Sheffield Hallam University | Centre for Regional Economic and Social Research

Low Carbon Energy Supply Chains, Employment and Skills in South Yorkshire: Headline Findings

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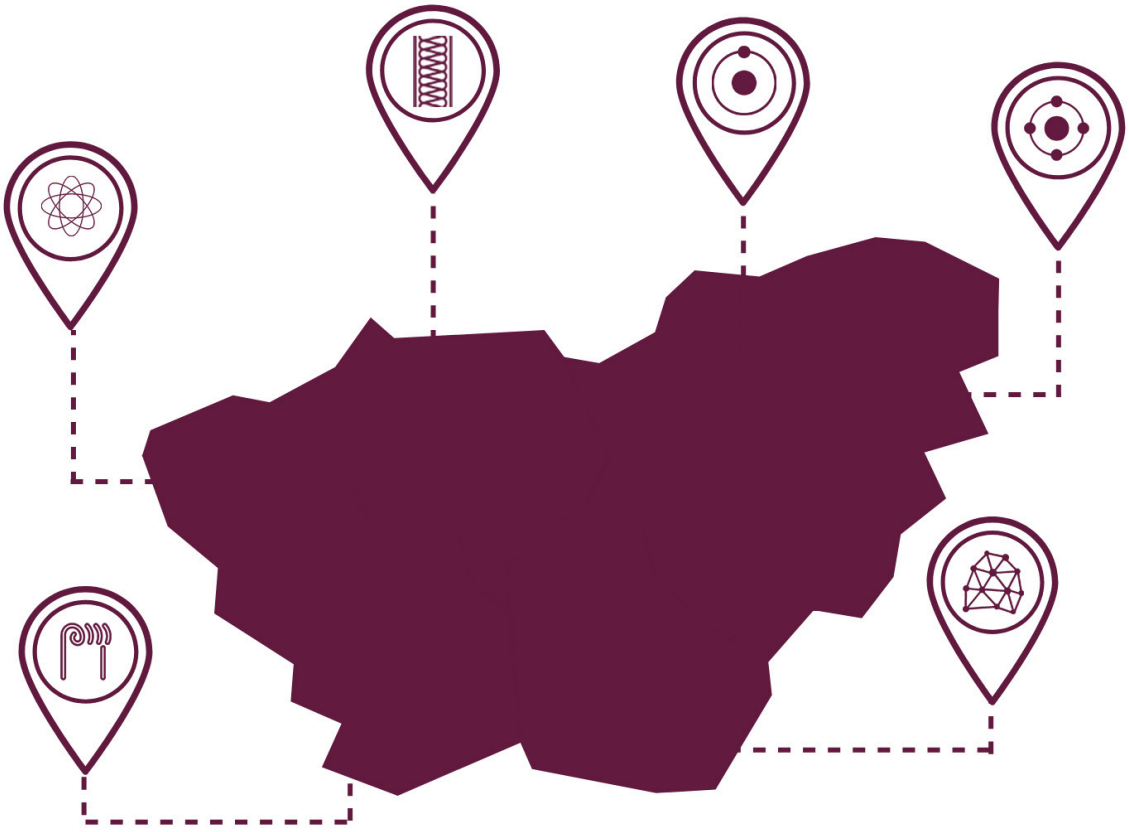


1. Introduction

This report outlines findings from research to better understand low carbon energy supply chains, employment and skills in South Yorkshire. It provides a summary of six sector studies and a review of existing employment, skills and business support provision to support development of these sectors. More detailed reports for each of the sectors supplement this summary. The research was jointly funded by Sheffield Hallam University (SHU) and South Yorkshire Mayoral Combined Authority (SYMCA).

Paying attention to low carbon energy supply chains is important to achieving a just transition for South Yorkshire for four principal reasons:

1. As a relatively less economically thriving region in England, making the most of opportunities for employment in new and growing sectors is important for 'levelling up' the region

2. Ensuring that decent jobs are created with good conditions of work, career prospects and fair pay is important for improving livelihoods across the region

3. Replacing lost jobs in industries that will be phased out (e.g. oil and gas, potentially some carbon-intensive manufacturing) and reskilling those workers affected is important to mitigate economic downsides to zero carbon transition

4. Safeguarding high carbon jobs through energy decarbonisation for energy intensive sectors (e.g. steel, glass production) is important to maintaining economic benefits of those industries for the region.

