



SKILLS AND LABOUR REQUIREMENTS OF THE UK OFFSHORE WIND INDUSTRY

2018 to 2032

October 2018

CONTENTS

Page

03

Foreword

Page

04

Introduction

Page

05

The future of offshore wind

Project pipeline
Innovation

Page

07

Which regions will lead the way in offshore wind?

The projected offshore wind industry 2032

Page

08

Competition for talent across the UK

Five major challenges facing the UK infrastructure sector
What does this mean for the offshore wind sector?

Page

10

Skills that will strengthen the industry

Identified skills areas crucial to the success of offshore wind
The focus of innovation

The supply of required skills

Apprenticeships
Higher education

Page

12

Progression of relevant education from school to higher education
Women studying STEM subjects
Transferable skills from other sectors

Page

16

How do we broaden the current skills supply in the UK?

Page

17

Regional offshore wind

The Energy Estuary at a glance

Page

18

What is next?

The existing workforce
The future workforce

FOREWORD

These are exciting times for the renewables sector. The UK is leading the world in offshore wind, with more installed capacity than any other country. We need to retain this position by continuing our investment in innovation and we can only do that with inspired and creative people.

On behalf of the offshore wind industry, I am delighted to introduce this study on the challenges we face over the next decade as we seek to attract the best people to our workforce. Commissioned from Energy & Utility Skills by the Aura partners, the report's publication is timely.

In response to the UK's Industrial Strategy, we have set ourselves some very ambitious targets in our Sector Deal Prospectus – A Sea of Opportunity. Tens of thousands of new jobs will be created as offshore wind becomes the backbone of a clean, reliable and affordable energy system.

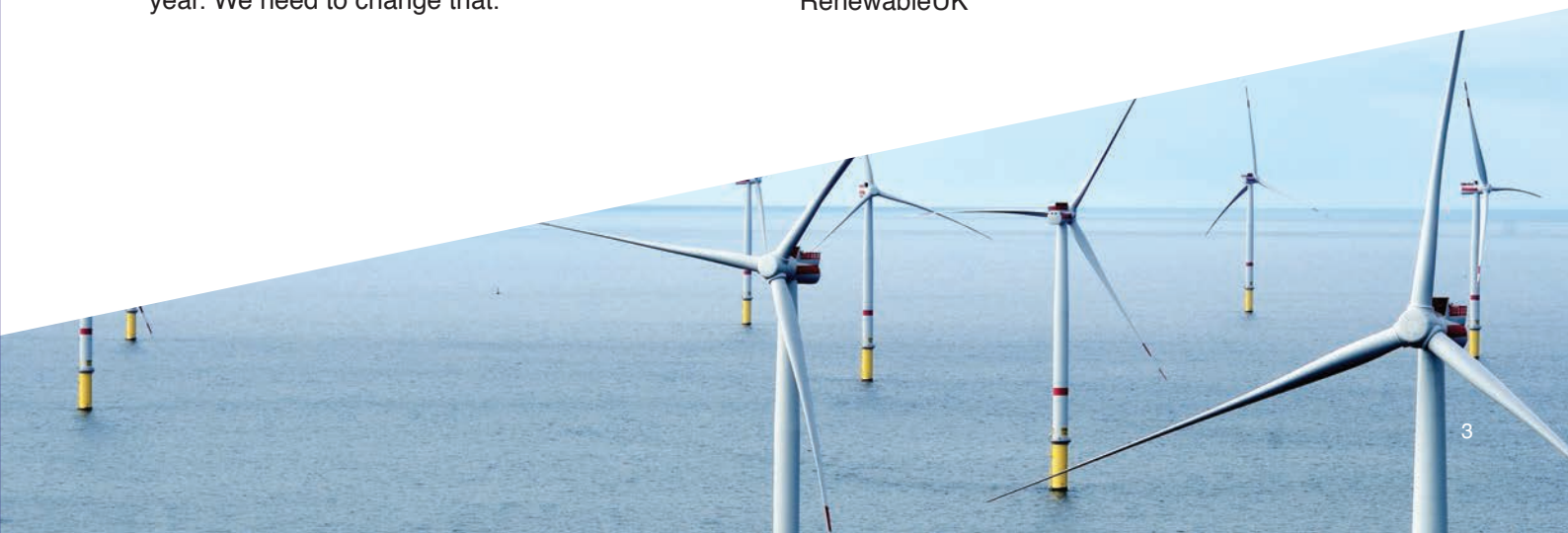
This study provides the facts that underlie some of the future struggles we will need to overcome. Based on the current project pipeline, we are going to need approximately 36,000 people employed in the offshore wind industry by 2032. To fill these roles, we are going to have to compete against other sectors to attract talented people, in what is predicted to be a very tight labour market over the next four to five years. Too few school leavers are choosing the subjects needed to work in an industry driven by technology, such as ours. The UK is already short of approximately 20,000 engineering graduates per year. We need to change that.

