**Cumbria Chamber of Commerce**

**Cumbria Clean Energy: Workforce Skills Requirement**

A picture containing text, graphics, font, graphic design

Description automatically generatedIcon

Description automatically generated

June 2023

Contents

[1. Executive Summary 3](#_Toc135938250)

[2. Introduction 4](#_Toc135938251)

[2.1 Background 4](#_Toc135938252)

[2.2 Scope and requirement 4](#_Toc135938253)

[2.3 Method 5](#_Toc135938254)

[3. Literature review 6](#_Toc135938255)

[3.1 Key national strategies and plans 6](#_Toc135938256)

[3.2 Key local strategies and plans 7](#_Toc135938257)

[3.3 Plans and strategies relating to clean energy generation technologies 8](#_Toc135938258)

[3.4 Summary: Literature review 11](#_Toc135938259)

[4. Data review 12](#_Toc135938260)

[4.1 Cumbria’s economy and employers 12](#_Toc135938261)

[4.2 Key projects: Past, current and future 13](#_Toc135938262)

[4.3 Occupations and employment 14](#_Toc135938263)

[4.4 Education and training delivery 17](#_Toc135938264)

[4.5 Summary 18](#_Toc135938265)

[5. Qualitative feedback 19](#_Toc135938266)

[6. Analysis and conclusions 21](#_Toc135938267)

[6.1 Clean energy scenarios for Cumbria 21](#_Toc135938268)

[6.2 Key findings – priorities for action 22](#_Toc135938269)

[6.3 Employer occupational skills needs 25](#_Toc135938270)

[6.4 Way forward 27](#_Toc135938271)

# Executive Summary

Cumbria’s Clean Energy Strategy sets out a bold vision for the county to become ‘the UK’s natural capital for clean energy generation’. With the UK’s net zero targets depending to a large extent on the country’s ability to deliver a decarbonised supply of energy, Cumbria has a fantastic opportunity to build on its natural assets and industrial track record to make a major contribution to converting the UK towards clean energy generation and use. By 2040 it is hoped that clean sources will generate 9GW of energy in Cumbria, supporting 13,000 jobs.

Cumbria’s workforce, skilled in engineering and energy-related activities, offers a key competitive edge as it seeks to maximise the economic benefit arising from clean energy. However the scale, scope and timing of employer skill needs in relation to clean energy are largely unclear to date. We anticipate that employer skills needs in relation to clean energy will rise in the latter part of this decade – well beyond the 2023-26 lifespan of the current version of the Local Skills Improvement Plan – via extensive and long-lasting construction and installation activities. From the early 2030s, this gradually changes as projects move more into operational mode, with smaller workforces but requiring locally-resident staff (rather than the more transient construction workforce) over a much longer period of time.

As yet there are very few clean energy projects outside of offshore wind (which is not in scope of this research project, due to it being the focus for another Chamber report) where there is a moderate to high degree of confidence that plans will come to fruition at scale. ‘New nuclear’ generation appears to offer the best prospects for creating significant clean energy skills demand, but it may be fifteen years until this technology is operational in Cumbria. *However this does not mean that partners within Cumbria should adopt a ‘wait and see’ approach in relation to clean energy skills*. To do so would risk turning clean energy into a missed opportunity. Instead, work can begin to build the partnerships, networks and enhancements to the local skills base that will serve Cumbria well in years to come.

This project undertook extensive desktop analysis of policies, plans and data which has been further enhanced by interviews with key employers, education and training providers, and other stakeholders to build an evidence base for clean energy skills in Cumbria. The report highlights key employer skills needs as far as can be understood (including occupations relating to the construction and operational phase for projects), identifying actionable priorities (suggested ways in which these needs can be met) in response. Finally, it outlines a series of next steps to implement actions in response. Of critical importance will been the maintenance and further growth of Cumbria’s engineering skills base which will create a solid foundation from which clean energy skill needs can be met, even if some employers ultimately require adaptations to these skill sets (which can be achieved via short courses). The report identifies a number of priorities for action, such as:

* Maximising the value of the £2.5bn MoU with Sizewell C contractors including in relation to skills
* Enhancing employer leadership in developing and delivering the skills required by clean energy
* Improving advice and guidance to young people, to stimulate demand for energy careers amid high employer demand and a steep decline in the working age population in the local area
* The opportunity to develop a more ambitious vision from Cumbria’s education and training providers about how they will prepare for and meet clean energy skills demands within the county and potentially across the UK as a whole
* Working with the new unitary authorities to ensure that public sector partners in roles such as planning, environmental health and economic development are equipped with the knowledge required to support the development of clean energy in Cumbria.

# 2. Introduction

## 2.1 Background

Energy generation has long been a mainstay of Cumbria’s economy. The county is best known for its extensive nuclear facilities which have built a substantial pool of knowledge and expertise. But in recent years a much broader range of energy generation activity has become established in Cumbria.

The ambition articulated by Cumbria LEP via its 2022 *Cumbria Clean Energy Strategy*[[1]](#footnote-1) is for the county to become ‘the UK’s natural capital for clean energy generation’, while simultaneously enabling the decarbonisation of its existing businesses. The UK’s Net Zero 2050 target depends to a large degree on the country’s ability to find and exploit low carbon sources of energy. Cumbria – with its nuclear, offshore wind and growing renewables sectors - has the opportunity to become a major contributor to the drive for net zero in the UK over the coming decades.

The availability of a trained, skilled workforce and a supporting infrastructure of relevant training provision that is well aligned to industry requirements can be a key source of competitive advantage as Cumbria seeks to maximise clean energy growth. Cumbria Chamber has identified the transition to clean energy as a key priority for its new Local Skills Improvement Plan (LSIP). The Chamber, appointed as the Employer Representative Body by DfE to develop the LSIP in Cumbria, is tasked with gathering evidence from employers and other sources to articulate employer needs via a set of actionable priorities. In response, providers (led by colleges, who by statute must publish their response to LSIP priorities) are considering how their curriculum offer will adjust in light of these employer-led priorities.

## 2.2 Scope and requirement

For the purposes of this project and in accordance with the Cumbria Clean Energy Strategy, the scope of clean energy technologies reviewed in this report incorporates:

* New nuclear developments
* Carbon capture, utilisation and storage (CCUS) and hydrogen production
* Renewable energy: Mainly onshore wind[[2]](#footnote-2), solar photovoltaics
* Network storage and grid upgrades

This report will provide information and findings that will contribute to the drafting of the Cumbria LSIP in Spring 2023. It will draw on desk-based secondary and primary qualitative evidence to develop conclusions about **employer skills needs** arising from clean energy in Cumbria. With available evidence, these needs will be articulated as:

* An indication of the likely scale of demand emerging from key clean energy developments and the phasing of this demand over the lifetime of the LSIP (to 2026) and beyond
* A sense of the likely occupations that either are already, or will be in high demand as a result of the transition to clean energy in the county
* Information that highlights any workforce development needs for employers’ existing staff

This evidence will be converted into a set of **actionable priorities** for clean energy skills in Cumbria –describing the type of response that will be required to ensure that each identified skills needs can be addressed.

Finally, the report will outline a proposed high level implementation plan, setting out the **way forward**. This will describe how the response to the actionable priorities can best be led and managed within Cumbria – articulating the desired change, the actions required (as far as known), the owner of the action, timescales and any funding implications.

It should be noted that there remains considerable uncertainty about both the scale and timing of clean energy activity within Cumbria. Therefore the project will seek to build an approach to projecting future skills requirements arising from clean energy that can be reviewed and updated as greater clarity of Whitehall policy intent becomes available, and as more detailed clean energy plans for Cumbria (from which more precise labour market forecasts can be developed) begin to crystallise.

## 2.3 Method

Accurate projections of future labour market need are especially difficult in an environment where insufficient information about the timing, scale and scope of key developments is yet to be determined. Experience from previous net zero projects suggests that the majority of employers have little understanding of their future skills requirements in relation to low carbon technologies, except in very general terms.

In light of the project timescale, available resource and the considerable degree of uncertainty around many of the proposed clean energy developments, the following method was agreed:

# 3. Literature review

This section provides the outputs of a review of the extensive current literature relating to the development of clean energy within Cumbria. It concludes with a summary of the relevant points from the existing literature.

