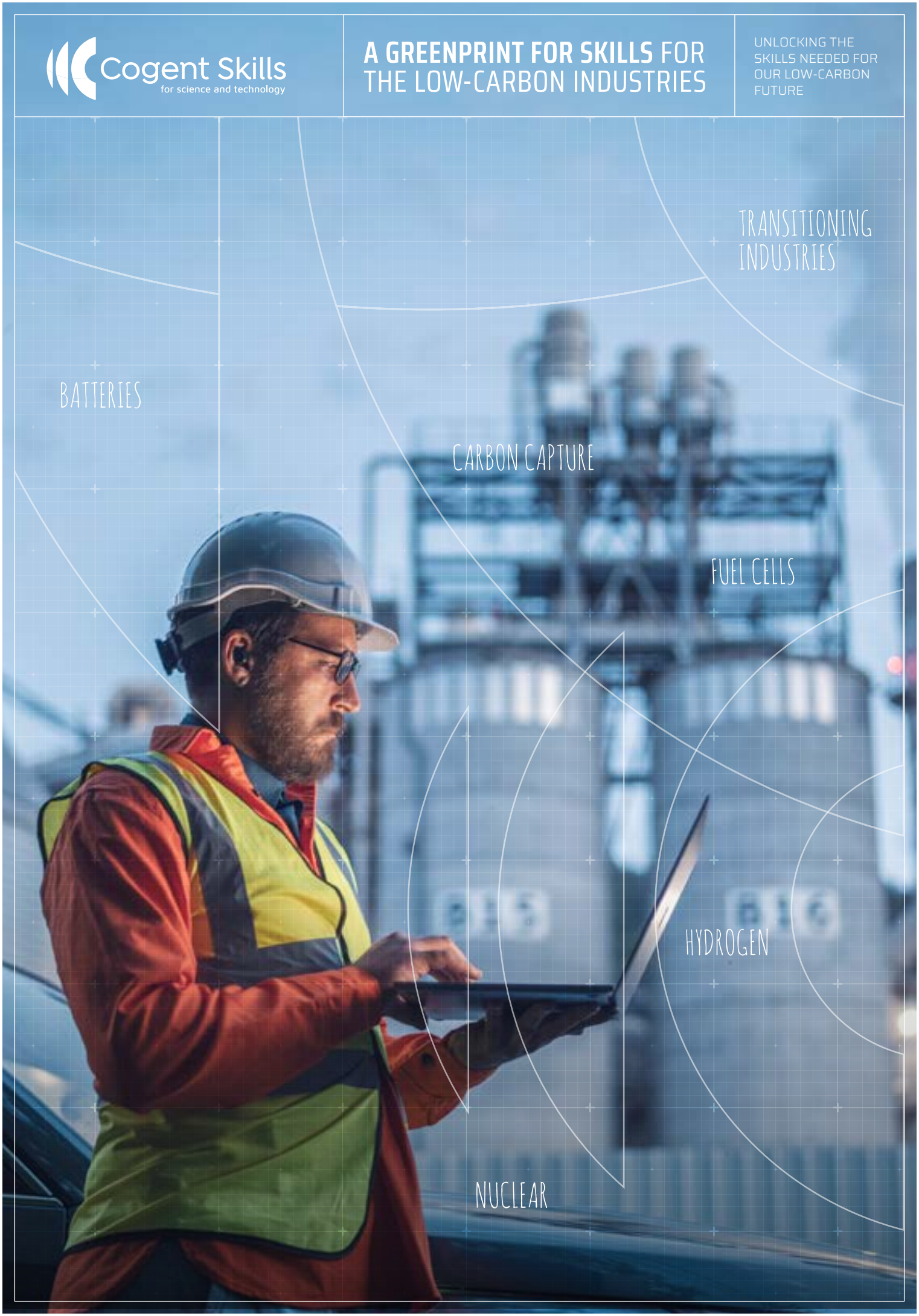
Cogent Skills
for science and technology

A GREENPRINT FOR SKILLS FOR THE LOW-CARBON INDUSTRIES

UNLOCKING THE SKILLS NEEDED FOR OUR LOW-CARBON FUTURE



A **GREENPRINT** FOR SKILLS FOR THE LOW-CARBON INDUSTRIES

Our 'Greenprint' is a strategic roadmap that provides clarity and direction for advancing the green-skills and occupations required to achieve net zero within the UK science and technology sector.