Our aim is to become a leading industry for diversity and inclusion. We want to be the industry of choice for women and Black, Asian and Minority Ethnic workers who want a career in a Science, Technology, Engineering and Maths (STEM) sector. We will be proactive in ensuring more females progress their studies of STEM subjects post-16. Only 35% of post-16 females study STEM subjects such as maths, physics, computing or a technical vocational qualification (compared to 94% of post-16 males). This is despite females accounting for 50% of STEM students at GCSE level.

This study demonstrates the importance of delivering a sector-wide strategy to standardise education and skills training to support clear career pathways and qualifications for all levels across the industry. Education provision is fragmented and un-coordinated in the UK today. We want to make it easier for people to work within the industry and supply chain, and to transfer from other industries and professions.

We are still a young and pioneering sector and we need to build on that to ensure that we keep our dominant position in the world. We need a highly skilled, diverse and motivated workforce to deliver innovative technologies that drive decarbonisation across the economy in the coming decades.

Hugh McNeal
Chief Executive
RenewableUK





INTRODUCTION

Aura and Green Port Hull commissioned Energy & Utility Skills to undertake a comprehensive skills study of the UK's offshore wind industry. The purpose of this study is to provide a deeper understanding of the nature and the extent of workforce supply and demand issues within the development, construction and operation of the UK's offshore wind energy sector to 2032.

The National Skills Academy for Power (NSAP) delivers initiatives, products and services identified as essential for the long-term sustainability and attractiveness of the sector by its member employers. NSAP is part of Energy & Utility Skills, which is at the forefront of bringing industry leaders together to identify and address the skills challenges our sector faces. Energy & Utility Skills is the sector's chosen workforce resilience and skills body. It has a voluntary membership of 81 of the UK's largest utility-based employers, comprising of the environmental infrastructure companies within water, power, gas and waste management/recycling and their top tier of delivery partners.

This document provides a summary of the study commissioned. The full study document can be downloaded online at the following websites:

