PEOPLE, SKILLS AND JOBS IN POWER SYSTEM DECARBONISATION

Working collaboratively to maximise impact

A Discussion Paper – and a Call to Action
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INTRODUCTION

One of the most critical issues we face in transforming the energy system in pursuit of a Net Zero future is ensuring we have the right people with the right skills and knowledge to undertake the broad spectrum of jobs that must be performed. This spans many disciplines, both professional and vocational. It represents a great economic and social opportunity, but also carries huge challenges.

Transformation of the energy system requires decarbonisation of electricity production and electrification of much of the end use of energy. There is now a clearly stated objective to achieve electricity system decarbonisation in Great Britain by 2030. The new Labour Government is pursuing this with vigour. All parts of the sector must respond accordingly if this is to be successful.

The breadth of the people, skills and jobs challenge is great. It spans the entire energy system and its supply chains. It must address the uncertainty in how transformation will happen and cannot take 2030 as a destination, only a milestone on the journey to 2050 and beyond. The challenge must also acknowledge that existing systems need to continue to operate – we are rebuilding the plane while it is in flight.

The opportunities and the challenges of energy system transformation are well documented. As this discussion paper will show, there is significant effort being deployed to try to address the question of how we build sustainable capability in people and skills, taking account of the requirements from the perspectives of different stakeholders – in Scotland, in GB and beyond. This is all well-intended and purposeful, but if programmes, funding and focus are fragmented, it could put delivery at risk. There is the potential to achieve better results and more productivity from scarce resources if there is coordination. Coordination does not mean central control or an undermining of competition between employers, but it does mean working together to achieve results in a coherent, collaborative way. This will help enable the most effective application of time, effort and money in circumstances of uncertainty and urgency.

Scotland has a central role in energy system transformation. This arises from its success and growing strength in offshore wind, its networks, its local decarbonisation efforts and in its historic relationship with North Sea oil and gas. Scotland's interests span infrastructure, technology, policy, regulation and system operation, all in the service of citizens and consumers. Importantly, Scotland has been a major source of people and skills for these sectors.

An issue arising from Scotland's success is there is now risk that competition amongst organisations for people and skills to fulfil the number and types of jobs needed will cause growing 'churn' of people between employers, increasing key organisations' uncertainty about resourcing and, potentially, putting investment in training and development programmes at risk.

SSE, Scottish Power Energy Networks (SPEN), the National Energy System Operator (NESO) and the University of Strathclyde have come together to try to articulate the problem, frame the opportunity, consider the landscape and identify elements of possible solutions. This has led to confirmation of the value of a collaborative approach across the sector and a call for working together to deliver good outcomes and positive impact.

This Discussion Paper is not intended to provide an exhaustive analysis of the challenge or to propose specific solutions. Instead, it is offered to encourage a community of key parties to come together to share commitment, effort and resources and work collaboratively to identify and rationalise solutions – and to act cohesively. This is focussed on addressing electricity system transformation in Scotland with emphasis on transmission and distribution network infrastructure development, maintenance and operation; however, the approach could be extended to apply to other aspects of the system and in wider geography.

"Ensuring a sufficient, skilled workforce is likely to be one of the most significant challenges for meeting rapid electricity decarbonisation ambitions. Analysis of current data across the energy sector suggests about an additional 200,000 workers are needed by 2030 to meet expansion demand on top of those required to replace the existing ageing workforce. While these numbers illustrate the scale of the challenge for the energy sector, there is also a wider engineering and technology skills challenge to meet business-as-usual and expected growth in activity across other sectors…

… The lack of an adequately trained workforce has the potential to constrain delivery by 2030 but done correctly the Government's ambition in this area can also drive skills development. If the vision, ambition and policies are in place to create a visible pipeline of work, and the skills system is configured to support employer investment in skills, then all parts of the supply chain will feel more enabled to build the new and existing workforce capacity within their organisations."

Rapid Decarbonisation of the GB Electricity System, National Engineering Policy Centre led by the Royal Academy of Engineering, July 2024

¹ https://www.gov.uk/government/news/energy-secretary-ed-miliband-sets-out-his-priorities-for-the-department

DESCRIBING THE NEED

SSE, SPEN and the NESO, all have significant presence in Scotland. This is alongside the UK National HVDC Centre operated by SSEN-Transmission, the Power Networks Demonstration Centre (PNDC) hosted at the University of Strathclyde and the offices of generation developers. Ofgem has a large office in Glasgow. The city is a major hub for engineering consultancies. The newly announced GB Energy will also be based in the nation. All share the ambition of successfully decarbonising the electricity system and realising the associated benefits.

This shared ambition could be at risk without purposeful activity to build the people, skills and jobs base required by these organisations to deliver their individual and collective commitments. This talent base will be multi-disciplinary in nature – from system planners, electrical engineers and lines-people to energy developers, infrastructure providers and others in project management, financial services, environmental disciplines and policy and regulation. Given this, the skills challenge in Scotland will extend not only to the network and operations companies but to associated industries as well as Scottish Government.

FRAMING THE OPPORTUNITY

A balanced perspective must be taken across people, skills and jobs if we are to be successful in realising the opportunities and addressing the challenges that arise in energy system decarbonisation. These elements are not independent; all must be considered as must the interactions and interdependencies between them as illustrated in Figure 1.
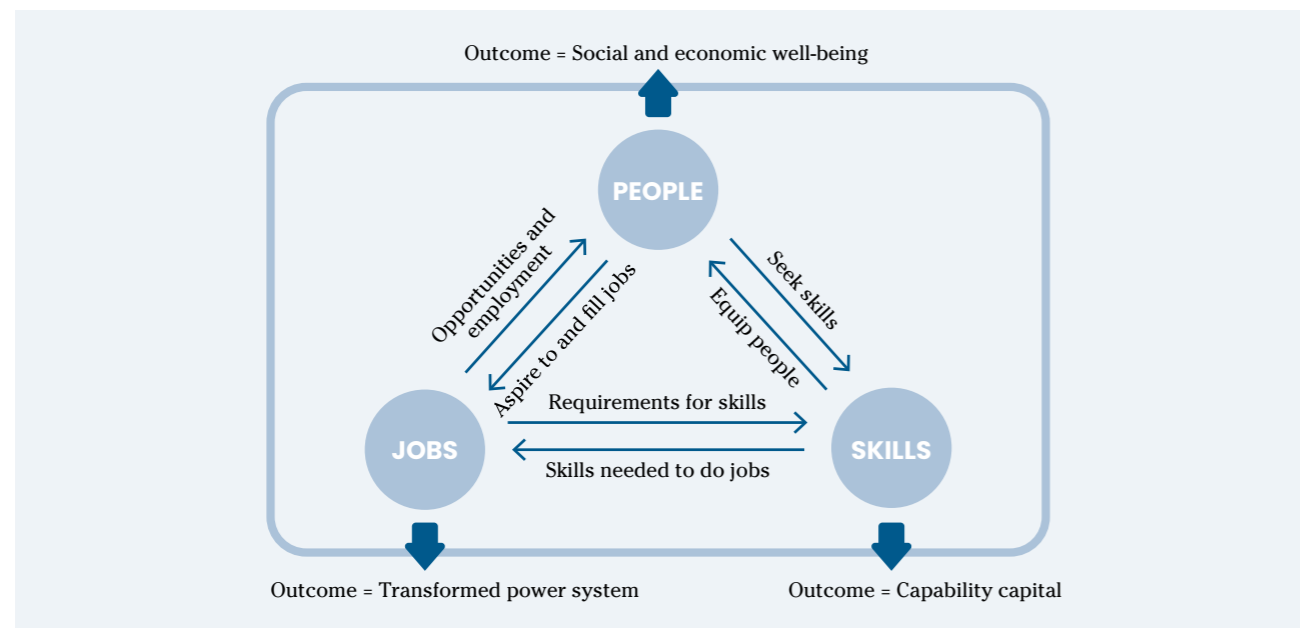

Figure 1: The relationships between people, skills and jobs

In doing this, it is not enough to focus exclusively on the decarbonised power system target. That is a crucial driver, but other key outcomes are the social and economic well-being of people and the communities in which they live and work. The creation of capability capital that will sustain growth in the longer term in service of other important national, regional and local objectives is also a vital outcome.

The interactions between people, skills and jobs are critical to achieving the outcomes sought. The specific details that describe these interactions and their related dependencies and trade-offs will change over time, but the need to consider all three holistically will not. One way to describe the need is to consider what the desired outcomes mean in terms of "demand" and "supply".

DEMAND: CAPABILITIES REQUIRED NOW AND IN THE FUTURE

The pathway that is followed for transforming the power system is a key driver and will provide the overall framing of the requirement. It will guide what jobs are to be performed where and when, what knowledge and skills are needed to perform these jobs and the contractual and employment conditions that might apply.

The plan for delivering power system decarbonisation will be a key strategic input to addressing the people, skills and jobs need and providing quantitative and qualitative measures of demand. This plan is emerging, first as Clean Power 2030 and then evolving to the Strategic Spatial Energy Plan (SSEP)[2] and the related Centralised Strategic Network Plan (CSNP)[3]. It is also expressed in Distribution Network Operator (DNO) plans, Local Area Energy Plans and in the future Regional Energy Strategic Plans (RESP)[4]. The role of Energy Mission Control is also expected to be highly relevant[5]. People, skills and jobs should be explicitly addressed in these plans and functions.