The findings are employer-led, based on desk research and discussions with more than 40 industry experts across a range of low-carbon industries, including **Hydrogen, Carbon Capture, Batteries, Fuel Cells,** and **Nuclear.**

At the same time, many established industries, such as **Downstream Petroleum, Chemicals,** and **Polymers** (known as transitioning industries), are also evolving and must find new ways of working to deliver the transformative innovations necessary for achieving net zero.

The full report provides an overview of each technology area, followed by an occupation and skills mapping exercise detailing the roles needed. We then analyse the current supply of skills in these areas before offering recommendations on how industry and its stakeholders can work collaboratively to manage the transition.

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Hydrogen | Carbon Capture | Batteries | Fuel Cells | Nuclear | Transitioning Industries

FOREWORD

I'm proud to say we've been at the forefront of the skills agenda, working on behalf of UK science-based companies for more than two decades. From safety training standard setting to working with policy-makers to create the skills environment employers need to thrive. As a charity committed to supporting employers in our sector, everything we do is focused on raising the bar on skills in science and technology.

Yet, as employers embark on their own net zero journey neither the skills required nor their availability are known – at least with any certainty. Therefore the size of any 'green skills' gap is not known. Indeed, the term green skills (sometimes unhelpfully applied) is a broad descriptor that applies to a range of technical skills needed to support the transition. What is clear is unless our industry can access the next generation of talent – including engineers, scientists, technicians, and operators – any plan for a just transition is destined to fall short.

The rapid growth and development of these industries necessitate an agile and adaptive skills system capable of meeting the demands of an evolving workforce. The ability to train enough people in the right areas and at the right levels in time for when they are needed is critical for success.

Understanding the maturity of each sector, expected job roles, and qualification levels is essential for the UK to fulfil its climate commitments and maintain its position as a global leader in innovation. Science engineering such as chemical processing in particular, is indispensable in reaching net zero, as it provides the expertise needed to design, build and optimise new technologies whilst ensuring efficient maintenance of plants. This key discipline will ensure new low-carbon technologies are efficient, cost-effective and reliable.

Transitioning industries – such as downstream petroleum, chemicals and polymers – must also attract a workforce which can maintain operational resilience while simultaneously advancing strategies for long-term sustainability. If these industries are not viewed as part of the solution, employers may struggle to recruit the staff they need to deliver the transformative innovations crucial for achieving net zero.

While the existing workforce has an important role to play, the next generation of talent will be absolutely critical. Research shows young people are highly motivated to combat climate change; the challenge lies in raising awareness of the available job opportunities and encouraging them to pursue careers in these fields.

Our journey towards a more sustainable future is one that demands the combined efforts of all employers and stakeholders. By fostering a spirit of collaboration, strategic thinking, and–most importantly–action, we can rise to the challenge and unlock the vast potential of our emerging low-carbon industries.

At Cogent Skills, we are committed to playing our part in this national effort. This report concludes with a list of next steps we will undertake to support the growth and development of our low-carbon industries. I am confident this report will inspire both optimism and determination as we work together in building a skilled workforce which will lead us towards a sustainable, prosperous future.

Justine Fosh,
Chief Executive
Cogent skills

The transition to a low-carbon economy is a once-in-a-generation opportunity to enhance our resilience to the impact of seismic global events and spearhead a new chapter of green growth.

Data from the Office for National Statistics suggests the low-carbon and renewable energy sector was worth almost £55 billion to the UK in 2021 – up nearly a third from the previous year. This striking financial indicator is only part of the broader picture, as green skills become increasingly important in science businesses and across the economy as a whole.