www.aurawindenergy.com

www.greenporthull.co.uk

www.euskills.co.uk



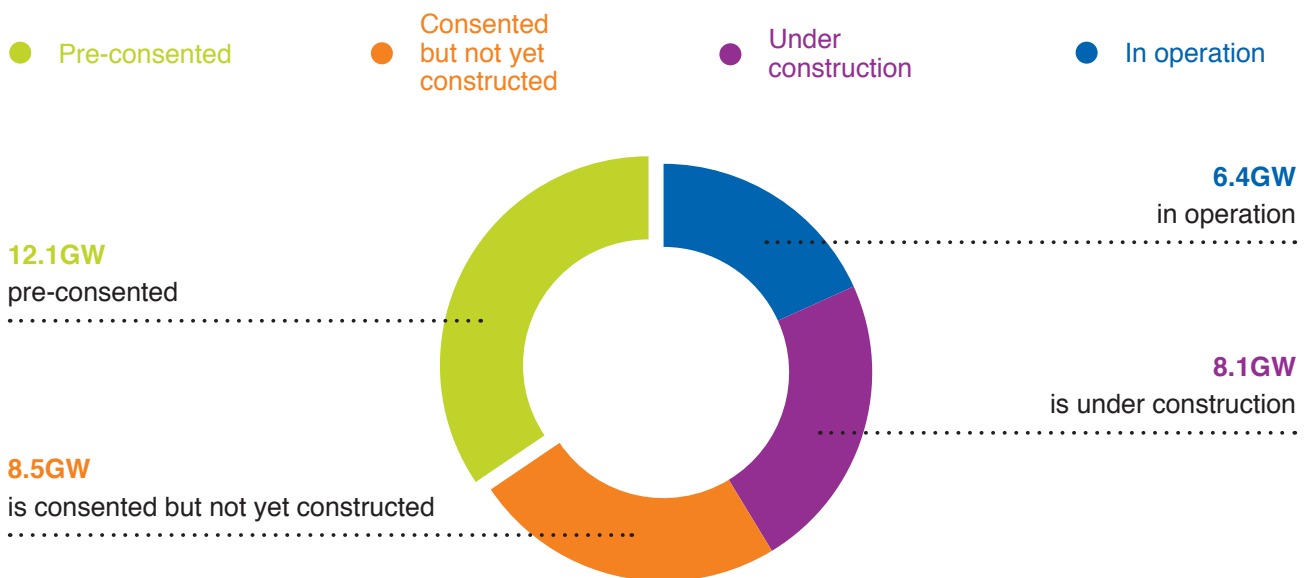
THE FUTURE OF OFFSHORE WIND

The offshore wind industry is growing. It will become a mainstream provider of low-carbon electricity. There are 65 current and planned projects which could generate up to 35 gigawatts (GW) of energy by 2032.

The current project pipeline shows the potential for the offshore wind industry to play a major role in the UK's energy mix at a fast-reducing cost, helping to

deliver sustainable green energy to many homes and businesses across the UK.

PROJECT PIPELINE



THE NUMBER OF PEOPLE EMPLOYED IN THE INDUSTRY IS SET TO INCREASE FROM 10,000 TO 36,000 BY 2032

x3

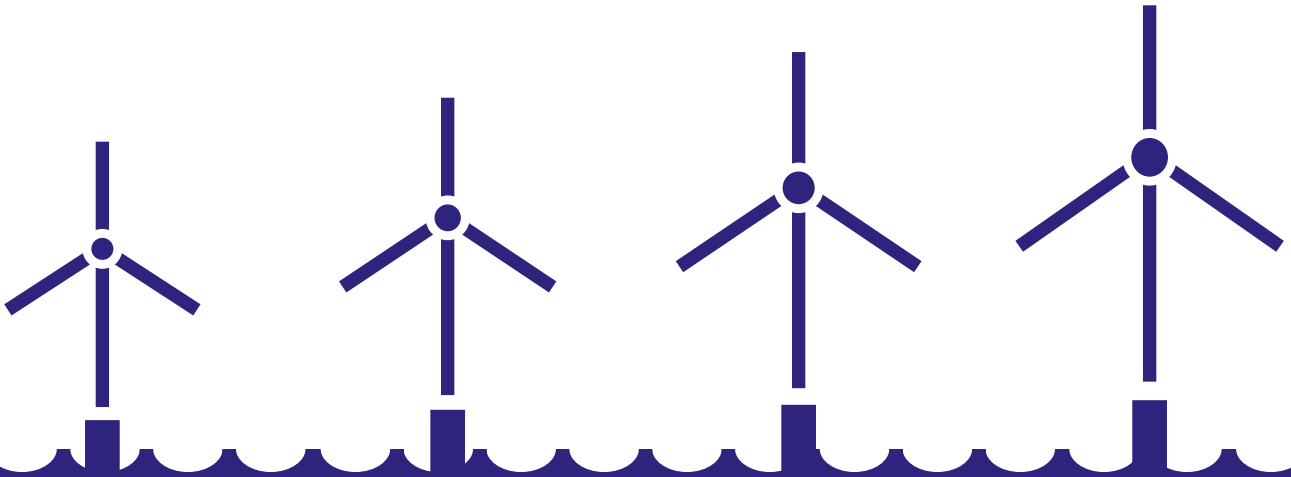
NUMBER OF TURBINES COULD MORE THAN TRIPLE FROM 1,660 IN 2017 TO 5,358 BY 2032



INSTALLED CAPACITY COULD INCREASE FIVE-FOLD FROM 6.4GW IN 2017 TO 35GW BY 2032

INNOVATION

The innovative turbine technology being employed is becoming increasingly powerful and sophisticated. Turbines could achieve outputs of 13-15 megawatts (MW) by the mid-2020s and capital costs associated with offshore wind could be reduced by 25-30%.¹



2017:

Average turbine power was 4MW.

2018:

Average turbine capacity being installed is 7MW.

2020:

Average turbine capacity in pre-consented projects is 10MW.

Mid-2020s:

Average turbine power could be 13-15MW.