The six technologies covered in this research were:

- Carbon Capture, Utilisation and Storage (CCUS).
- Heat Pumps.
- Heat Networks.
- Hydrogen.
- Insulation.
- Small scale nuclear.

These sectors were chosen in consultation with SYMCA, focusing on sectors that linked to existing strategic priorities for South Yorkshire. For instance the Sheffield City Region Energy Strategy sets out ambitious goals for domestic heating and energy efficiency with targets for cavity and solid wall insulation, as well as goals relating to district heating (especially minewater-sourced heating) and hydrogen deployment.

1.1. Aims and objectives

The project aimed to understand the low carbon energy supply chain and employment and skills potential for South Yorkshire. Project objectives were as follows:

- Map existing and potential supply chains for different technologies, considering their relation to South Yorkshire.
- Improve understanding of job creation potential of investments at different points in the supply chain.
- Explore the type and quality (e.g. pay and conditions, career prospects) of jobs created by different energy investments.
- Investigate training and skills gaps within SCR to take up employment opportunities.
- Co-develop policy proposals with SCR officers for supply and demand-side employment and training interventions required to meet skills/ employability gaps.

1.2. Methods

The project used secondary data sources (documentary review and quantitative datasets where available) combined with in-depth interviews to develop a profile of each industry. We also scoped out possibility for future work with a specialist economic data company to develop more detailed pictures of firms, employment and turnover in each sector.

The research team carried out documentary and secondary data review for each sector. We also conducted 58 interviews with policy makers, industry bodies and firms across the six sectors as well as employment and skills and business support stakeholders.

2. Low Carbon Energy Sectors in South Yorkshire: Potential and Challenges

In this section we provide an overview of findings from our six sector studies. We found growth and employment potential in each sector. However likely levels of employment potential for the region varied significantly, and on-going national policy uncertainties make precise judgements difficult to make. That said, we feel confident to outline some high-level findings leading into recommendations for SYMCA (See Section 5). Key points are as follows:

- Each of the six sectors is growing, but they vary in maturity and employment potential. Insulation and heat pump technologies were relatively mature as were heat networks (except for minewater heat projects). There are strong growth projections for hydrogen equipment manufacturing and production, although there remains some uncertainty about its future deployment uses. Prospects for nuclear was least certain.
- The greatest opportunities for short and medium-term job creation are in decarbonising heat in buildings, notably the insulation and heat pump sectors (potentially extending to other decentralised low carbon heat technologies like solar thermal). There are co-benefits of focussing on building retrofit such as reductions in fuel poverty, which in turn has economic benefits for the region.
- Hydrogen offers good potential for manufacturing employment due to the location of high-profile firms and links to Humber Industrial Cluster.[1] There might be potential for supply chain development through existing specialist steel and component firms. South Yorkshire could also develop specialisms in CCS equipment manufacture and consulting given its existing manufacturing and R&D strengths.
- Investment strategies for hydrogen and CCUS should focus on deployment potential in heavy emitting industries, particularly steel but also other hard to decarbonise industries in the region, such as glass manufacture. This creates jobs in deployment and helps to safeguard jobs in important industries for South Yorkshire and the wider Yorkshire and Humber region through links to the Humber Industrial Cluster. However there remain techno-economic challenges for local hydrogen distribution and carbon storage post-capture in the medium-term. The potential for hydrogen deployment for heating buildings is uncertain and would be a risky focus for investment.
- Skills gaps and labour shortages are acute in heat pumps and insulation deployment. There are general shortages across all sectors relating to construction and engineering skills and labour availability. There is competition between sectors, exacerbated by construction growth across the UK post-Covid and specific demands like insulation replacement after Grenfell.
- Nuclear, hydrogen, CCUS and to a lesser degree heat networks have similar construction skill and safety training needs, while insulation also requires similar construction skills. Construction and engineering skill shortages are widespread, partly linked to the ageing workforce in these sectors: attracting younger people by emphasising links between construction and sustainability could help this. There are also skills challenges for heat technology deployment, including reskilling existing workforce (electrical and heating engineers, plumbers and so on).
- Ascertaining potential for small-scale nuclear reactors was difficult – partly due to limited access to industry data and research participants – but South Yorkshire does not appear to have strong locational advantages nor any particular disadvantages. The supply chain is geographically diffuse. Opportunities in the short-medium term appear to be in specific R&D capabilities linked to university research centres.
- Quality of work, pay and career prospects vary significantly between sectors. However, all sectors offer prospects for decent jobs in South Yorkshire when considering the likely growth opportunities in different parts of sector supply chains. An important challenge is to enhance worker representation in larger companies, which is not currently the case in most instances across the six sectors; and to ensure that growth in industries like heat pumps and insulation do not lead to growth in outsourced, flexible labour on reduced pay and conditions.