Technical skills will be instrumental in driving this transformation. Businesses across the science sector are rightly keen to understand their future skills requirements and fill any gaps, whether by attracting new and emerging talent or through upskilling the existing workforce. Developing these skills is critical for the successful implementation and integration of low-carbon technologies and solutions.

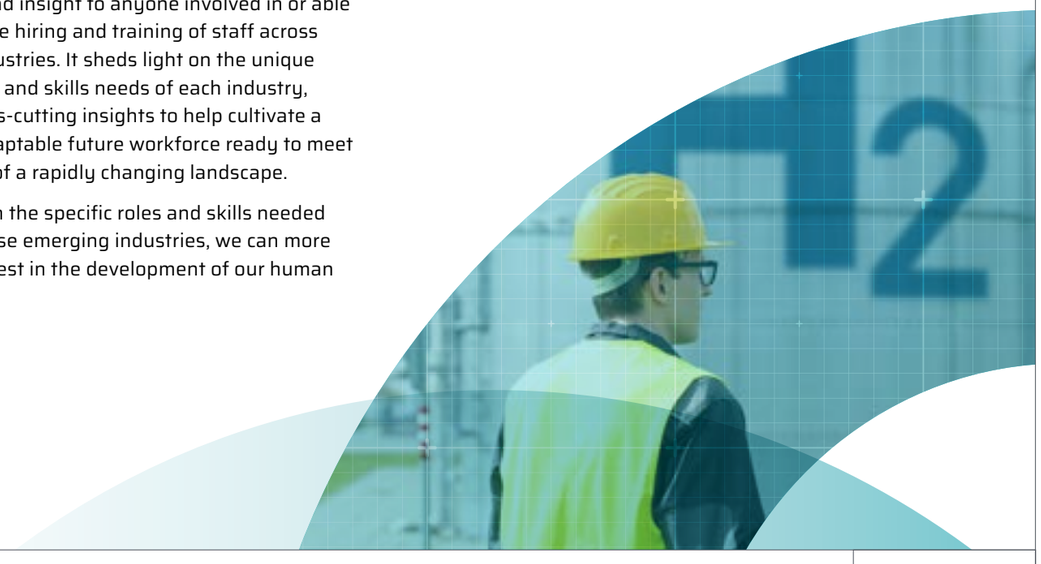
This report serves as an invaluable source of information and insight to anyone involved in or able to influence the hiring and training of staff across a range of industries. It sheds light on the unique characteristics and skills needs of each industry, providing cross-cutting insights to help cultivate a skilled and adaptable future workforce ready to meet the demands of a rapidly changing landscape.