## 3.1 Key national strategies and plans

The economic opportunities arising from the UK’s transition to net zero have received a high level of attention from national politicians over recent years. Outlined below are a handful of key national policy documents, which help for provide the context for clean energy in Cumbria:

**The Ten Point Plan for a Green Industrial Revolution**[[3]](#footnote-3)

Published by HM Government in November 2020, the Ten Point Plan was billed as “*the approach Government will take to build back better, support green jobs, and accelerate our path to net zero*”. The Plan, led by the Department for Business, Energy and Industrial Strategy (BEIS) identifies ten key opportunities that the green industrial revolution creates for the UK economy:

1. Advancing Offshore Wind

2. Driving the Growth of Low Carbon Hydrogen

3. Delivering New and Advanced Nuclear Power

4. Accelerating the Shift to Zero Emission Vehicles

5. Green Public Transport, Cycling and Walking Point

6. Jet Zero and Green Ships

7. Greener Buildings

8. Investing in Carbon Capture, Usage and Storage

9. Protecting Our Natural Environment

10. Green Finance and Innovation

Opportunities (1), (2), (3) and (8) are relevant to clean energy, with the plan describing how:

* Low carbon hydrogen could create 10,000 UK jobs by 2030 and 100,000 by 2050 under a high-growth scenario
* Employment at large-scale nuclear plants (such as at Hinkley Point) peaks at around 10,000 during the construction phase, falling to around 900 during the operational phase
* Carbon capture could support around 50,000 jobs by 2030
* The plan describes how “*engineers, fitters, construction workers and many others*” will have a key role in using new science and technology to harness opportunities.

**Net Zero Strategy: Build Back Greener**[[4]](#footnote-4)

Published in October 2021, the 386-page net zero strategy focused more clearly on green skills, built around the industries (eg power supply, heat and buildings, transport, natural resources etc) that will be key to the UK achieving its net zero target by 2050.

On skills, the strategy identifies four skills priorities:

* Making the skills system more responsive to the needs of employers so that providers, employers, and workers are incentivised and equipped to support the net zero transition;
* Enhancing support for workers in the high carbon economy to transition to green jobs;
* Ensuring people from all backgrounds can access opportunities in the green economy, including through careers advice; and,
* Providing children and young people with the high-quality education and training they need to work in a future green career, through better teacher training and development in STEM and other key subjects, and expanding post-16 training in line with the needs of the green economy.

**Green Jobs Taskforce[[5]](#footnote-5)**

Government’s Green Jobs Taskforce report, published in 2021, provided an indication of the likely scale of demand for green jobs and skills in the UK economy. It concluded that there are 410,000 jobs in low carbon businesses and supply chains in the UK (1.1% of all jobs) and that these businesses turn over an estimated £42.6bn annually, with exports of £7bn. An estimated 10% of jobs in the whole economy may experience demand growth through the transition to a green economy, however 10% jobs may also see a reduction in demand at the same time.

The Taskforce report made 15 recommendations across three themes: Driving investment in net zero to support good quality green jobs; building pathways to good careers; and a ‘just transition’ for workers in the high carbon economy. The Annex provides a helpful indication of key occupations across most forms of clean energy generation, including:

* Onshore Wind: Welders (L3/4), engineers (degree level), construction workers (L1-3)
* Solar: Electricians (L4), roofers (L2), engineers (degree level)
* Nuclear: A range of nuclear-specific occupations including nuclear grade welders (L3-4), radiation protection workers (L3-6) as well as project planning and control managers (L3-8), mechanical engineers (L5-6), control and instrumentation engineers (L3-6).
* Electricity networks: Grid infrastructure operatives (L3-8), civil and mechanical engineers (L3-7), data analysts (L3-7), overhead linespeople and installers (L2-7)
* CCUS and Hydrogen: no occupations listed due to ‘limited’ evidence in these emerging sectors.

## 3.2 Key local strategies and plans

Local strategy documents with relevance to clean energy in Cumbria include:

**Cumbria Clean Energy Strategy**[[6]](#footnote-6)

Describing Cumbria as ‘at the forefront of the UK’s commitment to net zero’, the Cumbria Clean Energy Strategy (CCES) outlines how the county can help decarbonise via growth in clean energy and the reduction of emissions. On the former, the focus is on offshore wind, nuclear, hydrogen/CCUS, and renewables. The strategy notes Cumbria’s advantages in relation to clean energy, such as:

* **Natural capital** – the aspects of the county’s physical geography and geology that leave it well placed to harness clean energy opportunities.
* **Supply chain strengths** – Cumbria’s strong engineering and manufacturing base, with expertise in nuclear, advanced manufacturing, marine engineering and civil engineering.
* **Enabling infrastructure** – the presence of critical energy transmission and storage networks
* **Skilled and innovative talent pool** – the extensive education and training infrastructure in Cumbria including the National College for Nuclear, Energus, Gen2, Energy Coast UTC, Advanced Manufacturing Technology Centre at Furness, four FE colleges and University of Cumbria.

The strategy discusses the nature of the potential opportunity across different forms of clean energy generation, setting out a high level forward plan to clarify and develop opportunities from late 2022. It concludes by highlighting three main ambitions in relation to clean energy in Cumbria:

* The generation of up to 9GW of clean energy by 2040, establishing Cumbria as a key clean energy producer for the UK.
* Driving up to 13,000 new jobs from clean energy deployment in Cumbria.
* Selection of the Moorside site for innovative fusion energy, placing Cumbria at the forefront of ‘the UK and global race for abundant long term affordable clean energy’.

**Business Decarbonisation: A Review of Cumbria Energy Intensive Industries**[[7]](#footnote-7)

This report by Cumbria LEP notes that industry currently accounts for 18 percent of C02 emissions within Cumbria, with fifteen large employers identified as being either in scope for the UK Emissions Trading Scheme or just below threshold. A profile of each employers is included in the report’s annex, detailing their emissions, approach to net zero, key decisions and opportunities. The fifteen employers include two within the energy sector: Spirit Energy at Barrow, and Sellafield Ltd.

**2050 Cumbria Balanced Scenario[[8]](#footnote-8)**

This report, produced by Navigant Consulting with the support of Cadent and Electricity North West, projects how energy supply and use in Cumbria could change in pursuit of decarbonisation. It foresees that total demand within Cumbria will fall from 15.5TWH in 2018 to 9.5TWH in 2050, as energy efficiency measures take effect.

While electricity (mainly derived from local generation) will form the largest energy supply in future, the report projects that hydrogen will account for around 37% of energy supply, mainly in response to energy demands from buildings. Hydrogen supply in Cumbria is expected to begin from the early 2030s, largely as a replacement for natural gas. Notably, around two-thirds of hydrogen in Cumbria is expected to be green hydrogen, well above the forecast national average of 20%.

## 3.3 Plans and strategies relating to clean energy generation technologies

Outlined below are the main points from existing plans and strategies that relate to aspects of clean energy generation that are within the scope of this report:

**Hydrogen**

Hydrogen has a key role to play in the drive to net zero, helping to enable so called ‘hard to reach’ industries such as aviation and transport to access and use clean power. Government’s *Powering Up Britain*[[9]](#footnote-9) energy policy statement outlines ambitions to have 10GW of low carbon hydrogen production capacity by 2030 and promises new legislation to help enable hydrogen developments.

A report for Cumbria LEP published in 2021 – *Hydrogen in Cumbria: A Vision for the Future* – contends that Cumbria has the potential to become “a strategically vital hydrogen producer and supplier for the whole of the UK, as well as a permanent CO2 storage location”. It highlights how Cumbria’s location on the Irish Sea coast offers an opportunity to develop blue hydrogen at scale (with carbon capture storage in the Morecambe Bay gas fields) and green hydrogen from renewables. It suggests that hydrogen production will be limited to blue hydrogen in Barrow to meet local industrial need between 2025 and 2035. Some transport of hydrogen north from Barrow to Sellafield is also possible on this timescale, as is some CO2 storage in Morecambe Bay arising from the Barrow hydrogen production. A significant acceleration of activity is forecast in 2035-45, including the production of some green hydrogen along the Cumbrian coast and a new hydrogen transport network heading south into the national transmission system. Limited use of offshore wind energy and solar will assist green hydrogen production. By 2050, hydrogen storage in offshore and onshore salt caverns is forecast, with production now dominated by green hydrogen generated via green and nuclear energy (the latter via Moorside, the former via dedicated renewable capacity).