A dashboard summary of potential for each sector in South Yorkshire is provided in Figure 1 (overall prospects) and Figure 2 (relative prospects at different points in supply chains).

1 https://www.zerocarbonhumber.co.uk/

Figure 1: Potential for growth in South Yorkshire by sector

SECTOR	TECH MATURITY	SECTOR GROWTH	EMPLOYMENT POTENTIAL			SKILLS GAPS
			NEW JOBS	REPLACEMENT	SAFEGUARDING	
HEAT PUMPS						
INSULATION						
HEAT NETWORKS						
HYDROGEN						
CCS						
MODULAR NUCLEAR						

Note: Green-Red scale where Green is most positive. Ratings for sector growth are relative to existing sector size. For employment, Green = potential for greater than 1,000 jobs.

Figure 2: Relative employment opportunities for South Yorkshire across supply chains in each sector

	R&D	MANUFACTURE	DEPLOYMENT
HEAT PUMPS			
INSULATION			
HEAT NETWORKS			
HYDROGEN			
CCS			
MODULAR NUCLEAR			UNCERTAIN

Note: colour coding based on overall distribution within sectors (along rows)

3. Employment, skills and business support provision

There is an urgent need for enhanced provision across employment, skills and business support. In the short and medium term there is need to bring through new workers and reskill workers in other sectors. In the long-term needs will change as the transition gathers pace and different challenges are prioritised, and as capacity grows employment and skills support will eventually need to taper to only providing replacements for workers who leave low carbon energy sectors. This presents a barrier to investment in skills provision.

3.1. Employment and Skills provision

In Section 2 above we noted acute skills shortages in most of the sectors studied. These are not currently being addressed by training provision in any of South Yorkshire's FE and HE institutions nor by private providers. There is also little evidence of employment support agencies working with (or via local authority planning/procurement agreements) low carbon energy employers to broker opportunities for those most in need of employment opportunities.

Failures in the skills and education market are most keenly felt for specific vocational skills. For instance, heat pump installers said that skills shortages were preventing businesses from growing to meet expanding demand. They said that there was no appropriate apprentice provision within South Yorkshire, and that manufacturer training for reskilling/upskilling was not sufficient to provide necessary skills for heat pump system design and installation (see Heat Pump sector case study for more detail).

There is also a more systemic challenge for larger projects such as new heat networks or CCUS deployment, where there are specific shortages of project managers and specialist high-level technical skills. Combined with ageing engineering and construction workforce there is a need to boost labour supply of people with appropriate skillsets.

FE colleges and Universities can play an important role by incorporating zero carbon technology training but there is a wider need to encourage retraining and entry to the industry for those with transferable skills (for instance process engineering and chemical industry skillsets for CCUS and nuclear). Retraining will be important to ensuring that people working in fossil energy industries can adapt to low carbon sectors. Yet companies felt that this need was not widely felt nor understood by these workers or the firms they work for – "they've got their heads in the sand", said one interview participant. Alongside provision of training there is a need for coordinated communication and engagement with these workers and firms to ensure that they are ready for the coming changes.