Demand can be described at a number of levels – nationally, regionally and locally – and will be reflected in the requirements of the contributing organisations including the network companies, the system operators and the contractors and partners they engage. It will change over time, with some roles disappearing and others emerging as decarbonisation progress is made and as new technologies are introduced at scale.

Demand will frequently be expressed in terms of skills, competencies and experience, but there will be important people factors as well that address matters such as location, working arrangements and Equality, Diversity and Inclusion (EDI), amongst others.

SUPPLY: CAPABILITIES THAT ENABLE GOOD OUTCOMES TO BE DELIVERED

People are the ultimate determiner of supply, in terms of numbers, interest, willingness and alignment of their capabilities with the specifics of demand. They also have a role in shaping demand by indicating preferences and through potential to introduce innovation into how tasks are performed.

People need to be attracted to the jobs that are to be performed and be willing and able to acquire and deploy the knowledge and skills to do them. They need to be confident these jobs will last an acceptable period of time and be willing to evolve and change as requirements change.

Jobs will require certain knowledge and skills if they are to be performed and performed well. Knowledge and skills enable people to do these jobs. Building them is not only of value to the individual; there are local and regional implications. Some skills may be transferable to other roles in the community or may be exported. They also contribute to resilience against unforeseen disruptions.

An important factor is the line of sight between the jobs and the well-being of the individual, their family and their community. People will value a sense of purpose as well as the financial and career benefits that come from their work.

ACHIEVING BALANCE

The challenge is finding and sustaining the right balance between demand and supply over time in a changing and uncertain environment, with some of the influences being illustrated in Figure 2. This requires clarity on demand and its direction, active engagement on fulfilling this demand in the best possible way, and on-going effort to ensure that interactions and interdependencies are understood and that trade-offs are made in an informed and timely manner.
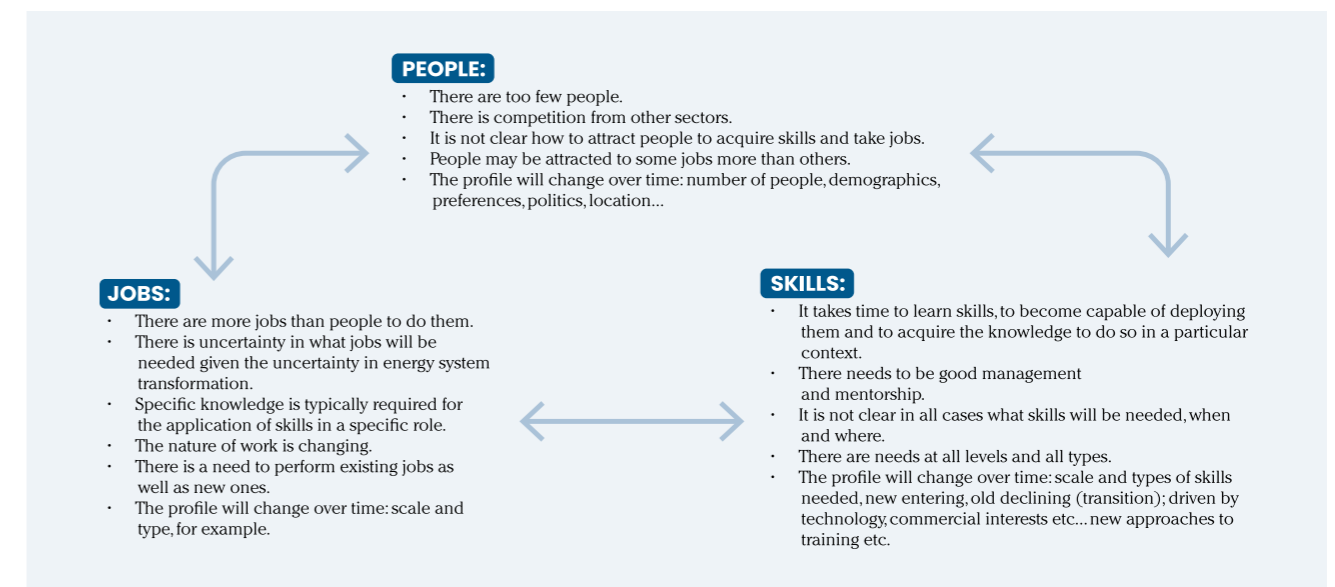

PEOPLE:
- There are too few people.
- There is competition from other sectors.
- It is not clear how to attract people to acquire skills and take jobs.
- People may be attracted to some jobs more than others.
- The profile will change over time: number of people, demographics, preferences, politics, location...

JOBS:
- There are more jobs than people to do them.
- There is uncertainty in what jobs will be needed given the uncertainty in energy system transformation.
- Specific knowledge is typically required for the application of skills in a specific role.
- The nature of work is changing.
- There is a need to perform existing jobs as well as new ones.
- The profile will change over time: scale and type, for example.

SKILLS:
- It takes time to learn skills, to become capable of deploying them and to acquire the knowledge to do so in a particular context.
- There needs to be good management and mentorship.
- It is not clear in all cases what skills will be needed, when and where.
- There are needs at all levels and all types.
- The profile will change over time: scale and types of skills needed, new entering, old declining (transition); driven by technology, commercial interests etc... new approaches to training etc.

Figure 2: Some of the influences on balancing people, skills and jobs perspectives

[2] https://www.gov.uk/government/publications/strategy-and-policy-statement-for-energy-policy-in-great-britain/strategy-and-policy-statement-for-energy-policy-in-great-britain-accessible-webpage
[3] https://www.ofgem.gov.uk/decision/decision-framework-future-system-operators-centralised-strategic-network-plan
[4] https://www.ofgem.gov.uk/consultation/regional-energy-strategic-plan-policy-framework-consultation
[5] https://www.gov.uk/government/news/first-mission-board-focuses-on-immediate-action-to-make-britain-a-clean-energy-superpower

VIEWS FROM KEY STAKEHOLDERS

In discussions with key representatives from SSE, SPEN and the NESO on the need for future skills, two strands of thought are prominent: firstly, there is a significant challenge for businesses to scale to meet decarbonisation objectives, and secondly there is a need to mitigate the risks from an ongoing skills shortage. The discussions provide a "front line view" of the need and the complexity in responding effectively and on a timely basis. Extracts, findings and insights from these discussions follow; they span considerations of both demand and supply and illustrate how interwoven people, skills and jobs are when confronting the task of enabling decarbonisation.

MEETING DECARBONISATION AMBITIONS

Meeting decarbonisation is described by targets for a Net Zero energy system:

"[We] estimate that the energy transition will drive the need for almost 50,000 jobs in Scotland by 2050."

Demand for skills is an obvious pain point and while numbers or accurate estimates for all the different roles are not readily available, there is agreement that the estimated scale of demand for future skills is expected to be a significant challenge, to the extent that this could limit the ability to meet energy transition objectives.

"Our current forecasts are predicting a growth of a minimum of 1,000 green jobs over the next few years. That is purely for growth, excluding retirals and attrition and of course movement or promotion within the organisation. The challenges arise from how and where do we fill these roles?"

There is also strong awareness of the wider environment and the challenges it poses to the decarbonisation transition, even when this is considered to be within the direct influence of particular organisations.

"You have to look at the scale because it's not just about the type of roles we recruit for. [Around 23 million homes in the UK currently use a gas boiler. In order to decarbonise domestic heating by 2050,] we will have to convert almost 18,000 homes a week for the next 25 years — that's a lot of heat pump fitters. …Or [there will be a need for people to] work with hydrogen boilers as well as gas."

Most roles require training programmes to support the development of the workforce to deliver needed outcomes. When compounded by the duration of training programmes and an inherent scepticism about these new types of technologies within much of the existing workforce, the need for quick, scalable, and attractive training programmes is highlighted.

UNCERTAINTY OF FUTURE SKILLS DEMAND

Future skills demand is inherently tied to the future composition of the energy system, which is required to change significantly to decarbonise conventional forms of energy and, in respect of electricity, to grow massively. There is, as yet, little familiarity with many of the technologies likely to be used and uncertainty about how quickly they will be deployed; this uncertainty impacts future jobs and skills needs.

Degrees typically represent training to an advanced level within technical specialisms. In the context of a need for greater consumer and citizen engagement, and for understanding the potential social impacts of new technologies and interdependencies between energy vectors, there is need for a broader set of skills than technical specialisms alone can provide.

"At the moment across the industry… we predominantly have 'electricity people', 'gas people', some 'hydrogen people' and people tend to stick in their own specialism. An increased focus on the whole energy system means there has to be the ability to understand specific vectors but also the interactions between the energy systems. You can't currently get a degree in that… we have to build these skills as we go along."

By implication, the view expressed here relates not only to the form that future roles might take but potentially also highlights that people who pursue undergraduate or advanced degrees have chosen to train in one particular discipline (above all others). There is a stronger principle underpinning this suggested by the idea that "you can't currently get a degree in that": the combination of the breadth of understanding sought, and the uncertainty around specific requirements for knowledge and skills, means that particular training programmes can only do so much in their own right; this is almost as if to suggest it is more important to have a workforce with the potential to adapt to whatever form a future energy system gradually adopts, than necessarily to train for specific requirements.

"Our business is preparing for our next Transmission Price Control period and a key section to these business plans is on how we intend to deliver and resource the work and projects during this period. We are looking at and planning for considerable growth of our workforce. When we're talking about electrifying the [whole] of the UK and moving away from gas, oil, coal… if we're going to do that and move fully in and meet the commitments for Net Zero, the whole sector will have the same resourcing challenges."