Utility networks have also put forward proposals for an expansion of hydrogen. *A hydrogen vision for the UK[[10]](#footnote-10)* (2023), published by the Energy Networks Association, foresees that hydrogen will provide 20-35% of UK energy needs by 2050. It anticipates that gas networks will invest £7bn in pipelines and storage by 2030, including potential for new and repurposed local transmission pipes in South Cumbria/Furness by 2030, reaching NW Cumbria in 2040. It anticipates hydrogen storage in Morecambe Bay 2040, with blue hydrogen production (via carbon capture and storage) in Cumbria by 2035. This report followed the *Hydrogen 10 Point Plan* (2022) from Cadent[[11]](#footnote-11), which anticipates the first hydrogen pipeline in NW England (unclear where) by 2027, scaling to 5GW of distribution by 2030. Notably, Cadent is creating a Hydrogen Skills Academy in 2024 with the University of Chester and the Institute of Gas Engineers. Attempts by the project team to contact the University of Chester to discuss this development have been unsuccessful at the time of writing.

**Carbon Capture, Usage and Storage (CCUS)**

CCUS is touted as playing a pivotal role in the UK meeting its 2050 net zero targets. The publication by the UK Government in April 2023 of *the CCUS Net Zero Investment Roadmap[[12]](#footnote-12)*, explains how the industry will develop in the UK supported by £20bn of Government investment, starting with four low carbon industrial clusters which are anticipated to come on stream by 2030. Two of these ‘track one’ clusters – in Teesside and North Wales/Cheshire/Derbyshire – have been selected, with plans to identify two more clusters later this year. Plans for a CCUS project led by Spirit Energy in Barrow, converting the existing gas terminal and using the depleted South Morecambe and North Morecambe gas fields as storage, are also moving forward. It recently submitted a bid to join the list of ‘track two’ of the UK Government’s cluster sequencing process (as part of the Morecambe Net Zero cluster), with negotiations and construction scheduled to take place up to 2030. Plans to repurpose Morecambe Bay gas field for carbon storage have also now been licensed by the North Sea Transition Authority, clearing a key regulatory hurdle.

The CCUS Net Zero Roadmap includes commentary on skills, much of which relates to existing policy (such as the expansion of Institutes of Technology, Local Skills Improvement Plans, T Levels, apprenticeships, etc.). It also flags Government’s Green Jobs Delivery Group[[13]](#footnote-13) which was launched in May 2022 but appears to have published no updates since. The roadmap also highlights the importance of the *North Sea Transition Deal*[[14]](#footnote-14) which has an Integrated Skills and People Plan[[15]](#footnote-15) first published in 2022. This document provides estimates of the scale of the workforce required to operate UK offshore energy technologies now and in 2030. Overall, it estimates that the offshore workforce will grow from around 154,000 in 2022 to 211,250 by 2030 and on to 350,500 by 2050. Expansion between now and 2030 will be driven by a significant expansion in the offshore wind sector (which will grow by around 65,000 jobs by 2030). Other estimates include:

* An increase in the offshore electrification workforce from around 500 to 5000 by 2030
* Growth in the hydrogen workforce from 1200-2500 to between 13,500 and 29,250 by 2030
* Expansion in CCUS jobs from 700-1000 now to 5,550 to 10,000 by 2030.

These forecasts include the skills required across all business areas (incorporating back office and professional roles), and the roles will be located onshore and offshore. A variety of sources are used to piece together these estimates. The wide variations in estimates indicate just how difficult it is to provide a reliable forecast of the scale of the workforce required by clean energy sector owing to significant uncertainty about the size and timing of key developments.

**Nuclear**

Government’s *Powering Up Britain* document summarises how nuclear will continue to act as the ‘critical baseload’ of our country’s future energy system. It plans to raise nuclear generation to 24GW by 2050 assisted by Great British Nuclear, which will be responsible for driving delivery of new nuclear projects. It reaffirms Government’s commitment to proceeding with Sizewell C and confirms that Great British Nuclear will launch a competitive programme to ‘select the best SMR [small modular reactor] technologies’, which will conclude in autumn 2023.

According to Cumbria LEP’s 2020 *Nuclear Prospectus*[[16]](#footnote-16), the sector contributes around £2.5bn of GVA locally, accounting for around 22% of the county’s economic output. Almost 1 in 3 of the UK’s nuclear workforce is based in Cumbria, where the sector employs around 27,000 people. But at the present time in Cumbria, only the development of twin small modular reactors (SMR) generating 940MW in total, led by the Solway Community Power Company in partnership with Rolls Royce, appears on track to proceed (the project is fully funded: £6bn). Plans to locate a new STEP fusion reactor at Moorside suffered a setback when the opportunity for the new prototype plant was awarded to the West Burton power station site in Nottinghamshire. The Solway Community Power/SMR project now needs to secure land (with regulatory licence) before an estimated 9-11 year construction phase can begin – meaning the new reactors are unlikely to become operational until the late 2030s.

While no other new nuclear developments are currently confirmed for Cumbria, the county’s nuclear supply chain should see the benefits of a memorandum of understanding (MoU) signed with Sizewell C[[17]](#footnote-17) that will see around £2.5bn of supply chain activity come to Northern England, along with 13,000 jobs over a 15 year period. The MoU has been agreed with a Sizewell C consortium of over 100 employers and trade unions, and has been countersigned by all of Cumbria’s MPs. The MoU pledges Sizewell C employers to work alongside local colleges and educational institutions to develop talent in the North to enter the nuclear industry.

Finally, the Nuclear Skills Strategy Group, an employer-led nuclear skills body, published in 2020 a *Nuclear Skills Strategy Plan[[18]](#footnote-18)* focused on aspects including improving skills leadership in the sector, strengthening pathways and apprenticeships (including T Levels), and the engagement of future generations in nuclear careers. NSSG’s detailed *Nuclear Workforce Assessment 2021*[[19]](#footnote-19) provides a well-developed model for estimating future demand for, and the supply of, nuclear skills – this will be covered in detail in the following section.

**Grid networks**

A report for Cumbria LEP in 2021 highlighted the risk to clean energy growth posed by the capacity of the existing electrical grid. Evaluations undertaken in 2015, when plans for a large new power station at Moorside were still in development, highlighted a necessary upgrade cost of between £1bn and £5bn, taking up to 10 years to complete. For context, the potential new clean energy projects in Cumbria could generate significant new capacity requirements for the grid, as follows:

* New large nuclear: 3200 MW
* New offshore wind: up to 3500 MW
* STEP reactor: 400 MW
* Small modular reactor: 470 MW per unit

The report states that the current grid capacity can only support the equivalent of a single SMR (470MW per unit); however feedback gathered via this project indicates that plans to retain much of the energy generated by Cumbria’s twin SMRs within the county mean that in effect the existing grid (supported by a few smaller-scale upgrades) will be adequate to support the Solway Community Power Company development, which is set to generate 940MW via twin SMR units.

## 3.4 Summary: Literature review

Based on the above, we can summarise that:

* There is a high level of ambition both locally and within Government to grow clean energy generation and use.
* There is a very high level of uncertainty about the scale and nature of clean energy growth nationally and, to a large extent, within Cumbria itself.
* During the lifespan of the current LSIP, new activity will at best focus on early stage construction activity given the operational life of most new clean energy developments is likely to begin post-2030 in the majority of cases.
* The understanding of likely workforce implications is very variable. Nuclear is the clean energy sector with the best visibility of likely future skills needs via NSSG modelling and active industry engagement. But even here, there is great uncertainty about the scale and timing of future activity such that no geographic breakdowns of NSSG’s future workforce models is possible. Sub-sectors like CCUS and hydrogen appear to have limited information about occupational skill requirements at this stage and even less understanding of the likely scale of demand.
* Within all forms of clean energy, the largest labour requirement will occur through the construction phase. The scale of employer workforce skill requirements once projects reach an operational stage are likely to be, in all bar a handful of cases, relatively small.
* The lack of capacity within the electrical grid in Cumbria risks becoming a major constraint on clean energy growth unless investment in made in a long term upgrading of the network.
* The extent of change represented by the energy transition longer term however presents both a challenge and on opportunity for Cumbria; the challenge to overcome capacity constraints and attract investment, the opportunity to satisfy the county’s own demand with local generation.

