www.stem.org.uk/sites/default/files/pages/downloads/stem-skills-indicator-findings.pdf>