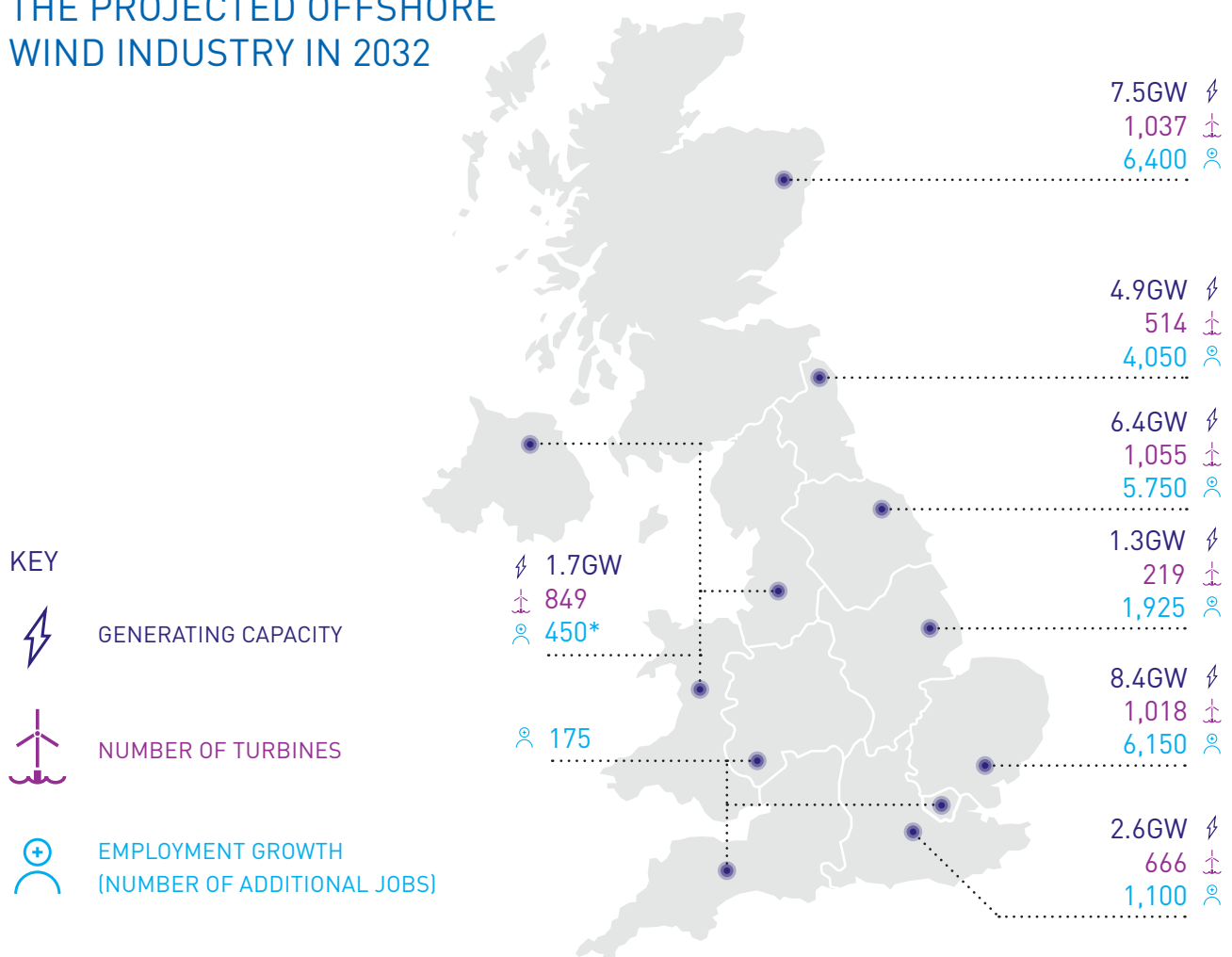
WHICH REGIONS WILL LEAD THE WAY IN OFFSHORE WIND?

More offshore wind farms are being constructed and planned than there are currently in operation. The total power generating capacity from offshore wind could grow from 6.4GW in 2017 to 35GW by 2032.

The majority of expected growth is in the North Sea which would mean regions along the east coast could increase their share of UK offshore wind capacity from 33% in 2017 to 60% by 2032.