Price controls are central to the operation of network businesses. These require businesses to anticipate their future activities, convince the regulator and other key stakeholders of the associated costs, and allocate funding to support recruitment toward those outcomes. They must therefore anticipate their operational requirements years in advance, despite uncertainty surrounding the future: economy, energy mix, network operation, labour constraints and emerging technologies. In this uncertain context, a key aspect of the regulatory regime is to minimise overall cost to consumers, which naturally translates as an upper bound on the salaries network operators feel able offer, in turn limiting the extent to which it is possible to compete for personnel.

AREAS OF ACUTE DEMAND

There are identified areas where skills are in particularly short supply.

"HVDC, control engineers, design engineers, senior authorised persons (SAP), [and what we term] craft professions like jointers, overhead lines and fitters, as well as project managers. Another area is in land & consents and planning."

The demand for talent is not characterised by a straight-forward linear relationship between the number of available roles and those with the skills to supply them. Roles associated with the core engineering technologies may be the most readily identified but there are other roles that arise because of the engineering work.

Competition is also an aggravating factor in fulfilling the need for talent; this might occur with land, consents, and planning expertise due to competition with the renewables industry, for example. This issue could even arise as internal competition within the same business group.

Another perspective on need and competition could arise from efforts to deliver bespoke training programmes to people in one area of a business who have an interest in moving to another, such as project management. This could also be the case with craft professions; SAP roles are susceptible to being in high demand in part due to the nature of the role requiring a high degree of certified experience and the need for an all-hours provision.

"We always need power systems engineers… in particular people for the control room… Another area is data analytics, and data modelling, where we can struggle to find people. [We don't] just [want] people who are technically good at manipulating data but who can model data effectively and communicate what it means too… [We need either] people who can do both, or people who can interpret [between those with a technical focus and the wider business] … [There's a shortage of] digital skills, and in particular AI… The difficulty with a lot of it is [that technology moves so fast that sometimes, the technologies people learn about in schools and universities] are out of date by the time [people] leave education and join the workforce."

There is a strong need for skills associated with the core technologies being deployed in the networks, combined with those needed for system operation. This includes requirements for people with data skillsets, with an emphasis on being able to contextualise results to form insights which are of use to the wider business; a need which extends beyond data processing to being able to use that data to deliver technical, operational and business outcomes.

The coupling of these ideas – firstly that it is a "struggle" to recruit these skillsets, and secondly that these skillsets ought to be broader than technology alone – reinforces a view that the level of competition for talent in network, system operation and energy system planning activities is strong.

Of particular relevance to digital technologies is how quickly these technologies evolve, compounded by the uncertainty in the nature and role of digital technologies in future system operation. This has a significant impact on how best to acquire these skills; traditional teaching might not necessarily be the best approach, particularly given the pace at which technology landscapes are changing.

Craft skills are also critical and in short supply.

"Craft roles such as Jointing, Overhead Lines and Fitting are specific to the industry and require organisations to grow these skillsets through their training programmes. Where there is a demand in work and projects requiring these skills in the wider industry or through the supply chain this creates more competition. We are starting to witness in areas where crafts-persons are being attracted to competitors with higher compensation packages. There is the benefit that these skills still remain in the energy sector; however, this creates gaps within our organisation requiring new and innovative ways to train and develop through upskilling and reskilling at a faster pace."

This paints a challenging picture for network operators, who invest in training programmes only for competitor companies to then recruit their qualified staff. This dynamic speaks to a 'shifting the burden' situation which is reinforced over time. Development of this skillset is critical to the industry, but not all competitor companies directly invest in training and can therefore afford to compete more strongly for qualified people. This in turn increases the reliance network operators have on contracts with these same competitors, further perpetuating the dynamic.

SYSTEM PLANNING

The NESO Future Energy Scenarios (FES) consider options for how the energy system will develop in future; these scenarios contribute significantly to system planning.

"The Future Energy Scenarios pathways always include a degree of uncertainty, but we have to assume that the necessary workforce will be there to support them… for example, the 'Hydrogen Evolution' pathway would require a workforce skilled… to support this vector which may not be sufficiently in place right now."

This highlights a need for future modelling of the system to account for the availability of skills and highlight different pathways' dependencies on them. It appears plausible that the ability of a system to transition will be contingent on the availability of skills, which in turn relies on the composition of the skills landscape, degree programmes, and training initiatives underway now or in the near future: the viability of each of the FES pathways is a function of the skills landscape.

WORKFORCE REDUCTION

Delivering decarbonisation objectives is limited by having the right people with the right skills available to do the required jobs. Workforce reductions, through retiral for example, present a serious threat to achieving these ambitions.

"Another aspect which impacts a future skills and knowledge shortage is that of an aging workforce, and due to recent changes in pension legislation employees have the opportunity to retire earlier than previously planned. In the next 4-5 years we will see an increase in our retirals, losing 30-40 years' worth of experience. To combat this, we are recruiting trainees now to support this loss."

It is important to understand if this effect is potentially more acute at some levels (or 'grades') in a career progression.

"These retirees span across roles in both engineering, craft and management and across differing levels of grades.

This suggests that experience is critical for certain skillsets and roles. Craft professions are by their nature almost closer to a form of art than to a science, insofar as technique, skill, and momentary judgement are essential to good practice. There is no standard approach as such, and what instructions there are, risk being viewed with suspicion (of undermining professional experience-based intuition) rather than for potential to support those completing a given task.

Experience counts for a lot in this business context and an associated loss of experienced individuals therefore poses a substantial threat to both short-term deliverability and longer-term viability of training and mentorship.

"What has happened is there has been a perfect storm. . . combined from Brexit, Covid, and changes to things like immigration policies"

Brexit is perceived as contributing to a less competitive offering in an international context. Covid has cultivated 'lifestyle changes' suggesting that people possibly find themselves less tied to one particular place or routine. Government policy to date has not explicitly targeted an improvement in the UK's international attractiveness to energy sector workers. Emphasis can be placed on the contemporaneous nature of these factors; each is a challenge in its own right, but their coincidence in time creates more difficult, and possibly reinforcing circumstances. There are further challenges in that these factors coincide with a need for rapid business expansion to address decarbonisation objectives and commitments.

"These factors extenuated the war for talent… [it is] so extreme now that retention is the new recruitment."

There is a need to mitigate a risk of an exodus of an experienced workforce: a 'cliff edge of retirals' associated with workforce demographics.

"[The sector has] historically good pensions and [as an industry we have always known there to be] a cliff edge of retirals, but it seemed to be always on the horizon."

Retention might generally be regarded as costing significantly less than recruitment (including its associated overheads in terms of building organisational familiarity and experience). It is noted that skills are now in such short supply that even contractors are difficult to find when vacancies arise.

An additional factor is that retention and recruitment are seen as being distinctively different tasks, and as such are likely to be independently considered.

There is a significant need to anticipate and plan for the risks arising in the workforce. Regulatory pressures and the need to provide returns to their different shareholders push energy network owners and operators, providers of critical national infrastructure for the rest of the economy, into competing with each other. However, the energy transition requires that the networks are maintained and expanded in a coordinated way across the whole of Great Britain with the associated expectation that the whole industry would face the people, skills and jobs challenge together.

MIGRATION POLICIES

International talent already plays an important role in the energy sector in Great Britain to help cover the shortfall in 'home-grown' talent. There is a view that, given supportive policies, its significant role in workforce will continue.

"The government[6] has recently changed immigration policies which has impacted some of [our] efforts to recruit graduates and some key skill shortages internationally."

"There is an opportunity for partnerships with Unis. Unis have a very similar problem to us in terms of recruiting internationally."

Scotland has the strength of a large number of internationally recognised universities and attracts international talent to undertake studies at both undergraduate and postgraduate levels, only for these same people to be asked to leave Scotland on completion of their studies and expiry of their student visas. In many respects this could appear to be a missed opportunity, since the Scottish workforce requires international talent to support the economy including the related commitment to energy system transformation.

"There are questions in the short term about whether we could make it easier to recruit internationally, but longer term we need to 'grow our own'."

It seems counterproductive to place obstacles in front of the recruitment of highly qualified people who already have a demonstrated interest in living in Scotland into a sector with a severe and increasing shortage.

THE NEED FOR "WELL-ROUNDEDNESS"

There is a need for staff who not only have the necessary technical knowledge and skills but also positive attitudes, adaptability, good communication skills and an ability to work well in teams. This need for well-roundedness affects not only the potential longer-term relationship an employee might have with a business, but could help to encourage greater diversity of candidates ultimately selected and serve to extend the potential applicant pool. Another implication of a drive towards greater diversity could be a case to extend eligibility for particular positions to people who, for one reason or another – including those outwith the sphere of influence of large universities and training providers, might be limited in their ability to obtain traditional qualifications, but who would still offer value to network businesses, and who might exhibit a greater willingness to stay with the business in the longer term.

[6] This refers to the previous UK government, in power prior to 5th July 2024

THE LANDSCAPE

The requirement for skilled people to deliver transformation of the energy system in Scotland is substantial, driven by the scale of infrastructure upgrades, the integration of renewable energy sources, and modernisation programmes.

However, estimating the exact size of the workforce needed is challenging and depends on various factors, including the pace of technological adoption, policy decisions, and investment levels. There are various industry reports that tens of thousands of new jobs will be needed across GB in the energy sector, with a significant proportion required in Scotland due to its renewable energy potential and ambitious decarbonisation targets. For example, a report by National Grid in 2020[7] estimated that the UK would need around 400,000 jobs in the energy sector by 2050 to reach Net Zero, with a substantial portion of this workforce needed much earlier, by 2035. Given Scotland's leadership in offshore wind and renewable energy, it could require at least 10-20% of these jobs, translating to approximately 40,000 to 80,000 jobs by 2035, specifically in electricity networks and related infrastructure.