Partnership for Skills Development in Stoke on Trent

Stoke on Trent Council is currently leading one of the UK's largest district heat system projects. It has formed a partnership with its suppliers (Logstor and Nordic Heat), the Swedish Energy Agency and the Stoke on Trent College to establish a district heat system Skills Academy. The aim of this venture is to support retraining and skills development in the Stoke on Trent area rather than relying on the use of short-term contract labour from elsewhere.

Linked to the above, energy, construction and engineering sectors are widely perceived as having a diversity problem. Globally only 14% of workers in the energy sector are women (rising to 22% in renewables)[2] and there are similar challenges in engineering and construction sectors. Our interview participants all acknowledged this challenge although also said that incremental changes were taking place. This is a sector-wide challenge, but there are opportunities for SYMCA to support communication aimed at women and other underrepresented population groups, including in schools.

3.2. Business Support

There is an opportunity to develop an offer, providing support and networking for low carbon sector start-ups in the SCR, which is currently not a focus for business support organisations. This would link to enhanced skills and training opportunities in the region (see Section 4).

As also highlighted in Urban Foresight's net zero work programme proposals to SYMCA (Action 17), there is potential to link this to an offer to mainstream SMEs supporting decarbonisation, in turn promoting and driving business with local suppliers. Such an offer would require partnership between SYMCA, local authorities, Chambers of Commerce and Universities, while also utilising capabilities in existing low carbon sector businesses.

Partnership for low carbon enterprise support in Derby

Using ESIF funds, Derby and Derbyshire Councils have worked in partnership with University of Derby to develop a support offer for SMEs looking to decarbonise their operations as well as low carbon business network for those operating in low carbon sectors. This model could be expanded to utilise low carbon businesses to provide support and measures to those looking to decarbonise.

4. Building an employment, skills and business support ecosystem for a just transition in South Yorkshire

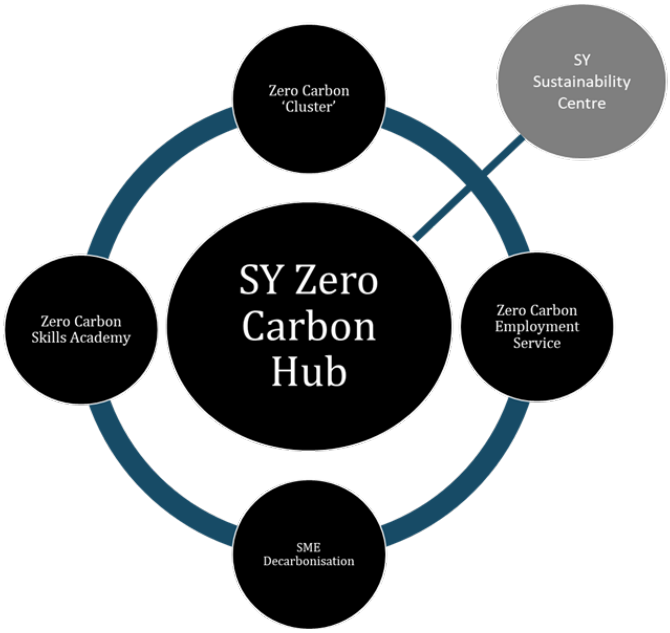
Each of the separate sector case studies provides specific recommendations. Below we briefly propose overarching actions for South Yorkshire to support growth in low carbon energy sectors wile also maximising employment potential for the regions' residents to help ensure a just transition for the region. Two of these (zero carbon business support and zero carbon 'cluster') have been proposed in various forms in other studies or are under consideration by SYMCA and/or its partners.

2 Global Energy Talent Index Report 2021: https://www.getireport.com/

But employment support and skills provision for a zero carbon economy is currently missing, yet this research shows the urgent need for such support. **A fundamental point is that these priority actions should be interlinked, potentially delivered through one Zero Carbon Economy vehicle taking a whole system approach to achieving economic benefits of a zero carbon economy for the region.**

As set out in the objectives for the research we will seek to co-develop detailed and actionable policy proposals with SYMCA but the following five recommendations offer a starting point for discussions.