This growth in capacity will mean that 36,000 people will need to be employed in offshore wind by 2032, 260% more than those currently employed.

THE PROJECTED OFFSHORE WIND INDUSTRY IN 2032



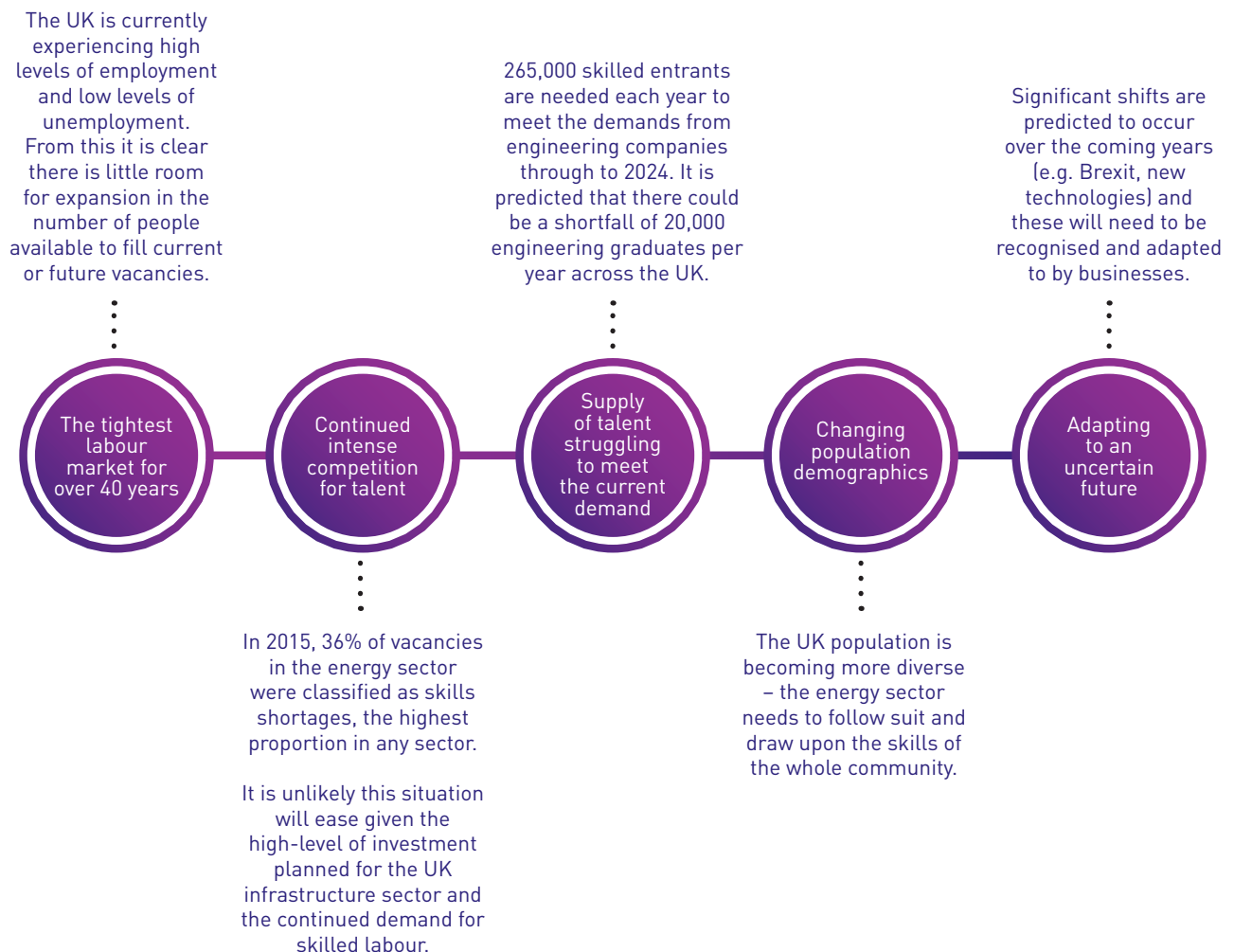
*Growth figure based on employment growth figure of the North West region, Wales and Northern Ireland.

COMPETITION FOR TALENT ACROSS THE UK

When considering the demand for skills and labour within the UK offshore wind industry, it is important to consider the wider external context and the demand for similar skills from other parts of the UK economy.