# 4. Data review

The project team undertook a desktop data review, to establish the key facts relating to clean energy in Cumbria, the outputs of which are summarised below:

## 4.1 Cumbria’s economy and employers

Emissions of CO2 from Cumbria have seen a steady decline over the past decade, driven by significant reductions in emissions from industry, as the chart below shows:

source: BEIS

The sectoral mix of Cumbria’s economy suggests it is well placed to make a significant contribution to reductions in CO2 emissions. NESTA, the innovation agency, created an Eco-Transformation of Industries Matrix that categorises sectors according to their level of emissions and level of environmental activity, as shown in the table below.

**Figure 2: The NESTA Eco-Transformation of Industries Matrix[[20]](#footnote-20)**

A picture containing text

Description automatically generatedNESTA’s view is that the most significant gains in reducing emissions are to be made in the group of sectors it classes as ‘followers’ – ie. significant in scale, with current high levels of emissions, but also a high level of environmental activity due to customer expectations, government regulation, and market competition.

A higher than average number of jobs in Cumbria are within sectors classed by NESTA as ‘followers’ - 24.6% of local jobs compared to 15.3% nationally. Cumbria also has a large share of jobs in sectors classed as ‘laggards’– 33.4%, against a national average of 27.3%

According to the Environment Agency, relatively few large polluters remain in Cumbria. Its Pollution Inventory lists the county’s largest emitters[[21]](#footnote-21) – with only three emitting more than 100kt of CO2 in 2020, as shown in the chart below:

Source: Environment Agency

## 4.2 Key projects: Past, current and future

Government’s Renewable Energy Planning Database highlights a pattern of relatively small projects developing in Cumbria. A list of the top 10 projects by installed capacity is provided below:

**Figure 4: Top ten renewable energy projects in Cumbria, last 20 years**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Operator** | **Site** | **Technology type** | **Development status** | **Operational** | **Installed capacity (MW)** |
| Pivot Power | Harker Grid Sub Station | Battery | Awaiting Construction | tbc | 49.9 |
| Centrica | Roosecote | Battery | Operational | 2013 | 49 |
| Iggesund Paperboard | Workington | Biomass | Operational | 2018 | 49 |
| Carlton Power | Barrow in Furness - Barrow Green | Hydrogen | Planning consent secured | est 2025 | 35 |
| EDF Energy Renewables | Beck Burn | Wind Onshore | Operational | 2017 | 31 |
| Elgin Energy | High Parkfoot Farm | Solar Photovoltaics | Awaiting Construction | tbc | 20 |
| United Photovoltaics | Aspatria | Solar Photovoltaics | Operational | 2015 | 19 |
| STOR 141 Limited | Grassing Rome Street | Battery | Application Submitted | tbc | 15.5 |
| REG Windpower/ BlackRock | Hallburn Farm | Wind Onshore | Operational | 2018 | 13.2 |
| Banks Renewables | Armistead Wind Farm | Wind Onshore | Operational | 2013 | 12 |

The above list presents an interesting mix of activity, including Cumbria’s first hydrogen project led by Carlton Power which has secured support from Government’s Hydrogen Business Model to provide hydrogen to the local Kimberly Clark factory in Barrow, producing about 3000 tonnes of hydrogen daily. The scheme has recently been granted planning consent and will enter commercial operation in 2025, employing 25 people through development and construction phases over the next two years, and three jobs once in operation (though it claims it will help safeguard 247 existing jobs that might otherwise be threatened by decarbonisation). Other developments include the installation of a biomass boiler at Iggesund Paperboard in Workington, as well as a handful of onshore wind, battery and solar PV projects.

A separate list of key projects, provided by ECITB, highlights key developments that are in the pipeline at varying stages of readiness, as shown in the table below:

**Figure 5: ECITB project list - Cumbria**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Project Name** | **Sector** | **Operator** | **Project Type** | **Stage** | **Project Status** | **Value (£M)** | **End year** |
| Sellafield Nuclear Decommissioning | Nuclear | Sellafield Ltd. | Decommissioning | EPRD | Contract Awarded | 63600 | 2120 |
| Rolls Royce Small Modular Reactor Hub | Nuclear | Rolls-Royce | New Build | FEED | Contract Awarded | 400 | 2029 |
| Barrow Green Hydrogen Hub | Hydrogen | Carlton Power | Green | Feasibility | Authority Approved | 120 | 2025 |
| Energy from Waste Kingmoor Park | Renewables | Verus Energy Ltd | Energy from Waste | Feasibility | Authority Approved | 92.8 | 2025 |
| Energy from Waste Carlisle (Todhills) | Renewables | Cumbria Waste Management | Energy from Waste | Feasibility | Authority Approved | 64 | 2024 |
| Battery Storage Facility Carlisle | Energy Storage | Pivot Power | Battery | Feasibility | Authority Approved | 32 | 2023 |
| High Park Foot Solar Farm | Renewables | Elgin Energy | Solar – PV | FEED | Authority Approved | 16 | 2024 |

This list confirms the small number of clean energy projects that are currently in progress in Cumbria, the largest of which is the SMR development with Solway Community Power Company and Rolls Royce (at the front end engineering design – FEED – stage), followed by the Carlton Power plan for hydrogen in Barrow, discussed above.

## 4.3 Occupations and employment

Owing to the small size of Cumbria’s labour market, there is limited available ONS data showing the number of people working within key occupations in the county.

No data is available on the current clean energy workforce in Cumbria. The closest proxy available, outside of sub-sector specific estimates (such as in relation to nuclear) is via ONS data published in 2021, which provided a breakdown of the number of residents within each NUTS3 location (East Cumbria and West Cumbria) working within each four-digit standard occupational code (SOC) role. The chart below shows the 71 occupations against which ONS was able to report the number of workers living in Cumbria (for most occupations the data was considered too unreliable to publish). Roles in engineering and manufacturing appear prominently in the chart below, reflecting the county’s strong industrial base within these sectors:

As noted above, future labour demand scenarios are difficult to forecast with any degree of accuracy. Model-based estimates – such as the recent *Skills Imperative 2035[[22]](#footnote-22)* release by Warwick Institute for Employment Research and Cambridge Econometrics in early 2023 – highlight the critical need for Cumbria to respond to high levels of replacement demand within key occupational groups, as shown in the chart below:

The LEP’s Local Skills Report[[23]](#footnote-23) highlights long-standing difficulties faced by employers in recruiting and retaining key occupations such as electrical engineers, mechanical engineers and production managers. With rising replacement demand, employers and providers will have to work harder to fill the vacancies now being created – many of which are at higher level in a LEP area which is home to, as the LEP itself notes, the smallest pool of residents qualified to level 4+ of any LEP area in the country.

The only detailed forecasting model that appears based in actual evidence of employer workforce recruitment and development (rather than one-size-fits-all forecasts derived from national formulas) relates to nuclear energy. NSSG’s *Nuclear Workforce Assessment 2021* uses a low/medium/high scenario for the pace and scale of nuclear developments in the UK (due to considerable uncertainty about future plans), drawing on recruitment and workforce data supplied by a large number of nuclear employers to build model-based projections for the UK. This states that:

* Even if a large civil nuclear new build programme were not to occur and taking account of declining total employer workforce demand, substantial replacement demand still exists for nuclear skills due to the sector’s ageing workforce (roughly half of those in the workforce in 2020 are expected to have left or retired by 2030).
* It has not focused on the geographic distribution of nuclear skills needs owing to difficulties in predicting the location of future nuclear sites – the estimates cover all of the UK (Cumbria accounts for about a third of the UK nuclear workforce).
* Current civil and defence nuclear facilities currently require around 3200 new recruits per annum (inflow), falling to around 2500 by 2030.