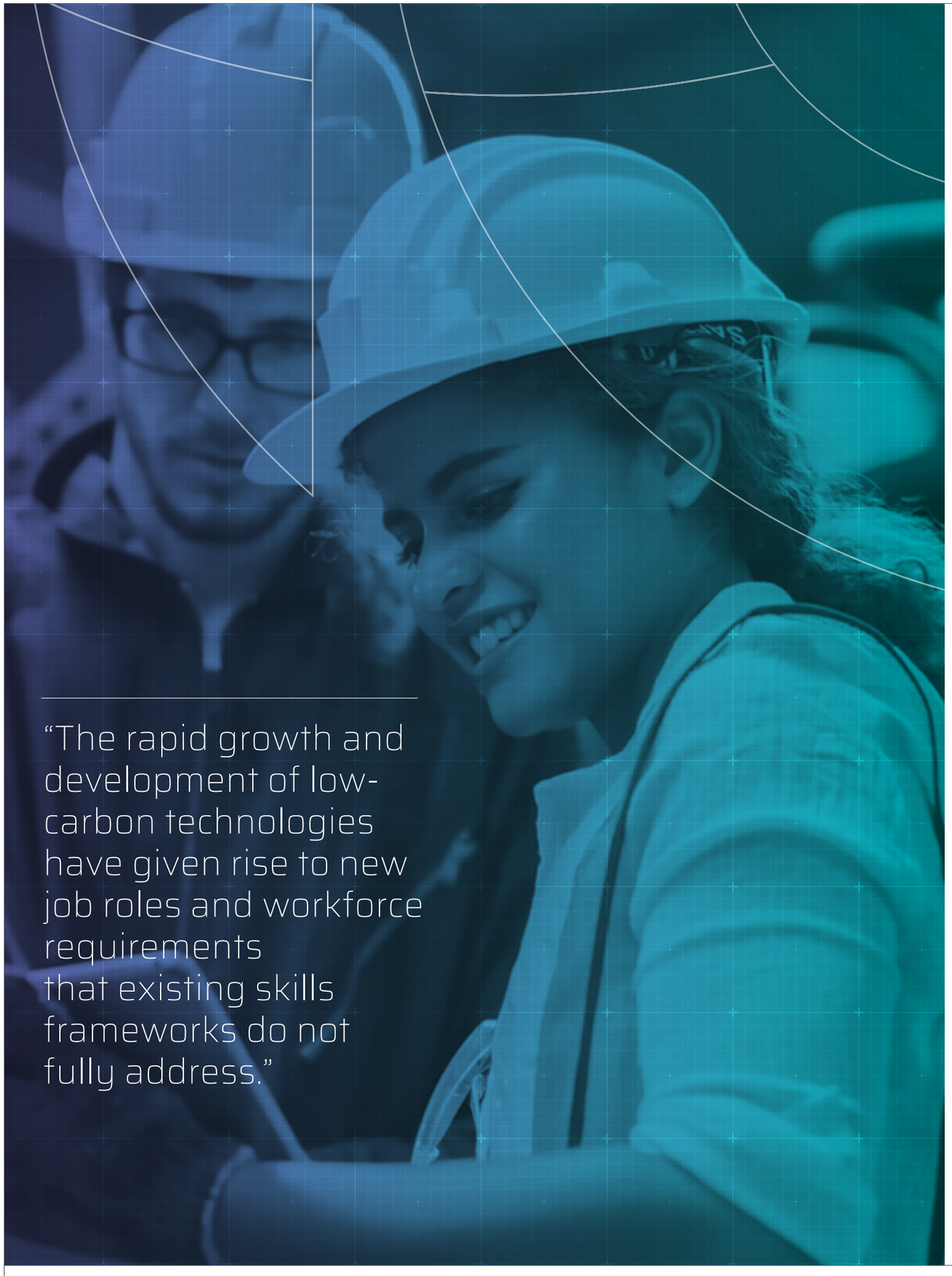
By focusing on the specific roles and skills needed to support these emerging industries, we can more effectively invest in the development of our human capital and ensure the workforce is equipped to face the challenges ahead. This includes the importance of assessing the current workforce's transferable skills, identifying gaps, and developing specialist courses.

The report highlights the need for a proactive approach to skills development, acknowledging that only through concerted action can we truly deliver on our commitment to net zero.

In light of this, embedding green skills across the economy must become a national priority if we are to preserve our current way of life and ensure a sustainable future. We hope this report provides a catalyst for developing the workforce capable of realising this vision in the years to come.

Professor Joe Howe,
Academic Lead for the Humber Industrial Cluster,
University of Lincoln





"The rapid growth and development of low-carbon technologies have given rise to new job roles and workforce requirements that existing skills frameworks do not fully address."

INDUSTRY INSIGHT

THE TECHNOLOGICAL MATURITY OF EACH INDUSTRY IMPACTS THE GRANULARITY AND ACCURACY OF FUTURE WORKFORCE PROJECTIONS

The skills requirements, manufacturing processes, and future demand are relatively well-known for established sectors like Nuclear, making it easier to predict and prepare for the number and types of jobs required. However, for industries in the earlier stages of technological development, uncertain manufacturing routes and weak demand signals mean that more must be done to clarify the precise job and skills requirements across a range of different growth scenarios.