FIVE MAJOR CHALLENGES FACING THE UK INFRASTRUCTURE SECTOR

Energy & Utility Skills have identified five major challenges that the UK's energy and infrastructure sector faces at the moment, these are as follows:



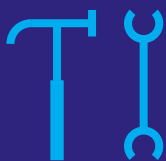
WHAT DOES THIS MEAN FOR THE OFFSHORE WIND SECTOR?



Investment in the UK's energy and infrastructure sector is reaching unprecedented levels. £57 billion will be invested into the UK's energy sector between now and 2020/21. £78.5 billion will be invested into the transport sector and £47.5 billion into the utilities sector.

£18 billion will be allocated to offshore wind, the largest single sub-sector.

£218 billion is planned for the UK's energy and infrastructure pipeline from 2021/22 and beyond.



Labour demand across the energy and infrastructure sectors will be significant, totalling around 760,000 by 2024. This includes 160,000 new jobs and replacing 600,000 people due to retirements.

There will be a total labour demand of 8.7 million jobs in the UK by 2024.

The offshore wind sector will need to compete against other desirable infrastructure sectors to acquire the 36,000 people that will need to be employed by 2032.



There will be strong competition to attract many of the technical skills required throughout the life cycle of an offshore wind farm, as many of these skills are applicable across other parts of the energy and infrastructure sector.

The availability of new talent could be an issue due to other planned infrastructure projects such as the Thames Tideway Tunnel, Crossrail 2 and Hinkley Point C. These will require similar technical skills as the offshore wind sector.



It is crucial to increase the size of the available labour pool – particularly in terms of attracting more females and those from Black, Asian and Minority Ethnic backgrounds.

The offshore wind industry and its regional supply chains will need to work together to maximise access to the required talent. They will need to minimise the extent they compete with one another.

SKILLS THAT WILL STRENGTHEN THE INDUSTRY

By 2032, we will see an increase in the operations and maintenance workforce to respond to the increased generating capacity of the offshore wind sector. This could lead to skills shortages becoming more prevalent.

Over the coming years, additional projects will enter the project pipeline, meaning there is likely to be a continued need for services, people and skills during

both the construction and operation phases of an offshore wind farm's lifespan.

IDENTIFIED SKILLS AREAS CRUCIAL TO THE SUCCESS OF OFFSHORE WIND SECTOR

ASSET MANAGEMENT	Specifically environmental, compliance and engineering
PROJECT MANAGEMENT	Ability to handle large contracts worth millions
LEADERSHIP	Ability to manage and organise teams
ENGINEERS	Across a number of relevant disciplines such as mechanical and electrical
SCIENTISTS	In environmental and physical sciences such as marine biology
TECHNICIANS	Particularly relating to blade and turbine maintenance
HEALTH AND SAFETY	Advanced first aid and rescue professionals
SOFT SKILLS	Such as team working, team living and problem solving

THE FOCUS OF INNOVATION

Developing tomorrow's innovators is vital for the offshore wind industry if it is to achieve its full potential, particularly in areas such as:

- Training and technical standards
- Vessels and logistics solutions
- Subsea cables
- Transmission
- Foundations
- Turbine technology
- Artificial intelligence and robotics
- Data analytics



THE SUPPLY OF REQUIRED SKILLS

In order to make a judgment as to whether there will be enough skilled people to meet the future demands of the offshore wind industry, we must review the current supply of skills into the UK labour market.

APPRENTICESHIPS

The take-up of apprenticeships that are directly relevant to the offshore wind industry has fluctuated since 2012. More recently, the introduction of the Apprenticeship Levy appears to have caused the take-up of apprenticeships to decrease slightly over the last year. The take-up of these relevant apprenticeships will need to be closely monitored over the coming years to help identify any potential skill gaps.

Overall, there are approximately 62 separate Apprenticeship frameworks/standards which are potentially relevant to the offshore wind industry.

After speaking to a number of employers it was clear that the following issues surrounding apprenticeships should be explored:

- ▶ **How well the full range of apprenticeships are promoted and understood by employers**
- ▶ **How companies are approaching the Apprenticeship Levy**
- ▶ **The Apprenticeship Levy Transfer policy could have the potential to be better promoted and utilised**
- ▶ **The availability of training provision where it is required**
- ▶ **Apprentices having difficulty in gaining the required on-the-job experience**



HIGHER EDUCATION

The availability of higher level talent in regions of offshore growth could be an issue given the number of graduates with relevant degrees coming out of regional universities.