Scotland is proactively responding to the need for skills and job creation in the energy sector through a variety of initiatives and programmes. Brief descriptions of a small sample of the key initiatives follow:

- **Climate Emergency Skills Action Plan (CESAP):** CESAP is a strategic framework developed by the Scottish Government to enable the workforce to be equipped with the necessary skills to support the transition to a Net-Zero economy. It comprises training programmes focused on renewable energy, smart grid technologies, and energy efficiency and engages with industry partners, educational institutions, and Government bodies to align training with market needs.

- **National Energy Skills Accelerator (NESA):** NESA is a collaborative initiative involving Scottish Government, academia, and industry stakeholders aimed at accelerating the development of energy sector skills by offering specialised training courses and certifications in electricity network management, renewable integration, and smart grid technologies. It identifies future skills needs and develops strategies to address gaps including working closely with universities and technical colleges to ensure curriculum relevance.

- **Energy Skills Partnership (ESP):** ESP focuses on delivering practical, job-ready skills tailored to the energy sector, including electricity networks. Their programmes provide apprenticeship opportunities in grid management, maintenance, and renewable energy installations as well as on-the-job training through partnerships with energy companies. Certification ensures trainees receive recognised qualifications upon completion.

- **Skills Development Scotland (SDS) Apprenticeships:** SDS offers a range of apprenticeship programmes specifically designed for the energy and electricity networks sectors. These address a wide range of roles including electrical engineers, technicians, project managers, and smart grid specialists. SDS also provides career guidance, training resources, and employer connections to facilitate successful apprenticeship placements. Both full-time and part-time apprenticeship options are offered to accommodate diverse needs.

- **University Programmes and Research Centres:** Scottish universities are at the forefront of energy research and education[8], providing advanced training and fostering innovation in energy networks. Undergraduate and postgraduate courses tailored to the energy sector are offered across a spectrum of relevant subject areas including technical, business and policy subjects. Collaborative projects with industry partners are encouraged to drive innovation and practical solutions. These can extend to internships and placements within energy companies to gain real-world experience.

- **Energy Networks Association (ENA) Scotland Initiatives:** ENA Scotland represents the electricity network operators and collaborates on initiatives to enhance workforce skills and network reliability. It develops and promotes training standards for network operators to ensure high levels of competency. In addition, it hosts events and training sessions focused on emerging technologies and grid management strategies. It also works in partnership with educational institutions and industry stakeholders to address specific skills gaps.

- **Just Transition Commission Initiatives:** The Just Transition Commission aims to ensure that the shift to a low-carbon economy is equitable, providing support for regions and workers affected by the transition, and considering the associated challenges and opportunities. In its work it promotes policies that ensure diverse participation in the green economy, including support for underrepresented groups.

- **Grid Expansion and Modernisation Projects with Training Components:** Large-scale projects aimed at expanding and modernising Scotland's electricity grid may include embedded training and workforce development elements. Such projects may provide hands-on training opportunities as part of project implementation and include certification programmes that ensure that workers involved in these projects receive necessary certifications and qualifications. They create direct job opportunities related to project construction, operation, and maintenance.

- **Local and Regional Training Initiatives:** Local and regional initiatives play a crucial role in addressing specific skills needs within different parts of Scotland. Key examples of such initiatives include Highland Energy Skills Hub which focuses on delivering tailored training programs for the Highlands and Islands, addressing the unique challenges of remote and rural energy networks; and Lowlands Green Energy Training which offers specialised training in the Lowlands region, emphasising integration of distributed energy resources and smart grid technologies. These work closely with local communities to ensure training programs are accessible and relevant and develop training modules that address the specific technical and logistical requirements of different regions.

- **Government Funding and Grants:** The Scottish Government provides financial support to initiatives aimed at developing skills and creating jobs. These include: grants for training providers and educational institutions to develop and deliver specialised courses; subsidies to employers who take on apprentices, reducing the financial burden and encouraging more apprenticeship opportunities; and investment in infrastructure – allocations of funds for grid expansion and modernisation projects that inherently create job opportunities and require skilled labour.

These activities and programmes sit within a landscape that is summarised in the tables included in the Appendix. It should be emphasised that the lists in the tables are not exhaustive but show that there is much effort being directed at the need by Government at all levels, industry and other key stakeholders. They also provide a resource to support discussion that would allow missing initiatives to be added or those that have come to an end or are thought not to be relevant, to be removed.

The landscape can be organised as a 'map' in an attempt to help visualise how key actors and initiatives relate to each other; the structure of such a map is shown in Figure 3. It incorporates key players or actors, their programmes or initiatives, publications (and other resources) that arise from this body of work, and the known relationships between these entities.
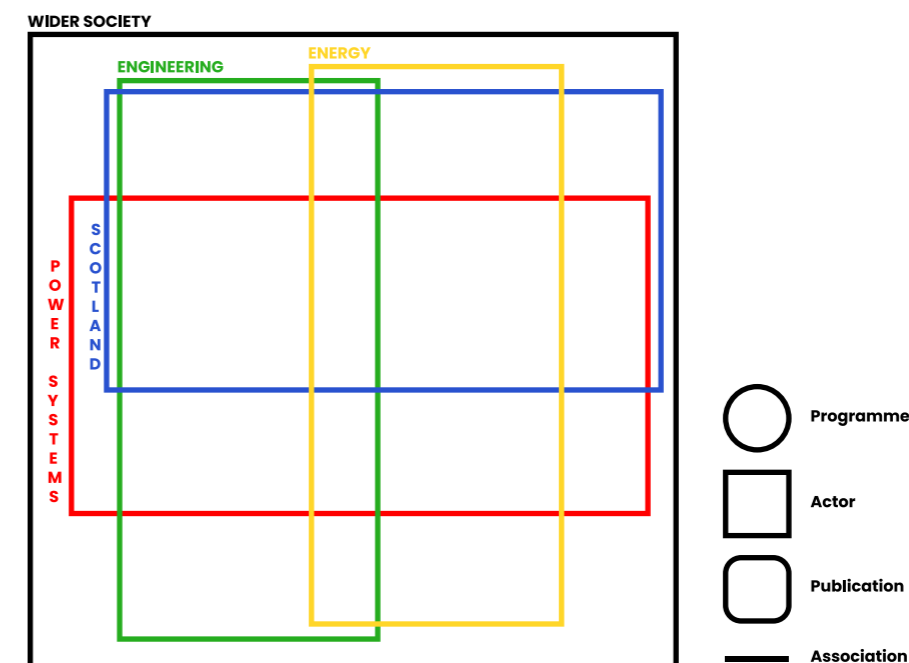

Figure 3: Landscape map structure

The map, populated with the programmes and activities identified in the tables in the Appendix, is shown in Figure 4.
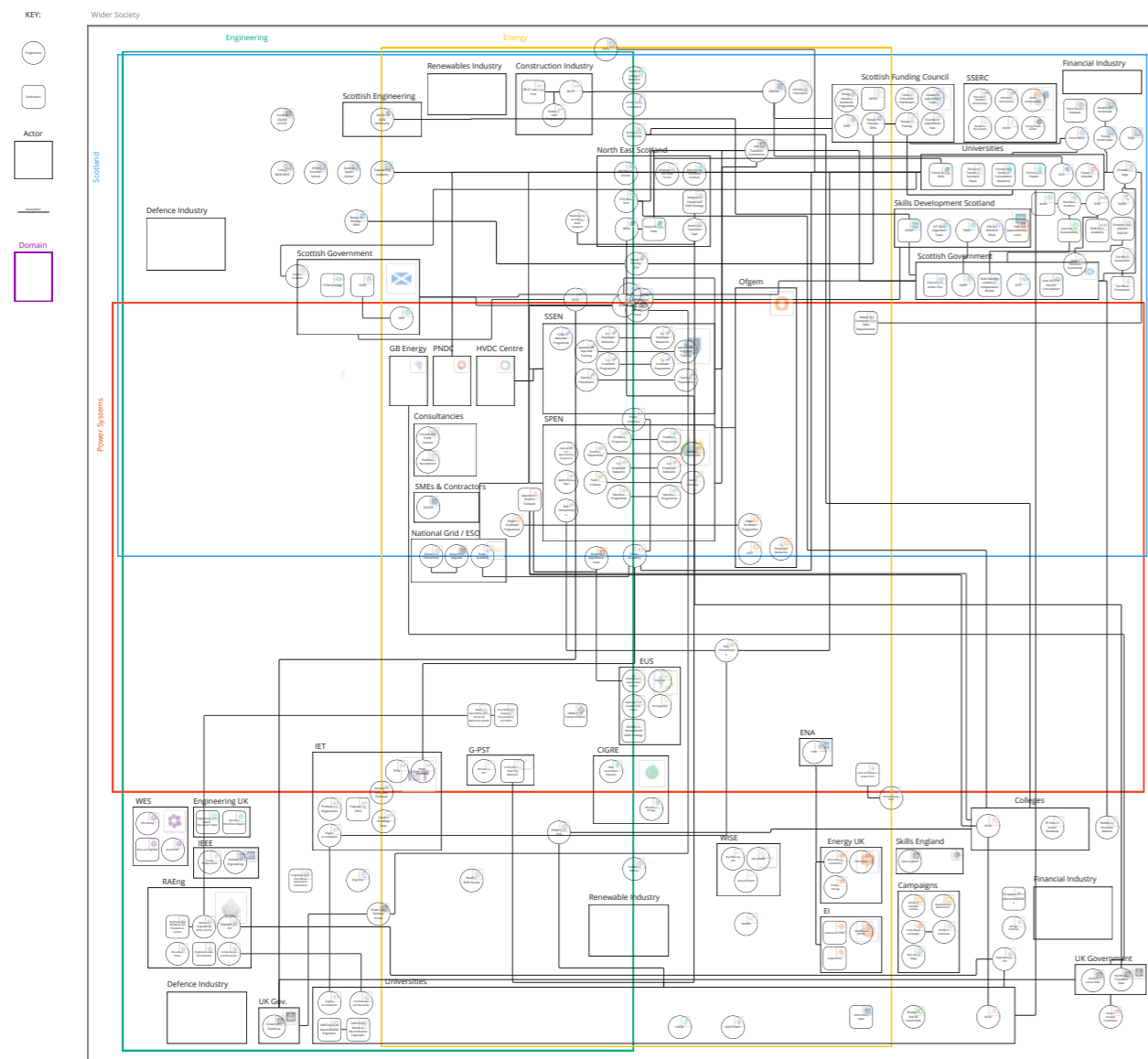

