Roundtable summary: The Energy Transition in Scotland

Executive Summary

- The energy system in Scotland has significant expectations placed on it, but the realisation of these is threatened by underdeveloped supply chains, inconsistent policy, and missed opportunities to capture domestic value.
- Scotland has the resources, expertise, and motivation to lead in a just energy transition but making a success of this requires systems thinking, properly implemented industrial strategy, and a clear focus on ensuring that local communities' benefit from the value of these energy projects.
- Chemical engineers and IChemE have a vital role to play in both delivering the energy transition and in helping articulate what is needed to make it a success.

IChemE call on the Scottish and UK Government to:

- ensure that the implementation of the UK industrial strategy is sensitive to the value of local supply chains, job creation and value retention;
- promote and invest in training, skilling and reskilling to ensure that the workforce is in place to deliver the energy transition, and to ensure that all individuals and communities can benefit from the opportunities it presents;
- publicly recognise the pivotal role of chemical and process engineers, and chemical and process engineering in achieving a sustainable world and in the transition towards this;
- designate chemical and process engineering as subjects of national strategic importance, alongside explicit references to chemical and process engineering in relevant discussions, documents, and legislation;
- prioritise chemical and process engineering education and training at all levels – supporting significant expansions in technical and apprenticeship, undergraduate and postgraduate, and post-doctoral routes as well as reinstatement of 'National Engineering Scholarships', designed to encourage and enable young people from currently under-represented groups.

Background

Scotland is a leading player in renewable energy, and both the Scottish and UK Governments are committed to promoting the transition to a greener future. Although energy policy is reserved to the UK Government and not devolved, the Scottish Government has a critical role to play in related areas such as planning, environmental regulation, renewable energy promotion and climate change targets.

Scotland's energy transition is well underway, with high levels of renewable electricity generation and significant investment in offshore wind and hydrogen. However, challenges persist around supply chain localisation, infrastructure gaps, and declining industrial output in traditional sectors such as chemicals and refining.

To explore this crucial topic, the Institution of Chemical Engineers convened a roundtable at the Royal Society of Edinburgh, Chaired by IChemE President Raffaella Ocone. The session brought together engineers, industry leaders, researchers, and regulators to reflect on the energy transition in Scotland, what has worked, what hasn't, and what should come next. This document provides an anonymised write-up of key themes from this discussion.

Scotland's transition to date

Participants agreed that Scotland had made significant progress on renewable energy generation to date, and that there was much to be proud of. A key theme in the discussion was the need for the UK and Scottish Governments to focus on building the energy system of the future and the need for coherent and systemic planning to do this – particularly around grid capacity, supply chains and industrial energy use.

It was recognized that Scotland and the UK have historically been less good than their peers at capturing the economic value of the energy they produce. Other countries such as Norway have managed to capture more than twice as much of the economic value of their energy resources, and there was a concern that the green energy transition would continue to see much of the economic benefits leaving the country. To achieve a just transition where all communities feel the benefit of these new forms of energy and the economic opportunities they provide, Scotland needs to do better in the future in capturing these economic benefits locally.

Integrated Value and Supply Chains

A key theme in the discussion was the need for greater focus on the supply chains required to deliver the green transition. It was felt that these were too often overlooked by policymakers, and this had led to a systematic failure to develop domestic supply chains for clean energy technologies. For example, offshore wind, hydrogen, and carbon capture projects currently rely heavily on imported components and services, which undermines economic resilience and emissions reductions, and misses out on opportunities for local industrial growth. This includes critical minerals which are vital to the delivery of the energy transition. In addition to these supply chain issues, there was also a concern that cost considerations can too often trump the need to ensure that projects are creating local economic opportunities – leading decisionmakers to look abroad to source components or materials that might be available domestically, albeit

at greater cost. This lack of consideration to supply chains was also seen to lead to an under-emphasis on ensuring a sufficiently large and skilled local workforce to be involved in delivering these technologies.

It was felt that chemical engineers need to better explain the value chain from feedstock through to end products that benefit society -for instance, telling the story of how a the molecule from the North Sea ends up as blood bags, syringes, PPE, contact lenses. If policymakers could understand this better, they would be better able to appreciate wider supply chain security issues than energy security alone.

Skills, Education, and Workforce Planning

Participants agreed that a successful energy transition requires a sufficiently large and skilled workforce and were concerned that this would not be available in the future (and, indeed, that it was not available at present). It was recognized that the traditional energy industries possess valuable skills and expertise essential to the green transition, that many of these skills were transferable, and it was therefore critical to enable workers from these backgrounds to pivot into new sectors as part of the energy transition.