In 2015/16 there were 9,185 UK graduates with degrees relevant to the offshore wind industry. 3,230 of these Honours Degrees were in Mechanical Engineering, 2,060 were in Civil Engineering, 1,930 were in Electrical and Electrical Engineering and 1,030 were in Environmental Sciences.

Although the overall number of relevant degrees achieved increased in the period between 2011/12 and 2015/16, there were substantial differences by subject area. The number of degrees in Mechanical Engineering increased by 1,000 during this period, while achievements in all other broad subject areas (such as electronic/ electrical, marine, civil, structural and environmental sciences) remained stable or decreased.

The number of degrees relevant to the offshore wind industry being obtained in the East of England, the region which has the potential to have the highest level of offshore capacity in 2032, was just 185 in 2015/16 and 38% of these were achieved in Environmental Sciences.

Other regions, such as Yorkshire and Humber and East Midlands were more successful, producing 955 and 940 graduates respectively.

PROGRESSION OF RELEVANT EDUCATION FROM SCHOOL TO HIGHER EDUCATION

Although interest in STEM subjects is strong at GCSE level, the progress of STEM learners through the educational system continues to be an issue in the UK economy.

Many larger employers in the offshore wind industry regularly engage with schools and promote the opportunities available within the industry. However, some smaller companies that make up the supply chain do not have the resources to engage properly with the relevant audiences and have reported difficulties in engaging with schools to promote their career opportunities to young people.



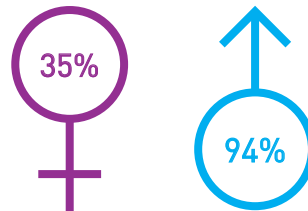
PROMOTION OF THE INDUSTRY WITHIN SCHOOLS NEEDS AN INDUSTRY-WIDE APPROACH WHICH INCORPORATES THE SUPPLY CHAIN.

WOMEN STUDYING STEM SUBJECTS

Females represent 50% of GCSE entrants in STEM subjects and out-perform males in achievement. However, just 16% of graduates with offshore wind-relevant degrees in 2015/16 were female and fewer than 10% of STEM apprenticeship achievers were female.

Progression of females through the STEM education system is still a challenge that needs addressing as the UK is likely to be short of 20,000 engineering graduates per year.

Career opportunities in the sector need to be promoted in a female-friendly way to attract a higher proportion of females to progress in STEM sectors including offshore wind.



ONLY 35% OF POST-16 FEMALES CHOOSE MATHS, PHYSICS, COMPUTING OR A TECHNICAL VOCATIONAL QUALIFICATION. THIS IS COMPARED TO 94% OF POST-16 MALES.

TRANSFERABLE SKILLS FROM OTHER SECTORS

The skills required within the offshore wind sector are similar to those in existing sectors such as onshore electricity generation, transmission and distribution, general manufacturing and the offshore oil and gas sector.

The UK oil and gas sector has shed many jobs over the past four years. As this sector is close in terms of both geography and skillset, it is worth monitoring employment trends and how the offshore wind sector might either benefit from continued job losses by attracting this cohort or react if employment levels begin to increase.



THERE ARE 14,000 EX-MILITARY PERSONNEL WHO LEAVE THE ARMED FORCES EACH YEAR, MANY OF WHOM WILL HAVE SKILLS TRANSFERABLE TO THE OFFSHORE WIND SECTOR.



HOW DO WE BROADEN THE CURRENT SKILLS SUPPLY IN THE UK?

The offshore wind sector is a dynamic, fast-paced and growing industry which can provide a wide range of career opportunities to both new entrants to the sector and experienced workers. The challenge will be in promoting these opportunities to all sections of the working population in a way that benefits the whole supply chain.

By looking at the Energy Estuary and the demand for skills across the sector, there is concern that local areas may not be able to deliver the growing skills demand.

Direct feedback from employers for this study suggests that attracting new talent isn't a major problem at the moment for the large-scale companies in the offshore wind industry. However, there is evidence to suggest that talent attraction and retention within the supply chain, particularly for small and medium-sized enterprises could be slightly more of a challenge.

As the population of the UK grows, white males are becoming a smaller proportion of the working population and therefore the offshore wind industry needs to consider how it can make the most of all the talent available to them.