Figure 3: A zero carbon support ecosystem for South Yorkshire



4.1. Zero Carbon Energy Skills Academy

This should be an urgent priority for the region. SYMCA should partner with existing FE and HE providers and low carbon businesses to develop skills capacity that meets business and worker needs. This academy could consist of a network of these existing organisations, as well as a physical location for shared access to specialist equipment. It is important that local businesses are involved in developing and potentially delivering this training. A central focus for training provision should be building retrofit, with wider offers within FE & HE focusing on energy sector engineering and construction needs. The academy would also support embedding sustainability into FE and HE programmes more broadly; and schools outreach would be a prominent programme, particularly focusing on encouraging diversity in the sectors.

4.2. Zero Carbon Energy Business Support

Work by Urban Foresight to develop a Net Zero work programme for SYMCA recommended development of a 'low carbon fuel and power cluster' (Action 18) to develop capabilities in the region and act as a vehicle for future funding bids. It is important that the region does develop coherent programmes to support low carbon energy sectors to make links between businesses, across supply chains and help businesses access opportunities outside South Yorkshire. An important aspect of such support would be to engage with existing 'non-low carbon' businesses operating in industries that could potentially be repositioned to capture deployment and supply chain opportunities.

SYMCA must also be mindful that similar plans are now in place for most City Regions / LEPs so the existence of a broad energy sector cluster would not be a point of distinction for the region. Rather such a cluster could focus its support programmes on key decarbonisation challenges for the region. Based on this study these should include:

- Heat decarbonisation (low carbon heat technologies, insulation) - with significant social, health and wellbeing co-benefits).
- Industrial decarbonisation (linking to hydrogen and CCS, and the Humber Industrial Cluster).

Transport is a third key challenge, but not addressed in detail within this study, aside from some advocacy for hydrogen use in transportation.

4.3. Zero Carbon Employment Support

There is a need to ensure that skills development and employment needs are joined up with people and places in need of work (or better work than they currently have). This is a basic principle but not straightforward in practice. It requires commitment from SYMCA, local authorities and other local anchor institutions to ensure commitments from firms to supporting pathways to employment for people who need work and/or live in disadvantaged areas. Points of leverage include through procurement, planning agreements and conditions on investment from public funds. Our work with Joseph Rowntree Foundation shows some ways this can be achieved.[3] More broadly linking this together with development of actions 1-3 will help to

3 https://www.jrf.org.uk/file/49175/download?token=2rTphMyb&filetype=full-report

develop a supportive ecosystem within the region and foster engagement with more socially orientated goals like employment support.

A wider recommendation related to this action is to enact a programme of community engagement, working with community organisations across South Yorkshire to promote the potential of low carbon jobs and careers to people in places where such opportunities and their potential benefits might be poorly understood.

4.4. SME Decarbonisation Support

The final element of a coordinated just zero carbon economy programme for the region focuses on SME decarbonisation engagement and support. This has not been a focus of this piece of research but there is a clear case to work with 'mainstream' SMEs to (a) consider how they could reposition themselves for low carbon markets (for instance, those operating in fossil energy industries; including reskilling staff); and (b) drive demand for low carbon businesses in the region. Business decarbonisation is also mentioned in the Urban Foresight report and there is an urgent and specific need to address SME engagement in decarbonisation agendas. A low carbon business support programme was launched by Sheffield City Council in partnership with the region's other localities in November 2021, set to run till June 2023. SYMCA and partners should build on this programme, working with the region's Universities, local authorities and Chambers of Commerce, as well as existing low carbon businesses to engage with SMEs to support SME decarbonisation.

Sector Summary Reports

- South Yorkshire low carbon energy supply chains: Carbon Capture, Utilisation and Storage (CCUS) sector summary
- South Yorkshire low carbon energy supply chains: Heat Networks sector summary
- South Yorkshire low carbon energy supply chains: Heat Pumps sector summary
- South Yorkshire low carbon energy supply chains: Hydrogen sector summary
- South Yorkshire low carbon energy supply chains: Insulation sector summary
- South Yorkshire low carbon energy supply chains: Nuclear sector summary

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