Figure 4: People, Skills and Jobs Map

This makes the complexity of the situation very clear. In this form the map is illustrative but not useful, suggesting the need for it to be provided in a dynamic form that enables "zooming in" and "zooming out" to allow specific interactions and relationship to be explored. The map is available here with zoom function being available using the .pdf tools. Active links are associated with the entries.

The landscape includes successes in Scotland in addressing the workforce need and its associated requirements. SSE, SPEN, the NESO and the University of Strathclyde have played important roles in this along with many others including Skills Development Scotland (SDS) and Energy & Utility Skills (EUS). The success is reflected in strong education and training infrastructure, apprenticeship programmes, industry collaborations, growth in job creation, programmes like those described above and support for workers transitioning from traditional energy sectors.

However, challenges remain as engagement with industry partners in this work suggests:

- **Skills shortages:** Despite the successes, Scotland still faces a significant skills gap in the energy sector. The rapid pace of technological change, especially with the integration of digital technologies and renewable energy, has outpaced the supply of skilled workers.

- **Mismatch between training and industry needs:** In some cases, available training has not fully matched the evolving needs of the industry, leading to difficulties in filling specialised roles.

- **Uneven distribution of opportunities:** Job creation and skills development efforts have not been evenly distributed across Scotland. While regions like the Central Belt have seen significant investment and growth, more remote and rural areas may have struggled to attract the same level of attention and resources. This has led to regional disparities in both job creation and access to relevant training programmes.

- **Challenges in rural areas:** The geography of Scotland presents challenges in deploying training and creating jobs in rural areas, where grid expansion and renewable energy projects are most needed.

- **Challenges in reskilling workers:** While initiatives like the Just Transition Fund have made some progress, the scale of the challenge in transitioning workers from traditional energy sectors to new roles in the electricity networks is significant.

- **Economic uncertainty:** The transition to a low-carbon economy has created economic uncertainty in regions heavily dependent on fossil fuels.

- **Low awareness of opportunities:** There has been limited success in raising public awareness about the career opportunities available in the green energy sector. Many people, especially young people and those in traditional industries, may not be fully aware of the potential career paths in this growing field.

- **Community engagement:** In some cases, there has been a lack of effective community engagement around electricity network projects, particularly in rural areas. This has led to opposition or delays in projects that might otherwise have created jobs and built local skills.

- **Funding shortfalls:** Some programmes aimed at building skills and creating jobs in the sector have faced funding challenges, limiting their reach and impact. This has been particularly evident in initiatives targeting rural areas or highly specialised training.

A common thread pervades these challenges, in that addressing them would be facilitated by collaboration across the many stakeholders involved and affected. This would enable the details and impacts to be confirmed and best practice on addressing them to be shared.

HOW MIGHT THE CHALLENGE BE ADDRESSED

Addressing the challenges and realising the opportunities that energy system decarbonisation represents requires a deep understanding of the jobs that will need to be performed and the skills needed to perform them. Attracting people to these jobs and helping them build the needed knowledge, skills and experience requires systemic change. This change must consider demand, supply and a sustainable balance between the two.

THINKING ABOUT DEMAND

The effort required to deliver good outcomes must be given purpose and direction by a clear vision. This vision addresses the likely nature of system transformation but also looks across the wider economic and social benefits that can be delivered for people.

Systemic change will see the workforce requirement as an integral component of system planning, and part of the decision-making process on feasibility and viability of the resulting plans. With the benefit of coordinated planning at the national, regional and local levels, it will be possible to generate pathways for the jobs and skills that will be needed. This could strengthen a case for building development capability ahead of need.

Demand can be described in terms of the number of positions, of which type, where and with which skills and people requirements. This description will be expressed in ways that are meaningful to the sector but must be communicated to the people that will fulfil the need. This task would typically fall to the Human Resources (HR) role and means that HR must be intimately connected to the rest of the business to understand the need (and its nuances) over a long enough time horizon to inform meaningful workforce planning actions. Talent acquisition and development should be a leadership priority. Part of this role is to have sufficient insight into the people and resources in the business to know if recruiting people from outside is the best or only option or if internal development could satisfy the requirement and in addition, have a benefit for the individual. A flexible, creative approach will be needed.

The sector as a whole needs to think in terms of its value proposition and do so in a way that seeks to align demand with realistic expectations of supply, acknowledging that there may be a need to be flexible in its requirements and in how it acquires and deploys skills. In doing this it should be emphasised that supply is not limited to the energy sector; there is a need to place demand in the context of a fiercely competitive market from other sectors.

Companies must create a compelling case for people to join and stay. They must also support them in their development and build a trust-based relationship that will offer assurance that uncertainty will not place them in disadvantaged positions.

A vision and plan will give a view of demand that provides confidence to strengthen and build supply not only for individuals but also the organisations tasked with fulfilment.

THINKING ABOUT SUPPLY

A critical success factor in responding to the demand for talent is for people to understand the opportunities and the value proposition for them and their families. A clearly articulated need placed in the context of purpose and expressed in terms that generate interest and commitment is an essential starting point. With this established there then need to be pathways for people to pursue these opportunities, whether that is through recruitment or development.

This pathway will vary depending on timing and circumstances. It will include attracting young people to study relevant subjects in school and then to pursue education or training in relevant areas. This can be academic, professional or vocational; all are needed. This requires effort in the education and training ecosystem that will be reflected in curricula and means of delivery. Institutions and facilities must become comfortable with both uncertainty and pace in their endeavours and investments but have the vision and plans that frame demand to provide a basis for decision making.

Development of education and training facilities and capabilities will be required. Investment should not be held back by uncertainty and should be delivered at sufficient pace and scale to build supply that responds well to demand and anticipated demand.

There are other options when looking to build supply: internal development, internal training facilities, collaborative training, drawing on retirees to train or continue working, looking internationally, re-skilling within the business or by attracting people from adjacent sectors, amongst others. Supply strategies should be based on a portfolio of approaches and framed to be resilient and sustainable.

THE CHANGING NATURE OF WORK

Digitalisation including advanced data-driven technologies – especially artificial intelligence and machine learning – will have a profound impact on the workplace. It will affect jobs – what they are and how they are undertaken. It will affect the skills that people are attracted to build and which they need to offer for new and emerging jobs; and importantly it will affect people and their perception of work and how they engage with their employers and the roles being asked of them. It is too early to predict the nature and scale of this impact, but businesses need to be acutely mindful that it must be factored into both demand and supply strategies and approaches.

PRIORITIES FOR TRANSFORMATION IN AN INDUSTRY POISED FOR CHANGE

Engagement with representatives from the NESO, SPEN and SSE reveals some of the areas of focus that will very likely form part of solutions going forward.

UNIVERSITY ENGAGEMENT

It is acknowledged that a present-day change to a curriculum would take years to offer results to businesses.

"There are 5 capabilities we want all our employees to have… a foundational understanding of:

- *data and digital literacy*

- *an understanding of the whole energy system*

- *effective engagement*

- *critical problem solving*

- *holistic thinking [i.e. considering and understanding the linkages, relationships, interactions and interdependencies between the various elements of our work and the energy system].*

Of these, it is amazing how much is not built into the way people [have been taught to] think."

"It would be great if students were taught to think in a way that promotes excellent problem solving and systems thinking. And of course, even if we change curricula now, it will take many years for skills like these to propagate through."

Universities would argue that what is taught in electrical engineering courses already aims to teach students to solve problems. However, there is always for room for reflection on what they could do better and how a curriculum should evolve.

Although a first sift of candidates based primarily on conventional measures of knowledge or skill (such as degree qualifications) is logical, it is not always sufficient; attention should also be paid to what else a candidate has learned. Degree programmes often offer deep understanding of a given specialism. Against a background of rapid technological development, pressure to pack in ever more topics is understandable but can be to the detriment of a more well-rounded appreciation of inclusive subject matter. Industry- based and experiential learning can take many practical forms – one example is the summer placements offered in the Power Academy – and might help bridge this divide.