Forecast UK demand under different growth scenarios are set out in the table below:

**Figure 8: NSSG labour demand scenarios**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Scenario and output** | **Facilities** | **Total UK workforce projection 2030-50** | **Inflow (recruits) per annum 2025** | **Inflow (recruits) per annum 2030** | **Inflow (recruits) per annum 2050** |
| **High scenario** plus current (19 GWe of new capacity by 2050) | 3 gigawatt-scale reactors plus 22 SMRs | c70,000 | 7234 | 3670 | 6030 |
| **Medium scenario** plus current (10 GWe of new capacity by 2050) | 2 gigawatt-scale reactors plus 8 SMRs | c.62,000 declining to c55,000 | 6541 | 3081 | 2614 |
| **Low scenario** plus current (6.4 GWe of new capacity by 2050) | 2 gigawatt-scale reactors | c.62,000 declining to c55,000 | 6541 | 2042 | 2455 |

Under the high scenario, employer demand peaks in the mid-2020s in response to Hinkley Point C and Sizewell C developments, before falling and then rising again in the 2030s to meet demand for SMR fabrication and development. The construction workforce is expected to peak in the late 2020s at around 15,000, before shrinking considerably until the early 2030s when it grows to around 10,000 per annum (focused on SMRs).

Under the medium scenario, the inflow requirement peaks in the 2020s as Sizewell C and Hinkley Point C are built. The annual inflow requirement then falls in the early 2030s before growing in the mid-2030s to 4998 in response to SMR growth. It then drops back again in the 2040s to 2614. The construction workforce peaks at around 13,000 in 2025, then falls away sharply to 2030 before growing again to around 8000 until 2040, after which it declines sharply.

Under the low scenario, the annual inflow requirement from 2030 stays below 2500, with no new build civil workforce beyond 2032.

## 4.4 Education and training delivery

DfE data provides insight into the volume and distribution of training in occupations and sectors that are likely to be at the forefront of clean energy growth. Cumbria is home to an extensive further and higher education provider base, much of it focused on responding to energy sector needs.

Analysis of relevant DfE **apprenticeship provision** data shows that in the first two quarters of the current academic year (August to January):

* 804 Cumbria residents started an engineering and manufacturing apprenticeships. The largest volumes were with BAE Systems (256), Gen2 (204) and Lakes College (111).
* Almost two thirds of these starts were at level 3, led by the Engineering Technician (184 starts) and Maintenance and Operations Engineering Technician (108 starts) standards. About 20% of these starts were at higher or degree level, with much of this activity focused within the nuclear industry in occupations such as Nuclear Technician (level 5), Product Design and Development Engineer (level 6) and Nuclear Scientist and Nuclear Engineer (level 6).
* Installation Electrician and Maintenance Electrician (level 3) is the most popular apprenticeship standard under the construction route in (95 starts), followed by the key trades. NCG, Lakes College and JTL are the largest providers in this sector, much of the top two’s delivery is at L2.

**T Levels** – intended to provide a high quality technical alternative to the A level pathway - remain in their infancy, though 2021/22 data suggests small volumes of learners undertaking relevant T Level specialisms with local colleges. This includes:

* Nine learners enrolled on electrotechnical engineering T Level specialisms at Kendal College and Lakes College
* Four learners on a surveying and design T Level specialism at Lakes College

**Adult 19+ delivery** is relatively sparse at level 3 and above (which is where the bulk of skills demand for clean energy occupations is likely to be), despite the availability of Government’s ‘Free Courses For Jobs’ programme, which restores the funding entitlement for level 3 learning for many adults. However DfE data does reveal some relevant delivery by local colleges, such as:

* Eight learners undertaking a diploma in occupational work supervision with Lakes College
* 10 learners studying for an HNC in Electrical Engineering with Furness College
* 18 learners enrolled on an HNC in Engineering with NCG (Carlisle) and Kendal College
* 123 learners enrolled on various welding courses – certificates and awards – with Furness College.

No detailed data is published on **16-19 study programme** delivery, which forms the mainstay of many colleges’ activity, except for data showing the size of leaver cohorts by subject area within achievement rate data, as follows:

* 470 learners aged 16-18 leaving Engineering and Manufacturing study programmes in 2022 at Cumbria’s colleges and Gen2 (either due to successful completion or dropout), with the largest numbers at Furness College (170) and Kendal College (150). Data for Carlisle College is not available
* 370 learners aged 16-18 leaving Construction study programmes in 2022 (either due to successful completion or dropout), largest volumes at Lakes College (160) and Furness College (130).

Finally, OfS data indicates that only small numbers of engineering and manufacturing **higher education** courses are delivered in Cumbria. The University of Cumbria does not specialise in this area thus far, though Cumbria’s colleges and Gen2 maintain a healthy HE offer (often accredited by the University of Cumbria). Within ‘Engineering and Technology’, OfS data indicates that in 2019 (most recent available data), HE student headcount by teaching provider in Cumbria was:

* Furness College: 265 students
* Lakes College: 195 students
* Gen2: 145 students
* NCG (Carlisle): 45 students
* Kendal College: 25 students

Feedback suggests that most of these students are sponsored by their employer to undertake their degree programme, leaving a question mark about whether learners taking the traditional A level route to university have a viable engineering degree programme route available in Cumbria.

## 4.5 Summary

The above data review indicates that:

* Emissions from Cumbria are falling largely as a result of reductions from industry, and there remains scope to make further gains in cutting CO2 emissions from major employers.
* Recent years have seen a modest trend of small scale, renewable energy projects in Cumbria. However the county is lacking many large-scale clean energy projects in the pipeline – only the nuclear SMR and the Carlton Power hydrogen development at Barrow currently register.
* A larger-than-average proportion of the local workforce are employed in occupations that are related to, or likely to be in demand from, clean energy developments in the county. However high levels of replacement demand mean that employers and providers will need to work hard (amid a declining local working age population) to avoid skills shortages in technical occupations from constraining clean energy growth in future
* The only well-founded forecasting model relating to clean energy is focused on the nuclear sector, though this analysis is UK-wide rather than specific to Cumbria. It points to a declining overall demand for skilled labour to operate facilities, though high replacement demand will mean that the annual requirement for new recruits will probably remain robust.
* Cumbria is home to an extensive infrastructure of training provision in occupations that are likely to be in demand as a result of clean energy developments over the coming years. Apprenticeship volumes are high, though the number of learners enrolled on T Levels remains modest and adult learning at level 3 and above is scarce. HE delivery in subjects relevant to green energy appears to be led by local colleges – the lack of a major mechanical, electrical or construction engineering offer from the University of Cumbria is perhaps a gap.

# 5. Qualitative feedback

Informed by the key facts gathered via the review of key policies and relevant data (above), the project team undertook a round of interviews with employers and other stakeholders to further develop the project’s evidence base. Lines of enquiry to pursue with different stakeholder groups (employers, education and training providers, other stakeholders, as well as insights from employer networks from other parts of the country that also have a focus on clean energy) formed the basis of semi-structured interviews. While personal invitations to participate in interviews were circulated to an agreed list of stakeholders (often following a request for support from Cumbria Chamber), significant time constraints limited the project team’s ability to secure interviews on a timely basis.

Key themes emerging from the interviews undertaken include:

**There is significant uncertainty about the nature and scale of green energy developments in Cumbria.** The clean energy strategy highlights a wide range of potential opportunities but currently there are very few that appear to stand a strong chance of proceeding in the next five years. Most activity, if it occurs, will take place well after 2030 (by which time the LSIP should have been refreshed at least twice). Uncertainty over the scale and timing of future project means that industry/provider links are inevitably less well developed in new technologies (such as hydrogen and CCUS) than in nuclear.

**In the absence of detailed labour market forecasts for key aspects of clean energy,** interviewees suggested that Cumbria should seek to retain its strong foundation of engineering skills – especially in roles such as welding (level 3-4), electrical engineering (L3-6), engineering maintenance (L3), mechanical engineering (L3-6) – which will leave more residents better placed to upgrade and adapt their skills to meet the needs of new clean energy technologies.