To meet the needs of the whole sector, talent attraction and skills development needs to engage with all communities. There should be a key focus in encouraging females and those from Black, Asian and Minority Ethnic backgrounds into the industry. This will help ensure the local workforce for different regions will be able to provide the required skills.

There must also be a focus on how the sector engages with its future talent pool. A sector-wide approach must be implemented across the whole supply chain to ensure engagement is successful throughout the industry. This should not be focussed solely on the larger developers and original equipment manufacturers.

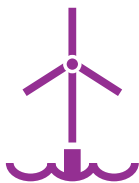
It is clear that the sector and region need a holistic education and training focus to ensure that growth is not constrained. As part of the UK's industrial strategy, the offshore renewable energy industry provides a golden opportunity to align national skills development with local skills development.

REGIONAL OFFSHORE WIND

The offshore wind sector is transforming coastal communities across the UK and is creating new jobs in regions of the country which would benefit most from economic investment. There are a number of regional clusters within the UK which are increasing productivity and competition across the industry.

The Energy Estuary is one of these clusters and will play a central role in delivering and supporting the growth of the industry in the North Sea in a clean and green way.

THE ENERGY ESTUARY AT A GLANCE



THE REGION HAS THE POTENTIAL TO ACCOMMODATE 7.7GW OF THE UK'S TOTAL CAPACITY IN 2032.²



THE NUMBER OF JOBS AVAILABLE IN THE REGION IN THE OFFSHORE WIND SECTOR WOULD INCREASE FROM 1,500 IN 2017 TO 9,200 BY 2032.



WITHIN THE REGION'S ENERGY AND INFRASTRUCTURE SECTORS, AN ESTIMATED 100,000 PEOPLE WILL BE REQUIRED BY 2024.



FEMALES MAKE UP JUST 22% OF THE ENERGY SECTOR WORKFORCE IN THE REGION.

4%

JUST 4% OF THE YORKSHIRE AND HUMBER REGION'S ENERGY WORKFORCE ARE FROM A BLACK, ASIAN AND MINORITY ETHNIC BACKGROUND COMPARED TO 8.5% OF THE AVAILABLE WORKFORCE.



THERE ARE OVER 62 AVAILABLE APPRENTICESHIP FRAMEWORKS WHICH ARE RELEVANT TO THE OFFSHORE WIND INDUSTRY. HOWEVER, IN A 50 MILE RADIUS OF HULL THERE ARE NO CURRENT TRAINING PROVIDERS FOR 23 OF THESE FRAMEWORKS.

² As the "Energy Estuary" is not a geographic area that is commonly used by the providers of statistics there is no specific data we can use. However as a proxy, we have combined data relating to the Yorkshire and Humber region with that of the East Midlands.

WHAT IS NEXT?

The offshore wind sector is one which is maturing as it grows and the industry must recognise this to ensure the relevant skills and training in the sector meet the demands of the future pipeline. When addressing the need for skills we have outlined some ideas which have a focus on retaining the existing workforce and expanding the potential future workforce. These are as follows:

THE EXISTING WORKFORCE

- Create a Procurement Skills Accord that will leverage procurement practices to encourage investment in training and skills throughout the supply chain
- Modify the Apprenticeship Levy to a Skills Levy to include all skills training to drive the development of people across the sector
- Implement common training standards – this could be done through an “Energy Passport” which could facilitate the movement of skills between technologies, companies and other sectors
- Create and promote a clear development pipeline to ensure people have a pathway for individual development
- Support the workforce in gaining on-the-job experience without workers having to go offshore
- Encourage sector collaboration to aggregate appropriate training so it is available where and when it is required

THE FUTURE WORKFORCE

- Promote STEM educational progression, opportunities and career pathways
- Co-ordinate and facilitate the engagement between employers and education institutions
- Develop innovative methods of engaging with females and those from Black, Asian and Minority Ethnic backgrounds and other under-represented communities
- Excite those about the sector in new ways such as the use of Virtual Reality, Augmented Reality multi-platform systems
- Promote the existing Apprenticeship Levy Transfer to help benefit the supplier workforce



Energy & Utility Skills Limited

Friars Gate, 1011 Stratford Road, Shirley, Solihull B90 4BN
T: 0845 077 99 22 E: policyandresearch@euskills.co.uk

Photography © Ørsted