GRADUATE APPRENTICESHIPS

Graduate apprenticeships are one form of industry-based learning where the overarching aim is to create a blended learning experience by expanding beyond problem-based learning (the application of traditional pedagogical learning to relevant problems often provided by industry), toward placements, secondments, and co-location between education and industry contexts. This enhances the timeliness and calibre of learning, offers near-term benefits to industry partners, and can ultimately support the employability of a trainee or candidate.

"There's really good value in the graduate apprenticeship schemes… A graduate apprenticeship scheme allows you to employ a member of your team who can contribute early on while attending university a day per week over a 4-year period to attain their degree. Your graduate apprentice will earn as they learn and don't have the financial burden of university fees. Graduate apprentices also have improved retention and a huge benefit to organisations where GAs are able to implement skills learnt through their programmes and make improvements and upskill within their business areas.

FOUNDATION APPRENTICESHIPS AND GROUP DEVELOPMENT SCHEMES

A complementary form of industry-based learning is in modern and foundation apprenticeships.

"Foundation apprenticeships and early career pathways are beneficial to attracting new entrants into the industry from high school. There is potential to introduce a pathway course for the energy and utilities industry in students' 4th/ 5th or 6th year at high school which could contribute towards a fast-tracked modern apprenticeship with employers. To do this we require the support of other industries and councils to implement that into their schools. As an industry if we are committing to this type of programme — then we are creating that interest for our industries, and a feed into our own trainee programmes. Switzerland has a model where their high school children do a year's apprenticeship and then they decide whether they want to go on and do a further apprenticeship or whether they want to go to University. They've got a higher uptake in those apprenticeships.

There is a huge benefit to their communities in the value they place on apprenticeship programmes".

To match the scale of adoption in other countries it is natural to conclude that discussion would have to represent a significant, co-ordinated ambition to support foundation apprenticeships on a national basis. Irrespective of any particular mechanism, this emphasis on industry-based learning further implies that co-ordination across industry is a pre-requisite.

"Commitment across all of industry is required to grow the workforce required for future growth. It won't be possible if this growth and investment to grow is only done by several of the larger organisations. Working together to understand what growth will look like and then supporting each other with developing these skills as a group is what is needed.

This points to the present-day imbalance in facilities among industry participants. Any form of meaningful cross-industry collaboration can offer smaller organisations a chance to circumvent practical issues by facilitating a contribution to a wider initiative, potentially with pooled resources and facilities.

RECOMMENDATIONS

The challenges and opportunities associated with people, skills and jobs for energy system decarbonisation are well recognised and documented. There is a broad set of initiatives that are complete, in flight or planned that seek to offer approaches and solutions. These reflect the interests of the respective parties leading them. Groups such as Skills Development Scotland (SDS) and Energy & Utility Skills (EUS) seek a cross-cutting perspective.

There is a clear need for an holistic approach to delivering the outcomes sought – holistic in terms of the problem being addressed and holistic in terms of the solutions being pursued. This strongly suggests there being value in coordination of effort to maximise the impact of individual contributions and to minimise unhelpful competition in an already difficult landscape.

SSE, SPEN, the NESO and the University of Strathclyde are committed to addressing the emerging people, skills and jobs challenge and will work with each other and with others across the industry to help achieve sustained focus. Such collaboration is not intended to replace or duplicate efforts but to support, encourage and reinforce the efforts of those already actively addressing the need. The objective is to help industry stakeholders align their approaches, priorities and ambitions at a strategic level and with an industry-wide perspective in order to maximise impact.

The goal is not to arrive at joint recruitment programmes but to help ensure there is strong alignment on critical skills priorities and that industry members are equipped to leverage their collective impact rather than risk competing amongst each other.

RECOMMENDATION 1: ALIGN STRATEGICALLY

Industry and other stakeholders should work closely with the newly created National Energy System Operator (NESO), the Energy Mission Control function and other key organisations charged with strategic planning of the energy system to understand the current and emerging demand for capability and to help embed people, skills and jobs planning in their strategic plans.

RECOMMENDATION 2: DEFINE THE CHALLENGE

Industry parties should develop and maintain a comprehensive view of the demand they foresee for people, skills and jobs over the period to 2030 and beyond, with sufficient detail, for each envisaged role. This should draw on data available from organisations such as EUS and align with insights from across the sector. This view should be shared with the intention of contributing to joint understanding that can inform individual and collective action. The view should incorporate quantitative and qualitative descriptions of requirements including those relating to skills, competencies, conditions of work, development potential, likely duration, diversity and anticipated conditions of employment amongst other factors that would facilitate effective response. Mechanisms should be established to ensure relevant matters of commercial confidence are respected where necessary, and to maintain currency as new information emerges.

RECOMMENDATION 3: CREATE THE ENVIRONMENT

Government and regulatory parties should develop a comprehensive view of the policy and regulatory environment they foresee for people, skills and jobs over the period to 2030 and beyond. This view should include planned or likely interventions that would help drive and enable demand and supply and be supportive of achieving helpful balance between the two. It should be clear on constraints that may apply. The core provision that the current skills landscape provides is constrained by funding. It is important to note that much of the new funding, where it has been made available is capital resource; additional revenue funding to fund staff and pay for training needs to be addressed. Provision is also constrained by system capacity, one measure of which is the availability of facilities and experienced trainers. There is a need to think creatively about optimising capacity right across the system. This view should contribute perspective on wider social and economic benefits where possible. A mechanism should be established to maintain currency as new information emerges.

RECOMMENDATION 4: IDENTIFY SOLUTIONS

Key stakeholders – including academic and training entities, industry, Government at all levels, trade bodies and others – should work together to develop a comprehensive view of the supply they foresee for people, skills and jobs over the period to 2030 and beyond, and to draw on their respective positions and strengths to build effective, coherent responses. This should include quantitative and qualitative descriptions of different forms of response to build supply which respond to the various types of demand and should be integrated to the extent possible to make it cohesive. This would encompass ways to understand the dynamics of fulfilling need, attracting people to the sector and roles within it, education and training programmes including STEM programmes, building competency frameworks, improving retention, providing internal development and mentoring, incorporating international perspectives and ways of avoiding unhelpful competition, amongst other areas of interest and concern. A mechanism should be established to maintain currency as new information emerges.

RECOMMENDATION 5: ENGAGE, SHARE AND ACT

All stakeholders – including industry, Government of all levels, regulatory, academic, training and other others - should come together to create an environment where they can support one another in understanding future requirements and responding effectively and efficiently. This should include actively sharing successful initiatives, strategies and established training and recruitment practices with the wider industry to highlight the challenge ahead and open the means of contributing. This will help identify gaps, overlaps, priorities and trends. Commitment to information exchange, maintaining information currency and generating insights for the benefit of all will enable progress. The approach followed should respect commercial confidence where necessary but acknowledge the benefits that come from collaborative working.

RECOMMENDATION 6: ADVOCATE AND COMMUNICATE

All stakeholders should work together to advocate for the energy industry at large - in schools, colleges, universities, and across wider society - and communicate its requirements and opportunities. This means seeking to engage with all those that could be attracted to building skills, pursuing jobs or supporting initiatives that help people and communities to understand the energy landscape. One focus area should be STEM career pathways. The messages should be consistent and honest, and delivered using approaches that are engaging and build confidence.

RECOMMENDATION 7: ATTRACT A DIVERSE WORKFORCE

The energy industry should commit to embedding diversity, equality and inclusion into its core operations. Focus should be made on making the energy sector appealing by promoting career opportunities, inclusive leadership, showcasing diverse role models and engaging with partner organisations to inspire diverse talent. This should draw on programmes and initiatives already being progressed in the sector, such as those led by EUS.

RECOMMENDATION 8: EXPLORE THE FUTURE OF WORK

All stakeholders should work together to address the matter of the changing nature of work made possible by artificial intelligence and other technologies. This should include exchanging information on uses that deliver benefit and those that do not. Insights should be applied to inform understanding of the implications on the nature of the jobs that are emerging and, on the shape, and timing of responses to need.

CALL TO ACTION

SSE, SPEN, the NESO and the University of Strathclyde called for key stakeholders to come together for a 'Future Energy System Skills Summit' hosted at the University of Strathclyde on 26th September 2024. The aim of the Summit was to provide a forum to sharing information and insights, to identify opportunities, to share concerns and to work together to create a single voice that will be supportive of others such as SDS and EUS in their efforts. The Recommendations offered in this paper framed the agenda and discussion.

This Summit was held as it was thought to be:

- timely, as the energy transition is already underway

- helpful, as challenges are significant and unanticipated problems are inevitable

- possible, given the collaborative sentiment across the sector

- efficient, to support the efforts of all.

This was be the first of a possible series of such Summits that would provide the opportunity to continue the discussion and, importantly, to measure progress in an active way.

The Summits would allow for the on-going sharing of ideas and thinking on this critical subject and, ideally, help priorities to be determined and collective effort to be deployed.

All key parties – from industry, academia and training, Government of all levels and regulators – working in the energy sector in Scotland would be welcome. The only requirement is commitment to achieving positive impact – individually and together, directly and indirectly, but in all cases, cohesively.

The first Summit in September – and the series that follow would seek to support the high-quality skills activities and programmes that have been initiated by industry bodies, HR teams, universities, training institutions and Government at all levels, and does not look to duplicate efforts, instead seeking to help align approaches, priorities and ambitions at a sector strategic level and maximise impact to deliver the outcomes the energy transition needs.