**Skills demands created by the operational phase of many clean energy projects are likely to be lower in volume than existing energy technologies.** Operational workforce headcounts within existing, smaller scale projects appear very low. For example, developers of solar PV farms explain within their planning submissions that monthly maintenance visits is all that will be required post-construction (thus minimising disruption to local people). Meanwhile the Carlton Power hydrogen plan for Barrow will create only three permanent jobs once operational, though it should help to safeguard a larger number jobs within other industries that might otherwise be threatened by decarbonisation. Among those projects expected to move ahead, only the nuclear SMRs appear to offer the prospect of a significant ongoing labour requirement at this stage; though there is potential to generate more skilled labour demand via upgrades to the electric grid, CCUS and (to a lesser degree) hydrogen developments. It is notable that even the large, 3.2GW plant at Hinkley Point C in Somerset appears likely to employ fewer than 1000 people once operational.

**Nuclear SMRs are the most substantial project in development now**, with £400m required to secure land and the required licences before a 9-11 year construction phase (costing around £6bn) can begin. All financing for the project, led by the Solway Community Power Company, is in place but estimates of the construction and operational workforce are vague – numbers are likely to be in the hundreds rather than thousands. Manufacture of the SMRs will be carried out off-site in three dedicated factories built by Rolls Royce, but this may bring supply chain opportunities for Cumbrian businesses. Major upgrades to the national electricity grid may not be required with an estimated 10% of SMR output being consumed by Sellafield and a further 200MW being exported to the Isle of Man via an underwater cable.

**Cumbria would likely benefit if employers working in clean energy formed a consortium or cluster,** working closely together to articulate skills needs, brigade occupation and workforce development demand, and work with providers to shape education and training delivery. Arguably this is more difficult if a locality lacks a single ‘tier one’ contractor overseeing all activity, but a working group featuring key employers working in emergent clean energy technologies (eg. Spirit Energy, Solway Power, Rolls Royce, Carlton Power and supply chain) would be of great value.

**More bite-sized, modular training provision may be required** to allow existing workers to upgrade and adapt their skills to new clean energy technologies. For example, hydrogen and wind power employers are likely to need the existing welding workforce to upgrade their skills to work on future projects – such programmes should be readily available locally when required, on a short-course basis for existing workers to transition to clean energy.

**There is concern over the level of local learner interest in clean energy careers**. Cumbria’s population is ageing and declining, reducing the available labour pool. Anecdotal feedback indicates that interest in careers in energy in the local area may also be on the wane. Given ongoing high levels of skilled labour demand from BAE Systems and Sellafield, any growth in demand arising from new forms of clean energy could result in employers facing significant skills shortages when recruiting, unless more can be done to increase the flow of local people pursuing a career in the energy sector.

**There is scepticism that the Lifelong Loan Entitlement will spur growth in higher learning by Cumbria residents**. The LLE will provide all adults with access to a loan to the equivalent of four years’ post-18 education, for use by the age of 60. But larger employers in the county more commonly sponsor employees to obtain higher education qualifications, rather than expecting employees to self-fund.

**Providers face significant and seemingly growing barriers to recruiting and retaining staff** with the specialist skills required to teach new green technologies. This is a long-standing problem, whereby staff with relevant skills can earn more in industry than in a teaching role and may intensify if new clean energy projects seek the same skillsets and knowledge as those that are highly prized among teaching staff.

**There may be a need for education and training providers to engage with the manufacturers of the key technologies** that will be deployed via clean energy projects in Cumbria. This will help ensure that local providers understand and are able to operate the critical infrastructure for clean energy, potentially engaging manufacturers (many of whom are based overseas) in the development and delivery of relevant training.

**There is likely to be a workforce development requirement for local public sector bodies**, who have a critical role to play in fostering and supporting the growth of clean energy in Cumbria. There is a risk that an ageing workforce in areas such as planning, economic development and environmental health will lead to a loss of knowledge and skills as current staff retire. Funding constraints may limit the ability of local authorities and other public bodies to recruit and retain staff with knowledge about how clean energy works and what is required to help it grow in Cumbria (connected to planning issues and future grid capacity).

# 6. Analysis and conclusions

There is clearly very significant potential for clean energy to play a major part in Cumbria’s future economic success. The county is extremely well placed to capitalise on clean energy developments across several technologies and the availability of skilled labour has the potential to create a significant market advantage for Cumbria when competing with other places for key developments.

## 6.1 Clean energy scenarios for Cumbria

The phasing of these developments suggests that activity will likely peak in the early 2030s, well beyond the lifespan of this LSIP. Summarised below is an attempt to plot the most likely trajectory of clean energy developments in Cumbria, based on a ‘low’ scenario (which captures only those projects already in the planning or development stage) and a ‘high’ scenario, which seeks to capture the myriad of potential projects highlighted in the Cumbria Clean energy strategy.

**Figure 9: ‘Low scenario’ growth of clean energy in Cumbria**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **LSIP report version** | | | Version 1 | | | | Version 2 | | Version 3 | | | Version 4 | Version 5 | |
| **Tech** | **Project** | **Confidence (RAG)** | **Value** | **2023-25** | | | | **2026-28** | | **2029-31** | | | **2032-34** | **2035-37** | |
| Nuclear | Sizewell C | Amber | £2.8bn | Construction phase (MoU) | | | | | | | |  | | | |
| Nuclear | 2 x SMR (Solway Community Power and Rolls Royce) | Amber | £6bn |  | | | | | SMR construction | | | | | | SMR Ops |
| Hydrogen | Barrow Green Hydrogen Hub (Carlton Power) | Green | £120m | Construction | | | | Operations | | | | | | | |
| CCUS | Barrow (Spirit Energy) | Amber | TBC |  | CCUS Construction | | | | | | CCUS Operation | | | | |
| Storage | Harker battery nr Carlisle (50MW, EDF) | Green | tbc | Construction | | | Operations | | | | | | | | |
| Solar PV | Higher Park Foot Farm nr Longtown (20MW, Elgin Energy) | Green | £16m | Cons | | Operations | | | | | | | | | |
| Solar/ On-shore W | Great Oaks (Ridge Energy, 24MW Solar, 17MW wind) | Amber | tbc |  | | | Cons | Operations | | | | | | | |

The above is based on projects that are highlighted within the ECITB project list and the renewable energy projects in development. All can be characterised as having a fair-to-high level of confidence that they will be implemented in Cumbria. Key observations are as follows:

* The phasing of these projects suggests that the bulk of activity during the lifespan of this LSIP will be via construction activity, with operational requirements coming to the fore post-2026
* The first large-scale clean energy project appears to be plans for the capture and storage of CO2 led by Spirit Energy based at Barrow, utilising available spent gas fields in Morecambe Bay.
* The only nuclear project on the list that is likely to have substantial operational requirements is the Solway Community Power small modular reactor, which is being developed by Rolls Royce. However feedback indicates that the project is several years off securing a nuclear license for the land, and that construction could take as much as ten years from that point.
* The battery storage and solar PV/onshore wind plans listed above are likely to generate very small numbers of sustained jobs during operational phase.

**Figure 10: ‘High scenario’ growth of clean energy in Cumbria**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **LSIP report version** | | | Version 1 | | | Version 2 | | Version 3 | | | Version 4 | Vers. 5 | | | |
| **Tech** | **Project** | **Confidence (RAG)** | **Value** | **2023-25** | | | **2026-28** | | **2029-31** | | | **2032-34** | **2035-37** | | | |
| Nuclear | Sizewell C | Amber | £2.8bn | Construction phase (MoU) | | | | | | | |  | | | | |
| Nuclear | 2 x SMR (Solway Comm Power & Rolls Royce) | Amber | £6bn |  | | | | SMR construction | | | | | | SMR ops | |
| Nuclear | EPR large new build | Red | £11bn |  | | | | | | | Moorside construction | | | | | |
| Nuclear | AMR and Hydrogen Generation | Red | TBC |  | | | | | | | | | | | | |
| Grid | Electricity grid upgrade | Red | £4bn+ |  | | | | | | Grid construction | | | | |  | |
| Hydrogen | Barrow Green Hydrogen Hub (Carlton Power) | Green | £120m? | Construction | | | Green Hydrogen Hub Operation | | | | | | | | | |
| Hydrogen | Pipe network South Cumbria | Red/Amber | TBC |  | | | | Construction | | Operation - Hydrogen pipes | | | | | | |
| CCUS | Barrow (Spirit Energy) | Amber | TBC |  | CCUS Construction | | | | | CCUS Operation | | | | | | |
| Storage | Harker battery nr Carlisle (50MW, EDF) | Green | tbc | Cons | | Operation | | | | | | | | | | |
| Solar PV | Higher Park Foot Fm nr Longtown (20MW, Elgin Energy) | Green | £16m | C | Operation | | | | | | | | | | | |
| Solar PV/ Onshore Wind | Great Oaks nr Carlisle (Ridge Energy, 24MW Solar, 17MW wind) | Green | tbc |  | | C | Operation | | | | | | | | | |