DIFFICULTY IN QUANTIFYING HOW MUCH OF THE EXISTING WORKFORCE HAVE GENUINELY TRANSFERABLE SKILLS

While the types of low-carbon technologies that will be important are generally well understood, the exact composition of industries required to achieve net zero is still largely unclear. This uncertainty makes it difficult to know just how much of the current workforce has genuinely transferable skills, whether they could enter the same type of roles at similar salary levels, and how much an ageing workforce limits the number of transfers.

LACK OF CLARITY OVER WHICH ROLES WILL NEED DEDICATED COURSES AND TRAINING

While our initial analysis suggests emerging technologies like hydrogen, carbon capture, and fuel cells may require bespoke training, the types of courses and specific roles that require dedicated apprenticeships or short courses still need to be identified. Engaging with industry to understand their views will be critical to ensuring that the right qualifications and skills are developed in time to support the ramp-up.

"If the transitioning industries are not viewed as being part of the solution, they will struggle to attract the workforce needed to deliver the considerable disruptive technological improvements that are so important to the national effort for net zero."

CHANNELING YOUNG PEOPLE'S MOTIVATION TO SOLVE CLIMATE CHANGE INTO PURSUING CAREERS IN LOW-CARBON TECHNOLOGIES

Employers repeatedly told us of difficulties in recruiting technicians, operators, and maintenance staff who are typically trained to Level 3 or 4 equivalent. A key issue raised was the perceived attractiveness of manufacturing environments compared to other career pathways for the new generation of workers. The emergence of new low-carbon technologies presents an opportunity to reposition these roles by harnessing the motivation of young people in relation to environmental sustainability.

THE DEPLOYMENT OF LOW-CARBON ENGINEERING AND SCIENCE ROLES IS HIGHLY DEPENDENT ON THE CONSTRUCTION SECTOR MEETING EXPECTED DEMAND

Greater understanding is needed of how the scale-up of new low-carbon technologies will create jobs across the entire project life cycle. This needs to take into consideration the design and construction of facilities, as well as the operational and maintenance staff required to operate them.

THE IMPORTANCE OF FORGING PARTNERSHIPS WITH ADJACENT ORGANISATIONS IN THE SKILLS AGENDA

Significant coordination across different industry segments will be required to accurately quantify the number of future roles and qualifications required. Strategic partnerships with industry, training providers, and trade associations will be needed to reduce the duplication of activities and focus efforts on the most pressing challenges.

RECOMMENDATIONS

Our work with employers led to the identification of four key themes that have been used to structure the recommendations. Under each theme, specific recommendations are provided.

Skills Strategy

An overarching skills strategy that instills confidence and stability in both industry and government, supporting long-term investment in skill development and planning.

- Establish clearly defined role profiles for key positions.
- Deliver an industry-led low-carbon skills strategy for each technology area.
- Develop workforce projections to anticipate future skills demand in different growth scenarios.

Skills System

The methods and precise mechanisms utilised by industry to address the current skills demand.

- Enable a stable and consistent policy environment that fosters employer engagement on skills and encourages longterm strategic planning.
- Develop and maintain a diverse range of apprenticeship standards that reflect modern technological developments and industry needs.
- Ensure the UK visa system facilitates the flow of workers into the low-carbon industries to meet urgent and crucial skills requirements.

Future Workforce

Activities that aim to create a sustainable talent pipeline to meet future skills demand.

- Promote careers outreach programmes to educate and inspire young people to enter the low-carbon industries.
- Raise awareness of the importance of the low-carbon industries in securing the net zero transition.
- Undertake research to understand the equality, diversity & inclusion (ED&I) issues of the workforce and identify best practices to inform the action plan.

Enabling the Transition

Short-term measures to facilitate the UK's transition towards a net zero economy.

- Promote a culture of lifelong learning and continuing professional development (CPD) to ensure a skilled and committed workforce capable of delivering the transition.
- Develop clearly defined pathways to facilitate the transition of workers from adjacent industries to bring cross-sector learning.
- Understand and define regional skills requirements, connecting economic hubs and industrial clusters to deliver nationally for industry.