To deliver the workforce needed, participants wanted to see industry-led upskilling, stronger R&D–industry–education connections, place-based training and the successful scale-up of new technologies. In addition, reskilling was seen as a crucial response to the workforce challenges, and it was felt that government intervention was vital to ensure that companies were incentivised to invest in this.

IChemE's work in encouraging people to join the field was noted as an example of what can be done to address these workforce challenges. Its virtual work experience platform and outreach to schools in particular were highlighted as effective, scalable models that others could learn from. More generally, outreach was seen as crucial in helping the sector explain its work better to the public, to ensure that people were not avoiding working in the industry due to misconceptions about it. The Government was seen to have a key role to play in helping people see a future for themselves in this workforce, and to help people see that they will have good prospects in these kinds of roles.

Innovation and the energy system of the future

Participants identified a recurring challenge in seeing promising new innovations crossing the 'valley of death', where new initiatives often fail to make the transition from the lab through to commercial scale. It was felt that more support was needed to help bridge this gap, and that innovation was too often being stifled by rigid funding mechanisms. A related issue was raised with the need for robust market opportunities

to be available before companies feel incentivised to invest in new technologies – for instance, without seeing a robust market for hydrogen in place, firms will be wary about the value of starting to produce it themselves. Government action was seen as crucial in helping promote the markets needed for many of these clean energy technologies.

Innovation was seen as crucial if Scotland was to maximise the value of its energy resources, and it was felt that rather than simply training workers to operate existing technologies, programs should engage them in developing improvements and novel solutions, so that Scotland could move beyond raw renewable generation to high-value products and expertise.

The group discussed the crucial role of enterprise investment in delivering the energy transition as investors identify and capitalise strategic decarbonization, efficiency, renewable energy and infrastructure opportunities but require the right market conditions and policy frameworks for such investment to be worthwhile. There was a desire for Government to ensure that policy and regulation set out and incentivised the future energy system that the government wants to see, rather than merely focusing on banning undesirable aspects of the current system.

The role of IChemE

IChemE was seen to have an important role to play in helping articulate a positive vision for the energy system of the future, drawing out connections between innovation, industry, materials, jobs, and energy systems in a way that policymakers often neglect. Similarly, IChemE was seen to have a key role to play in helping others understand the critical value chains involved in the energy transition (e.g. chemicals to clean technology) to help inform policy audiences. As one participant put it, “the challenge is: can we explain why hydrogen, ammonia and polymers matter to net zero?”

Other key areas for contribution were seen in IChemE’s continuing work on educational outreach – particularly for areas affected by the energy transition – and on the development of quality standards, training pathways, and safety guidance for emerging technologies and industries.

Conclusions and recommendations

The energy system in Scotland has significant expectations placed on it, but the realisation of these is threatened by underdeveloped supply chains, inconsistent policy, and missed opportunities to capture domestic value. Scotland has the resources, expertise, and motivation to lead in a just energy transition but making a success of this

requires systems thinking, properly implemented industrial strategy, and a clear focus on ensuring that local communities' benefit from the value of these energy projects.

- Historically, Scotland has not retained as much of the economic value of its energy resources as comparator countries**.** The energy transition is an important opportunity to do better on this front.
- To ensure that Scotland's energy transition is a just transition will require decisive action to ensure that all communities and individuals can benefit from new energy projects and be involved in the opportunities it brings. This will require a range of interventions from support for reskilling through to developing robust plans to promote local economic growth.
- Chemical engineers and IChemE can play a vital role in both delivering the energy transition and in helping articulate what is needed to make it a success, e.g. drawing out the foundational importance of integrated value and supply chains. IChemE call on the Scottish and UK Government to:
- ensure that the implementation of the UK industrial strategy is sensitive to the value of local supply chains, job creation and value retention;
- promote and invest in training, skilling and reskilling to ensure that the workforce is in place to deliver the energy transition, and to ensure that all individuals and communities can benefit from the opportunities it presents;
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About IChemE

The Institution of Chemical Engineers (IChemE) is the qualifying body and learned society for chemical, biochemical, and process engineers in the UK and worldwide, with over 33,000 members. Our mission is to champion the input of chemical engineers to create a sustainable future. Find out more about IChemE and our strategic vision of engineering a Sustainable World at icheme.org