The above list includes projects identified in the ‘low’ scenario but now also includes the bulk of the potential projects identified in the Cumbria Clean Energy Strategy (excluding offshore wind), such as:

* Potential for a second small modular reactor located in Cumbria
* Revival of plans for a large scale EPR reactor new build at Moorside
* Potential for an AMR reactor with associated hydrogen generation
* Significant investment in an upgrade to the electricity network, which would be required if Cumbria’s clean energy output grew beyond the provision of a single SMR
* First work on installing a hydrogen pipe network in South Cumbria

## 6.2 Key findings – priorities for action

The evidence above allows us to develop a number of key findings about the nature of the workforce skills requirement relating to clean energy in Cumbria, as follows:

There is currently a limited range of clean energy developments that are both likely to proceed during the lifespan of this LSIP and appear set to generate significant employer workforce skills needs. Only the development of the Solway Community Power SMR, along with Sizewell C supply chain work via the MoU, look set to make an impact within the next three years – making ‘new nuclear’ likely to be the most productive source of clean energy skills demand in Cumbria. **As part of this, work led by Cumbria Chamber to deliver a regional supply chain and skills hub model for SZC should continue**, to help ensure that the potential of the MoU is realised.

* The largest share of job opportunities on clean energy projects will be created during the construction phase however experience suggests that this workforce is often transient and likely to be comprised only in part by local people.
* The longer term benefit from clean energy developments will emerge from the engagement of local people in the operation of these new technologies, however the workforce requirement of such developments on an ongoing basis appears to be relatively low except in the case of offshore wind (which has already been covered via a separate report to Cumbria Chamber).

**Key occupations and upskilling needs:** In lieu of more detailed workforce needs data from employers seeking to develop clean energy in Cumbria, education and training providers should focus on ensuring that Cumbrian residents are equipped with core engineering skills required by energy employers, which can then be adapted to each clean energy technology as required (usually via short course provision). Priority occupations[[24]](#footnote-24) are:

* + Electrical engineering (L6)
  + Mechanical engineering (L6)
  + Engineering maintenance (L3)
  + Engineering technicians (L3)
  + Pipe and plate welders (L3)
  + Engineering fitters (L3)
  + Engineering design and draughtspersons (L3)
  + Project controls technician (L3) / professional (L6)

Employment opportunities linked to the construction of clean energy developments promise significant job vacancies but these are likely to be short-lived on all bar the largest projects (where builds can last up to 10 years). In response to this, existing providers should maintain a focus on key technical civil engineering and construction occupations, such as:

* Civil engineers (L6) and technicians (L3)
* Construction site supervisors (L4) and managers (L6)
* Quantity surveyors (L6)
* Engineering construction riggers and erectors (L3)
* Electrical trades and installation (L3)
* Scaffolders (L2)

**Employer leadership:** In an environment where the type, scale and timing of employer skills needs is extremely uncertain, there is a need to develop an infrastructure whereby information about employer needs can be fed into education and training providers as it emerges. This might best be done via **a clean energy employer network,** to enable employers will be better able to collectively:

* + Provide strategic and operational direction to the curriculum offer and other, wider learning programmes.
* Co-invest resources in training programmes developed with their input.
* Offer staff on a day release basis to enable the delivery of rigorous, high quality, adaptable learning programmes from level 3 to level 7, noting the challenges faced by providers in recruiting and retaining teaching staff with relevant knowledge.
* Participate in work with schools and colleges to inspire young people, their teachers, parents and peers, to seek careers in clean energy. This could include sponsored ‘young apprenticeship’ programmes, offering internships and summer job placements to year 9/10 pupils on a competitive basis (see below).
* Shaping the focus of a wide range of productivity and business development programmes delivered by the Business Growth Hub.

**Enhancements to careers information, advice and guidance will be required** to ensure that there are sufficient well-trained Cumbria residents ready to access the labour market opportunities that clean energy will create. Cumbria’s declining working age population is centred on West Cumbria (the former Copeland and Allerdale districts) and Barrow in Furness – these are the locations at the heart of Cumbria’s clean energy ambitions. But these areas are being affected by steep declines in the working age population (down by 11% in the case of Copeland since 2011). With major employers such as Sellafield and BAE Systems already well established, there is a risk that insufficient numbers of local people will come forward seeking careers in new clean energy opportunities.

Action is required to build on existing good work to improve and better coordinate careers education and business involvement in schools – such as the “Power On” book for Nuclear for other sectors – to inspire engagement in the energy sector by a new generation. This could be delivered via an enhanced role (and resource) for the current Careers Hub, hosted by Cumbria LEP.

**There is scope to set out a more ambitious vision for technical education and training delivery from Cumbria that has nationwide appeal while ensuring providers are ready when clean energy demand appears.** Overall Cumbria is well served by technical education and vocational training provision within the key engineering occupations that are likely to be central to future clean energy employer needs. There is an opportunity to broaden the ambition and reach of provision further, such as by:

* Establishing relationships between Cumbria providers and the key players in the clean energy industry that go beyond transactional arrangements whereby providers only respond once employers have known volumes of skills demand, and into a more engaged model of employer engagement – co-designing and co-delivering programmes, sharing innovations, participating in applied research, spin-outs, etc
* Making Cumbrian providers a central part of the supply chain for a fleet of new SMRs, playing the leading role in developing the skills the UK requires for new nuclear developments. The same may apply to other aspects of clean energy, where the experience and expertise of Cumbrian providers – long used to serving mainly local employers – can be developed in partnership with other employers, particularly in locations where clean energy developments are set to come on stream earlier and at greater scale than in Cumbria.

As part of the above, **a collective response to clean energy from education and training providers would be highly desirable**. Clean energy will introduce new employers and new technologies to the county, which may require a review and re-articulation of a visible curriculum offer to employers in Cumbria that spans all the major clean energy technologies now becoming available. This could operate under the banner of a Cumbria Clean Energy Academy – a mechanism to pull together all of the curriculum and qualifications into a branded offer for employers, focused initially on development and installation activities, latterly on operational requirements. This could be undertaken with the sponsorship of major employers that are planning to invest in Cumbria, to support curriculum development and delivery.

**We think that local young people taking the academic post-16 pathway currently lack a via HE course offer in the core engineering degree subjects that relate to clean energy.** Local colleges and Gen2 already have 600 higher education students (as of 2019-20) studying courses at level 4 above in engineering and manufacturing technologies. However feedback indicates that much of that provision is employer sponsored, rather than the more conventional learner-responsive HE model. The University of Cumbria does not deliver higher education engineering programmes but the creation of a new Institute of Engineering, Computing and Advanced Manufacturing at the University, part of a new campus in Barrow, offers an opportunity to change that. Given the high number of level 6 occupations already in demand from the energy sector in Cumbria and the likelihood that this will continue as green energy grows in the county, there appears to be **an opportunity for the university to develop a local offer for employers and learners focused on the major engineering disciplines: electrical, mechanical, construction**.

**Public planning and regulatory services:** For clean energy to thrive in Cumbria, it needs a supportive operating environment where public sector bodies have a key leadership and enabling role to play. One area for focus should be the capacity of the new unitary authorities to understand and support clean energy growth in their area via services such as planning, environmental health and economic development. Local authorities have an ageing workforce where vacancies can go unfilled due to budgetary constraints. It would be prudent for **mechanisms to be put in place that can enable knowledge transfer about the clean energy to public sector organisations**, so that they are better able to carry out their economic and civic leadership role.