"INDUSTRY NEEDS TO TAKE PROACTIVE MEASURES TO ADDRESS CONCERNS AND EMPHASISE THE OPPORTUNITIES FOR INNOVATION AND GROWTH IN THE SECTOR."

"STRATEGIC PARTNERSHIPS WITH INDUSTRY, TRAINING PROVIDERS, AND TRADE ASSOCIATIONS WILL BE NEEDED TO REDUCE THE DUPLICATION OF ACTIVITIES AND FOCUS EFFORTS ON THE MOST PRESSING CHALLENGES."

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IMPACT AND SUCCESS

The Nuclear Skills Strategy Group

With UK Nuclear set for unprecedented levels of growth, sector-led intervention is required to mitigate critical skills risks. The Nuclear Skills Strategy Group (NSSG) actively profiles the supply and demand of skills and is committed to supporting the industry in the creation of a workforce capable of meeting the demands of the sector. The NSSG brings together all areas of UK nuclear to encourage and facilitate effective collaboration. With a risk-based and insight-led approach to skills planning, utilising the latest labour market intelligence, the NSSG identifies, analyses, and addresses the key issues and risks affecting the supply of skills. The NSSG provides an effective 'one voice' on skills and represents industry coming together to resolve the most pressing skills issues, for the success of our nuclear sector.

NSSG

Hydrogen Skills Alliance

A collaboration with the High Value Manufacturing Catapult (HVMC), the Hydrogen Skills Alliance (HSA) is committed to building a skilled workforce necessary to support the growth and development of the UK hydrogen sector.

Ensuring employers can access the talent needed to compete, innovate and grow as we meet the demands of a changing energy landscape and deliver our net zero ambitions. The HSA will be fully inclusive inviting representatives from industry, academia, research, industrial clusters, government, skills bodies and others with a genuine interest in ensuring that the UK has the necessary people and skills to support the move to a hydrogen-fuelled economy as part of the move to a low-carbon future.

Hydrogen Skills
Alliance

"HAVING A CLEAR UNDERSTANDING OF THE POTENTIAL DEMAND FOR SKILLS HELPS TRAINING PROVIDERS AND EDUCATIONAL INSTITUTIONS TO DEVELOP COURSES AND CURRICULA THAT ALIGN WITH THE EMERGING NEEDS OF INDUSTRY."

OCCUPATION AND SKILLS MAPPING

Occupational skills maps group related knowledge, skills and behaviours into pathways, making it easier to see the opportunities for career progression within that particular route.

The maps provide a useful guide to show the technical pathways for employers, individuals and training providers.

Value Chain Steps	Subject Areas	Job Types	
Underground Storage of Hydrogen **The importance of engineering skills emerged consistently during the occupation and skills mapping exercise**	• Chemical, Mechanical, Petroleum Engineering • Geological Engineering Geology • Geophysics Industry Mechanic • Aerospace Engineering	**Engineers**	
		• Drilling & Completion Engineer	• Cavern engineer
		Field Operators	
		• Drilling Crew • Heavy duty mechanic • Reservoir technologist	• Service rig crew • Well completions operator • Well completions supervisor
		Geoscience Professionals	
		• Geologist • Geophysicist	• Geotechnical Specialist
		Surface Facility Operations & Maintenance	
		• Control centre operator • Compression specialist	• Maintenance trades • Measurement specialist

Black text = Entry or low skill level Green text = Intermediate skill level Purple text = High skill level

NEXT STEPS

The need for proactive action cannot be overstated. If we fail to act decisively and strategically, we risk failing to develop a workforce capable of delivering the low-carbon transition. By prioritising collaboration and adopting an agile approach to the challenges ahead, Cogent Skills is well-positioned to drive the development of the skilled workforce necessary for achieving the UK's net zero targets.

ABOUT COGENT SKILLS

We are a specialist in skills for science and technology, and a charity that's committed to making a difference on the availability and quality of skills in our sector. To find out more about our work visit www.cogentskills.com

To find out more about this report (including the full analysis) contact info@cogentskills.com