2022-IPXX: Synopsis of the ECR Net Zero Conference, Manchester, UK

In an excellent demonstration of cooperation to support the UK's drive to Net Zero, nine research consortia forged an alliance to organise the first ECR Net Zero conference on the 30th of November and 1st of December 2022 at the Etihad Stadium in Manchester, UK. The conference brought together early career researchers (ECRs) within the net zero space across the UK to discuss the challenges and solutions to delivering net zero. The vast majority of the UK's academic research is carried out by PhD students and postdoctoral researchers. Their perspective on, and understanding of, the UK's energy system and research needs is incredibly valuable.

Snapshot of the welcoming address by Carys Blunt, UKCCSRC at the ECR Net Zero Conference, Etihad Stadium, Manchester, UK.

The conference provided an opportunity for ECRs from these research consortia to meet and network with peers from different research communities, which was especially valuable for ECRs who had not had this opportunity due to COVID. The organisers of the conference are listed below.

1. The Centre for Postdoctoral Development in Infrastructure, Cities and Energy (C-DICE)
2. United Kingdom Carbon Capture & Storage Research Centre (UKCCSRC)
3. Industrial Decarbonisation Research and Innovation Centre (IDRIC)
4. Transforming Foundation Industries Network + (TFI Network +)
5. The Centre for Research into Energy Demand Solutions (CREDS)
6. United Kingdom Energy Research Centre (UKERC)
7. The Greenhouse Gas Removal Hub (CO_2RE)
8. Energy Research Accelerator (ERA)
9. EnergyRev

The future of our energy systems, the climate and state of our planet are reliant on how skilfully equipped our ECRs are today. Therefore, it was great to see ECRs from a broad spectrum of disciplinary and technological backgrounds come together to network, share experiences & learnings and brainstorm on key challenges on delivering net zero. Also, it was a great privileged to have been invited as a speaker to the ECR Net Zero conference, where I gave a brief talk about the mandate of IEAGHG and the research work that I conducted during my PhD at the University of Sheffield.

Beyond the accustomed energy conferences themes such as clean energy technologies advancement, policies & regulatory tools, cost & environmental sensitivities which are particularly pertinent, the ECR conference highlighted the following discussion themes:

- Developing an effective framework to incorporate research by ECRs into policies and strategies for decarbonisation pathways
- Integrated approach to create a net zero cluster
- The role of the public in delivering net zero economy
- Embracing the concept of Just Transition for regional decarbonisation campaigns
- Identification and enabling skills set acquisition relevant for industrial decarbonisation
- Considering the role of demand in reaching net zero

We are at an unprecedented time of research and innovation and should take the opportunity to create value for society and the economy. As we tackle the unintended consequences of the first industrial revolution (and bear in mind those from this 'revolution' too), it is critical to design efficient instruments that help research achieve impact to solve climate challenges (rising temperature are fuelling environmental damage, natural disasters, weather extreme weathers, food and energy security, economic disruption, and conflict). However, desired impacts are achievable when there is systematic engagement between academia, industry, government, and members of the public, to integrate engineering, environmental and technical solutions with economic, behavioural and policy provisions. The challenge is a socio-technical one.

At the heart of net zero economy are industrial decarbonisation campaigns delivered via industrial clusters. A successful cluster should be able to:

- Demonstrate cooperation between businesses & organisations across the region and evidence joint decision-making for the benefit of the wider cluster.
- Consider the wider societal benefits (and unintended negative side-effects/ rebounds) of their activity.
- Have a membership that represents the industries within their geographies. They will have engaged relevant public sector organisations and have support from communities in which the operate
- Realise the wider benefits that decarbonisation can bring for the region, going beyond individual decarbonisation projects to maximise emissions reduction potential and development of supply chains and jobs.

These are complex and demanding challenges, but the new industrial revolution and sustained public engagement presents major opportunities to address them and to enrich and improve lives and community development. Public attitudes have been reported to be crucial for technology development and upscaling. However, there's little evidence that public attitudes currently constitute a major barrier to greenhouse gas removal, but public attitudes can be enablers as well as barriers.

Customarily, energy and environmental discussions are often relegated to the analysis of technologies and economics, but energy justice is about humanising the discussion, it's not just about megawatts, gigatons, sensitivity analysis, and costs, it's about people**.** The transition to a net zero energy system provides society with an opportunity to embed energy justice principles and practices across the energy sector to achieve a transition which is not just 'green' but also 'just'. Within the last decade a surge of activity was reported in themes relating to energy justice and just transitions in both academic

literature and policy priorities. While these investigations and activities have advanced our understanding of both concepts and unearthed potential mechanisms for applying these to policy making, several key questions remain as follows:

- What do we mean when we talk about delivering a just transition to net zero or embedding energy justice within the energy system?
- Who is responsible for implementation? of this goal and ensuring energy justice is embedded in the transition to net zero?
- Do different stakeholders have different capacities to act? How can those with real power be motivated to create change and held accountable for their actions? [1]

The 'Delivering a Just Transition' report which was presented at the conference attempts to address these questions, drawing on a series of 12 in-depth interviews with experts (based in academic institutions across the UK, the European Union, the USA, Australia, and Norway, as well as in Africa and Central America) in the topic of energy justice and just transitions. Access to the report can be access HERE. Further, the characterisation provided for 'Energy Justice' and 'Just Transition' as informed in the report is as follows.

- *''Energy justice recognises that the energy system transition needed to combat climate change is going to impact people and societies in a various way and that without taking moral considerations into account this could disproportionately affect poor and marginalised communities. Energy justice also recognises that the global energy system is currently 'unjust' but that transition to net zero brings an opportunity for countries to recreate their economies in ways that are more equitable instead of replicating these unjust policies and processes''.*

- *''A just transition takes into account the rights of the workforce and encourages the creation of decent work and quality jobs in sustainable economic sectors in accordance with nationally defined development priorities. It maintains that the burden of climate action should not be borne unequally by one set of workers or communities or any one country''*

Finally, Industrial decarbonisation will require a substantial workforce that comprise of a diverse mix of jobs and responsibilities, some at a professional level creating strategies, designing, planning, and managing delivery, others more technical and trade focused responsible for physically delivering projects. Though some technologies needed to realise a net zero future are not yet all fully developed, and that ongoing research, development, and innovation are critical to success, the key technologies available now to deploy, included amongst others CCUS and replacement of natural gas with hydrogen. These technologies draw on the same skills and competencies used to deliver large scale industrial infrastructure today. The workforce in the existing oil and gas and energy sectors will likely find themselves well placed to be part of the transition to a decarbonised the global economy.[2]

This scale of demand for construction workers and civil engineers represents a significant challenge for industrial decarbonisation. In the UK this is notably evident given the current labour market tightness in the economy and especially in construction and civil engineering sectors. There are

[1] Bray, R. & Ford, R. 2021. Delivering a just transition to net zero: Whose role is it anyway? Glasgow: University of Strathclyde. ISBN: 978-1-909522-93-0. doi: 10.17868/78376

[2] IDRIC. Enabling Skills for the Industrial Decarbonisation Supply Chain. November 2022

currently insufficient workers in the sector to meet this extra demand, which unless acted upon through labour supply measures, will harm the prospects of decarbonisation and for the UK economy.

As a recognised leader in climate action the UK's continued commitment to delivering Net Zero is expected to strengthen the global effort and therefore, benefit the UK transition by reducing costs.

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