## 6.3 Employer occupational skills needs

Employer occupation[[25]](#footnote-25) skills needs expected to arise from clean energy are summarised below. All skills needs in this table are described as occupations using the taxonomy established within the Institute for Apprenticeship and Technical Education’s Occupational Maps, which provides clear links to apprenticeship, FE and T Level courses:

|  |  |  |  |
| --- | --- | --- | --- |
| **Skills need** | **Actionable priority** | **Resource** | **Is provision already available locally?** |
| **Construction and installation phase** | | | |
| Civil engineers (L6) | Grow via full-time HE and apprenticeship | Lifelong Loan Entitlement, mainstream DfE funds | Yes – Lakes College |
| Civil engineering technician (L3) | Grow via apprenticeship or T Level | Mainstream DfE funds | Yes – Gen2 |
| Construction site supervisors (L4) | Apprenticeship upgrading from trade roles, commercial short courses | Employers, LSIF | No |
| Construction site managers (L6) | Apprenticeship upgrading from trade roles | Employers/LSIF | No |
| Quantity surveyors (L6) | Grow via full time HE or apprenticeship | Employers/Lifelong Loan Entitlement | No |
| Engineering construction riggers and erectors (L3) | Grow via apprenticeship | Employers/LSIF? | No |
| Installation electrician and maintenance electrician (L3) | Grow via apprenticeship | Employers | Yes – Gen2 and all four colleges |
| Scaffolders (L2) | Grow via apprenticeship, full time FE courses | Employers | Yes – Lakes College |
| **Operational phase** | | | |
| Electrical engineer (L6) | Grow via T levels then FT HE | Mainstream DfE, Lifelong Loan Entitlement (LLE) | Yes – T level at Kendal and Lakes colleges; BEng at Furness and Lakes College, HNC at Furness |
| Mechanical engineers (L6) | Grow via FT HE and apprenticeship | Employers, LLE for learner-led | Yes - Furness College (BEng) |
| Maintenance and Operations Engineering (L3) | Grow via apprenticeship | Employers | Yes - Gen2, Furness College, NCG |
| Engineering technicians (L3/4) | Grow via apprenticeship, 16-19 FT FE, and HNC | Mainstream DfE, employers, Lifelong Loan Entitlement (LLE) | Yes – BAE Systems, Gen2, Lakes College (apprenticeship); NCG and Kendal College for the HNC |
| Pipe and plate welders (L3) | Upgrading via short adult courses, possibly apprenticeships too | AEB, employers | Yes – AEB via Furness College; apprenticeship via Furness, Lakes and Gen2 |
| Engineering fitters (L3) | Grow via apprenticeship | Employers | Yes – Gen2, Lakes College, Kendal College |
| Engineering design and draughtspersons (L3) | Grow via apprenticeship | Employers | Yes – BAE Systems, Gen2 |
| Project controls technician (L3) | Grow via apprenticeship | Employers | Yes – Lakes College |
| Project controls professional (L6) | Grow via apprenticeship and short courses | Employers | No |

## 6.4 Way forward

| **Change and expected impact** | **Actions** | **Owner** | **Lead** | **Timescale** | **Funding (if applicable)** |
| --- | --- | --- | --- | --- | --- |
| Expansion and further development of regional supply chain and skills hub for SZC, maximising the value of the £2.5bn MoU signed recently | Share initial proposal with SZC consortium, refine on feedback  Consult on updated proposal with key employers (and supply chains), networks and training providers  Explore options for a physical base for hub  Explore funding options, draft budget and confirm deliverables  Implementation | Cumbria Chamber | Ca | Summer 2023  Spring 2024  Summer 2024 |  |
| Development of a clean energy employer group into a network driving the growth of clean energy, including in relation to its skills needs | Draft proposal for revamping the panel – purpose, membership, operations. Identify chair/lead employer  Consult on proposal and refine following feedback, including work programme  Implementation and annual review | Chamber  Employers |  | Summer 2023  Autumn 2023 |  |
| Enhance careers information advice and guidance activity to increase the number of local people seeking careers in the clean energy sector via the Careers Hub | Chamber to work with clean energy employers to develop a programme of activity to stimulate demand for energy careers in primary, secondary and post-16 settings | Chamber  Cumbria LEP (skills hub)  Clean energy employers |  |  |  |
| Establish a provider working group to set out a vision and strategy for the delivery of education and training in support of clean energy. The aim is to move beyond transactional employer relationships locally, and to extend the reach and influence of Cumbria’s training providers and colleges to the national stage in support of new clean energy technologies. | Draft a discussion document for consideration by colleges, Gen2, University and gather feedback.  Hold first meeting of clean energy provider network  Draft vision and strategy, in consultation with employers, reflecting on clean energy strategy for Cumbria  Implementation and monitoring | Providers  Chamber  Employers |  | Summer 2023  Autumn 2023  Winter 2023/24 |  |
| Work with the two new unitary authorities to ensure that all staff in roles that will work with clean energy developments have the knowledge and skills required to support the growth of the sector in Cumbria. | Initial engagement via clean energy employer group  Develop and deliver a programme of briefings and engagement, including site visits and regular meetings. |  |  |  |  |

1. See <https://www.thecumbrialep.co.uk/clean-energy/> [↑](#footnote-ref-1)
2. Offshore wind is excluded because it has been comprehensively covered via another report provided to Cumbria Chamber [↑](#footnote-ref-2)
3. See <https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution> [↑](#footnote-ref-3)
4. See <https://www.gov.uk/government/publications/net-zero-strategy> [↑](#footnote-ref-4)
5. See <https://www.gov.uk/government/publications/green-jobs-taskforce-report> [↑](#footnote-ref-5)
6. See <https://www.thecumbrialep.co.uk/resources/uploads/pages/net_zero/2208-CumbriaCleanEnergyStrategy.pdf> [↑](#footnote-ref-6)
7. See <https://www.thecumbrialep.co.uk/news-detail/2022/business-decarbonisation-a-review-of-cumbria-energy-intensive-industries/> [↑](#footnote-ref-7)
8. See <https://www.enwl.co.uk/globalassets/go-net-zero/net-zero/decarbonisation-pathways/cumbria-decarbonisation-pathway.pdf> [↑](#footnote-ref-8)
9. See <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147340/powering-up-britain-joint-overview.pdf> [↑](#footnote-ref-9)
10. See <https://www.energynetworks.org/industry-hub/resource-library/a-hydrogen-vision-for-the-uk.pdf> [↑](#footnote-ref-10)
11. See <https://cadentgas.com/tenpointplan> [↑](#footnote-ref-11)
12. See <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-net-zero-investment-roadmap> [↑](#footnote-ref-12)
13. See <https://www.gov.uk/government/news/green-jobs-delivery-steps-up-a-gear> [↑](#footnote-ref-13)
14. See <https://www.gov.uk/government/publications/north-sea-transition-deal> [↑](#footnote-ref-14)
15. See <https://www.offshoreenergypeopleandskills.co.uk/> [↑](#footnote-ref-15)
16. See <https://www.thecumbrialep.co.uk/resources/uploads/files/200707-Cumbria-Nuclear-Prospectus_Final.pdf> [↑](#footnote-ref-16)
17. See <https://www.sizewellcconsortium.com/news/northernpledge> [↑](#footnote-ref-17)
18. See <https://www.nssguk.com/skills-strategy/skills-strategy-and-sector-deal/> [↑](#footnote-ref-18)
19. See <https://www.nssguk.com/media/2812/nwa-2021-issue-1.pdf> [↑](#footnote-ref-19)
20. Source: <https://media.nesta.org.uk/documents/Going_Green-_Preparing_the_UK_workforce_to_the_transition_to_a_net_zero_economy.June.2020.pdf> [↑](#footnote-ref-20)
21. The names of these organisations are presented as they appear in the Environment Agency database, although we are aware that in some cases these names have since changed (eg Corus, Hydrocarbon Resources Ltd, BNFL, etc) [↑](#footnote-ref-21)
22. See <https://www.nfer.ac.uk/key-topics-expertise/education-to-employment/the-skills-imperative-2035/> [↑](#footnote-ref-22)
23. Available via <https://www.thecumbrialep.co.uk/skills/> [↑](#footnote-ref-23)
24. The description of occupations reflects the terminology used in IfATE’s occupational maps [↑](#footnote-ref-24)
25. The titles of occupations are the same as those used in the IfATE occupational maps [↑](#footnote-ref-25)