Landscape of Recent Initiatives across Government Academia, Industry, the Third Sector, Industry Organisations, and Networks

GOVERNMENT AND ACADEMIA

TITLE	WHO	WHAT DOES IT DO?	LINK
Scottish Energy Advisory Board	ScotGov	Represent the voice of industry to government on energy.	Find out more
Scottish Energy Networks Strategic Leadership Group	ScotGov	Provide advice on challenges and opportunities for power networks.	Find out more
Climate Emergency Skills Action Plan	ScotGov	List actions to align skills with `green' opportunities.	Find out more
Investing in skills to support recovery	ScotGov	Train people made redundant or facing unemployment.	Find out more
Roadmap to Energy Skills Passport	ScotGov	To support the translation of skills from oil and gas to cleaner energy.	Find out more
Future Skills: Action Plan	ScotGov	Reaffirm the importance of skills to help people reach their potential.	Find out more
Young Person's Guarantee	ScotGov	Give every young person a route into employment or training	Find out more
Skills Delivery Landscape: Independent Review	ScotGov	To deliver an agile, people-centred skills system built around collaboration to ensure the public body skills landscape remains aligned to future need.	Find out more
Scottish Net Zero Roadmap	ScotGov	The Scottish Net Zero Roadmap consolidates a plan of actions to meet net zero emissions by 2045.	Find out more
Scottish Net Zero Infrastructure	ScotGov	Scottish Net Zero Infrastructure aims to decarbonise Scottish industry as a `cluster'.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Equate Scot	ScotGov	To enable women in STEM to develop by supporting recruitment, retention, and progression.	Find out more
STEM Strategy	ScotGov	To set goals and prioritise actions for education in STEM subjects.	Find out more
Just Transition Commission	ScotGov	An independent group to advise the Scottish Government.	Find out more
NESA Future Energy Skills Report	ScotGov	To develop courses and deliver funded training for the North East of Scotland.	Find out more
Climate X Change	ScotGov	To provide evidence in support of policy development and to build interdisciplinary networks.	Find out more
Mapping Scotland's Solar Skills Requirements	ScotGov	A report to anticipate skills and workforce requirements for the Scottish Solar industry.	Find out more
Sniffer	ScotGov	A charity to foster collaboration across sectors toward climate adaptation and mitigation.	Find out more
DYW Scotland	ScotGov	To connect employers, young people, and educators to support transitions into the workplace.	Find out more
DYW Skills Academy	ScotGov	To provide resources and direct support to young people, to impart knowledge and help prepare for the workplace.	Find out more
Education Scotland	ScotGov	To improve quality of Scottish education & improved learning experiences for pupils.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
RAiSE	ScotGov	To improve teachers' skills in delivering STEM teaching at primary level.	Find out more
Learning for Sustainability Action Plan	ScotGov	To consolidate efforts to build a `strategic national approach' to including sustainability within the curriculum.	Find out more
Fair Work Convention	ScotGov	To form advice for Scottish Ministers on workplace democracy, policies, and skills development.	Find out more
Fair Work Convention	ScotGov	To define fair work and to propose a framework to unlock high-performing and innovative workplaces.	Find out more
Skills Reform Consultation (June 2024)	ScotGov	To consult on legislative changes to `simplify the operating environment for colleges, universities, and training providers'.	Find out more
Cluster Sequencing	BEIS	Develop CCS to support industry decarbonisation.	Find out more
NSTD	UK Gov	A deal between the oil and gas industry and the UK Government.	Find out more
Integrated People and Skills Strategy	UK Gov	To create a joined-up approach to people and skills across the (offshore) energy industry.	Find out more
Green Jobs Delivery Group	UK Gov	To act as a central forum for continued action on green jobs and skills.	Find out more
Green Jobs Taskforce	UK Gov	To advise government and industry how best to provide green jobs.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Unit for Future Skills	UK Gov	To co-ordinate industry and its projects for emission abatement through CCUS.	Find out more
Skills England	UK Gov	To co-ordinate the 'fractured skills landscape' and provide oversight of the skills system.	Find out more
Unit for Future Skills	UK Gov	A research unit to provide high-quality information for decision-makers on (present and future) skills and jobs.	Find out more
Green Jobs Workforce Academy	SDS	To harmonise CPD and microcredentials for a European Education Area by 2025.	Find out more
My World of Work	SDS	To raise awareness of career options (and their requirements) among school pupils.	Find out more
Apprenticeships.Scot	SDS	To promote apprenticeships as a career option.	Find out more
Climate Change Committee	CCC	To advise government on climate change adaptation and mitigation.	Find out more
Scottish Cities Alliance TNZCAP	SCA	To share knowledge and facilitate shared working to help lessen the impact of climate change.	Find out more
Skills Hub	ETZ	1 of 5 campuses for flexible teaching, demonstration, and training facilities.	Find out more
Skills Alignment Team	STF	An effort within SDS, SFC, STF to support alignment.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
FWDF	STF/SFC	A fund to support apprenticeships.	Find out more
NZSFA	SFC	To outline support for Universities and Colleges to make sustainability improvements.	Find out more
Foundation Apprenticeships	SFC	Access for students to spend 1 day a week in a workplace.	Find out more
Graduate Apprenticeships	SFC	Industry support students through University via paid employment around study.	Find out more
Tertiary Education Pathfinders	SFC	To align skills provision against societal and employer need, localised to specific regions of Scotland.	Find out more
Research Pooling	SFC	To encourage Scottish HE researchers to collaborate to improve competitiveness.	Find out more
SRPe	SFC	A research pool to support research projects in engineering.	Find out more
ETP	SFC	A research pool to support research projects in energy.	Find out more
SERE	SFC	To promote opportunities and collaboration for PhD and early career researchers in energy.	Find out more
Energy Industry Doctorate Programme	SFC	To combine industry, government, and academic support for collaborative training of PhD candidates in energy.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
BE-ST	SFC	To collaborate between Scottish construction industry, Government, Colleges and Universities.	Find out more
BE-ST National Hub Programme	SFC	To develop low-carbon construction skills, with a focus on public sector assets.	Find out more
BE-ST Learning Hub	SFC	Resources to promote skills development for the Scottish construction sector.	Find out more
FocusWEST	SFC	To promote further education to school pupils in the west of Scotland.	Find out more
Scottish Colleges Net Zero Courses	Colleges	To list college courses associated with net zero in Scotland.	Find out more
Energy Skills Partnership	Colleges	A platform to collaborate among Colleges, Government, and Industry around the CESAP.	Find out more
Consultation Response	Unis. Scot	A response on how best to support training for sustainable and `green' careers.	Find out more
Tomorrow's People	Unis. Scot	A call for 8 recommendations to support skills and training.	Find out more
SUII Just Transition Summary	SUII	To review definitions, metrics, and reasons for fuel and transport poverty in Scotland.	Find out more
Edinburgh Climate Change Institute	Uni. Edin.	An interdisciplinary collective of energy researchers, aiming to identify effective ways to accelerate sustainability in Scotland.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Energy Transition Institute	RGU	To focus on challenges and opportunities in the north sea offshore energy sector.	Find out more
Fraser of Allandar Institute	UoS	To inform challenges and opportunities for the UK through economic research.	Find out more
Engineering Academy	UoS	To support transitions from an HNC or HND into University with industry placements.	Find out more
Scottish Space School	UoS	A one-week outreach programme to promote engineering skills among school pupils.	Find out more
Young WEIR-WISE	UoS	A two-day outreach event to promote engineering to girls in S2, supported by the Weir Group.	Find out more
STEM Summer School	UoS	A month-long introductory course to form part of conditional offers for STEM degree acceptances.	Find out more
Young Strathclyder	UoS	A 1-day programme to develop interest in University study among pupils from P5 to S2.	Find out more
Accelerate	UoS	A 1-week introduction to develop interest in University study among S5 and S6 pupils.	Find out more
Research Interns at Strathclyde	UoS	To give undergraduate students experience of a research environment.	Find out more
IDRIC Policy Paper	UoS	To study the impact of skills shortages on industrial decarbonisation, particularly in relation to CCUS.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
UHI Energy Innovation	UHI	To support the energy sector as it delivers for Scotland and the Highlands and Islands.	Find out more
SRAEHL	UoSA	To collaborate for an equitable and sustainable net zero future in Scotland.	Find out more
UWE Study on Neurodiverse Engineers	UWE	To present findings of a study of how neurodiverse engineers experience the employee lifecycle.	Find out more
UWE Video Series on Neurodiverse Engineers	UWE	To present findings of research into neurodiversity in engineering as a video series.	Find out more
Electric Revolution Skills Hub	Coventry	A digital skills resource to help provide a sustainable workforce.	Find out more
UK Energy Research Centre	UCL	A UKRI and EPSRC funded independent, interdisciplinary research network for the UK.	Find out more
IGNITE Network+	UKRI	A network+ for energy researchers to improve diversity and inclusion.	Find out more
CDTs	UKRI	To deliver cohort-based training in fields requiring both breadth and depth of research.	Find out more
Research and KE Concordats	Vitae	A framework to support the conditions of employment for research and KE staff.	Find out more
FE Climate Action Roadmap	AOC (Colleges)	A roadmap to guide sustainability strategies and define KPIs for the Further Education sector.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Education Industry Partnerships	SSERC	Bespoke partnerships for STEM outreach supported by industry.	Find out more
ENTHUSE Partnerships	SSERC	Collaborative industry-school partnerships to improve STEM attainment.	Find out more
ESERO	SSERC	Use space to inspire primary and secondary school pupils into STEM subjects.	Find out more
Research Placements	SSERC	Offer S5 pupils short summer placements in Universities and research institutes.	Find out more
STEM Ambassadors	SSERC	Support industry representatives to engage with schools to promote STEM career options.	Find out more
Young STEM Leader	SSERC	School pupils take initiative to run their own STEM engagement activities to a peer group.	Find out more
PlanItPlus	Councils	A collaboration to help local authorities promote career options for school pupils.	Find out more

INDUSTRY

TITLE	WHO	WHAT DOES IT DO?	LINK
Graduate Programmes	SP	The ScottishPower graduate programme.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Eng. Pre-Apprenticeships	SP	ScottishPower pre-apprenticeship programme.	Find out more
6 x Employee Networks	SP	Employee networks to create a supportive workplace.	Find out more
Summer Placements	SP	Undergraduates in relevant courses can spend summers working at Scottish Power.	Find out more
YinI	SP	School leavers can gain a year of work with ScottishPower after school, before a next career move.	Find out more
Returner Programme	SP	To support personnel on their return from a career break.	Find out more
Apprenticeships	SP	To train directly with ScottishPower in a range of skillsets.	Find out more
MSc Scholarships	SP	To support people to study relevant subjects to develop future talent.	Find out more
8 x Employee Networks	SSE	To support a sense of belonging at SSE.	Find out more
5 x Graduate Programmes	SSE	SSE's graduate programmes.	Find out more
Summer Placements	SSE	Undergraduates (> 2nd year) can spend summers working with SSE.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
STEM Returner Programme	SSERC	Support staff to return to industry after a career break.	Find out more
Apprenticeships and Training	SSERC	SSE's apprenticeship and training programmes.	Find out more
SGS GA	SGS	Graduate Apprenticeships are shared across the industry supply chain.	Find out more
Graduate Recruitment	TNEI	Graduate recruitment occurs across the industry, including local consultancies.	Find out more
Consultancy Early Careers	FN	Local consultancies offer graduate and undergraduate roles, including placements and Year in Industry.	Find out more
Ofgem Graduate Programme	Ofgem	Ofgem runs its own graduate programme.	Find out more
Consultancy Early Careers	Ofgem	A framework to accelerate transmission investment by exempting select projects from competition.	Find out more
7 x Employee Networks	Ofgem	To support inclusion at Ofgem.	Find out more
Great Grid Partnership	National Grid	To respond to UK supply chain and skills shortages.	Find out more
Great Grid Upgrade	National Grid	A portfolio of 17 infrastructure projects.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
My Energy Future	Opito	An online platform to inspire people to pursue careers in energy.	Find out more
North Sea Transition Deal	Opito	To develop an `Integrated People and Skills Strategy' for the `North Sea Transition Deal'.	Find out more
NESA	NESA	To `retain and enhance talent capabilities [in] our energy industry'.	Find out more
Future Energy Skills	NESA	To `inform the development of new courses' with academic partners.	Find out more
Employment and Skills Forum	OEUK	A forum to ``share information'' about employment and skills.	Find out more
Skills in Shetland	Orion	To collaborate on attraction, development, and retention of talent in Shetland.	Find out more
ETZ Skills Hub	ETZ	A training and reskilling facility to be able to flexibly train people in a variety of skillsets.	Find out more

THIRD SECTOR, INDUSTRY ORGANISATIONS, AND NETWORKS

TITLE	WHO	WHAT DOES IT DO?	LINK
Just Transition Commission	JTC	An advisory group independent of government.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
EPGS	IET	A link between the engineering industry and government.	Find out more
FPSA	IET	To ``identify new capabilities required by the electricity system in 2030''.	Find out more
Power Academy	IET	To attract graduates to energy companies across the UK.	Find out more
Engineering 2050	IET	A manifesto on policies needed to close the UK engineering skills gap.	Find out more
Professional Registration	IET	To register engineering personnel according to an international standard.	Find out more
Innovation and Skills (Surveys)	IET	To offer insights and resources to help tackle the STEM skills gap.	Find out more
Faraday Challenge Days	IET	An annual competition for secondary pupils to take part in STEM activities.	Find out more
Young Professionals	IEEE	A group of early-career professionals.	Find out more
Women in Engineering	IEEE	An international network for women in engineering.	Find out more
Women in Energy	CIGRE	An international network for women in the energy industry.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
NGN	CIGRE	A network for young professionals in the power systems industry.	Find out more
Women in PST	G-PST	Mentorship, training, & internships to support women to lead the energy transition.	Find out more
Pillar 3 - Teaching Materials	G-PST	Free teaching materials to cover power engineering topics relevant to the energy transition.	Find out more
ReWiRE	Regen	Mentoring for women in the electrical industry.	Find out more
TIDE	ENA	A `taskforce' for inclusion and diversity in the energy sector.	Find out more
HeatNIC Skills Survey	HeatNIC	To survey the heat sector's current skills to support creating 35,000 jobs.	Find out more
Net Zero Skills Programme (Webinars)	Scottish Engineering	Webinars to support skills development, mostly for SMEs.	Find out more
YEP Forum	Energy UK	A community of `next generation' energy industry leaders.	Find out more
Pride in Energy	Energy UK	A community of LGBTQ+ members, mindful of the Stonewall Workplace Equality Index.	Find out more
EDI in Energy Conference	ENA	A conference to provide a platform to share knowledge and best practise across the sector.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
MentorSET	WES	Mentoring within a professional network of women engineers.	Find out more
She's an Engineer	WES	An outreach initiative to celebrate women as role models in engineering.	Find out more
PPE Survey	WES	A survey of engineers to assess the need for PPE designed for women.	Find out more
Training and Resources	Equate Scot	A non-profit to champion women in STEM careers, signpost roles, and offer training.	Find out more
My Skills My Life	WISE	An outreach initiative for secondary education to encourage women to join STEM careers.	Find out more
Jobs Board	WISE	To signpost opportunities and help employers recruit women.	Find out more
Awards Event	WISE	Awards to celebrate women role models in STEM professions.	Find out more
POWERful Women	EI	To help address the gender imbalance at senior levels of the UK energy industry.	Find out more
Generation 2050	EI	An outreach project and manifesto to `reverse mentor' political and industry leaders.	Find out more
Hearts and Minds	EI	A toolkit to promote workplace safety cultures.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Tripod Foundation	WES	A framework tool to conceptualise risk.	Find out more
EI Publications	WES	Publications for the energy industry on human and organisational factors.	Find out more
Net Zero Workforce Report	Engineering UK	A review of recent reports on the engineering skills needed for Net Zero.	Find out more
Engineering Skills Needs - Discussion Paper	Engineering UK	To provide insights from labour market analysis into the engineering and technology sector.	Find out more
National Skills Academy for Power	E&US	A network to address need for a workforce with skills required for an economy sector.	Find out more
EUS Register	E&US	A register of people trained for the utility sector.	Find out more
EUS Jobs	E&US	To signpost jobseekers to roles in the energy industry.	Find out more
EU Independent Assessment Service	E&US	To assess apprenticeships.	Find out more
Workforce Renewal and Skills Strategy	E&US	To review progress against a framework of 10 objectives designed to protect workforce sustainability.	Find out more
Education Policy	RAEng	To help characterise the landscape around skills, training, and engagement initiatives.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Engineers 2030	RAEng	A consultation (and synthesis of recommendations) on engineering knowledge and skills.	Find out more
Scholarships and Bursaries	RAEng	To support higher engineering to deliver engineering qualifications.	Find out more
Engineering X - TSP	RAEng	To create partnerships between academia and industry to address sustainable development goals.	Find out more
NEPC	RAEng	To ``marshal... leading engineering expertise to provide practical policy advice".	Find out more
Engineering a Resilient and Prosperous Future	RAEng	To call for a long-term approach to the big challenges facing the UK.	Find out more
Rapid decarbonisation of the GB electricity system	RAEng	To discuss priority actions and recommendations for a transformed energy system.	Find out more
Roundtable 5: Capacity, Procurement, and Skills	RAEng	To recognise what procurement models, industry capacities, and skills are needed to decarbonise by 2035.	Find out more
UCAS	UCAS	To match University applicants with suitable places.	Find out more
Apprenticeships in Scotland	UCAS	To advertise apprenticeships to potential applicants.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Sustainability First	SF	A charity to promote practical environmental, social, and economic solutions in energy and water.	Find out more
Jobs and Skills in Green Tech	SF	A report on future trends in green tech jobs and skills, with approaches to engage young people and underrepresented groups.	Find out more
Utility Dive: Future of Work	Utility Dive	An article to highlight the role of automation in a future skills landscape.	Find out more
Working Families Toolkits	WF	Toolkits to help employers design workplace arrangements to support family life.	Find out more
Awards and WF Benchmark	WF	Working Families awards and a Working Families benchmark allow sharing best practise.	Find out more
Engineering for One Planet (education) Framework	EOP	To transform engineering education in view of social and environmental sustainability aims.	Find out more
Enginuity	Enginuity	To find new ways to close the skills gap in UK engineering and manufacturing.	Find out more
4 Day Week Campaign	4DWeek	A manifesto for a change to 4 day working week.	Find out more
ASPECTT Database	Autonomy	A database of skills associated with the energy transition.	Find out more

TITLE	WHO	WHAT DOES IT DO?	LINK
Wellbeing Economy Alliance	**WEAll**	A charity to promote alternative economic incentives to the more traditional GDP.	**Find out more**
Real Living Wage	**SLW**	A campaign for a living wage.	**Find out more**
Shingo Institute	**Shingo**	A suite of training options to support organisational understanding and improvement cultures.	**Find out more**