



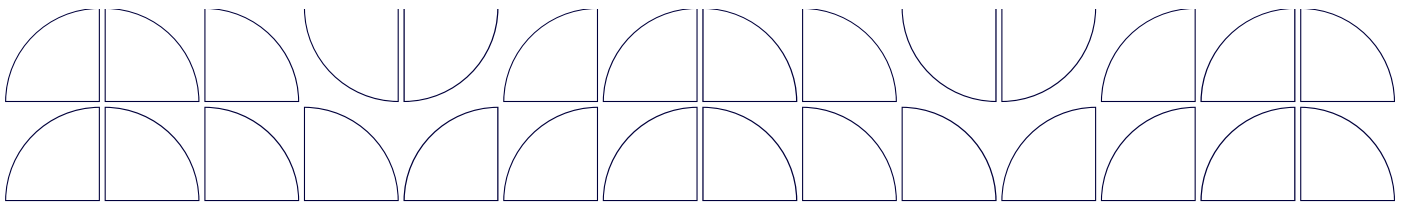
Policy Brief: Assessing the role that a CO₂ transport and storage sector could play in transitioning away from oil and gas extraction

Antonios Katris, Karen Turner, Hannah Corbett

March 2024

Centre for Energy Policy, University of Strathclyde

<https://doi.org/10.17868/strath.00088382>

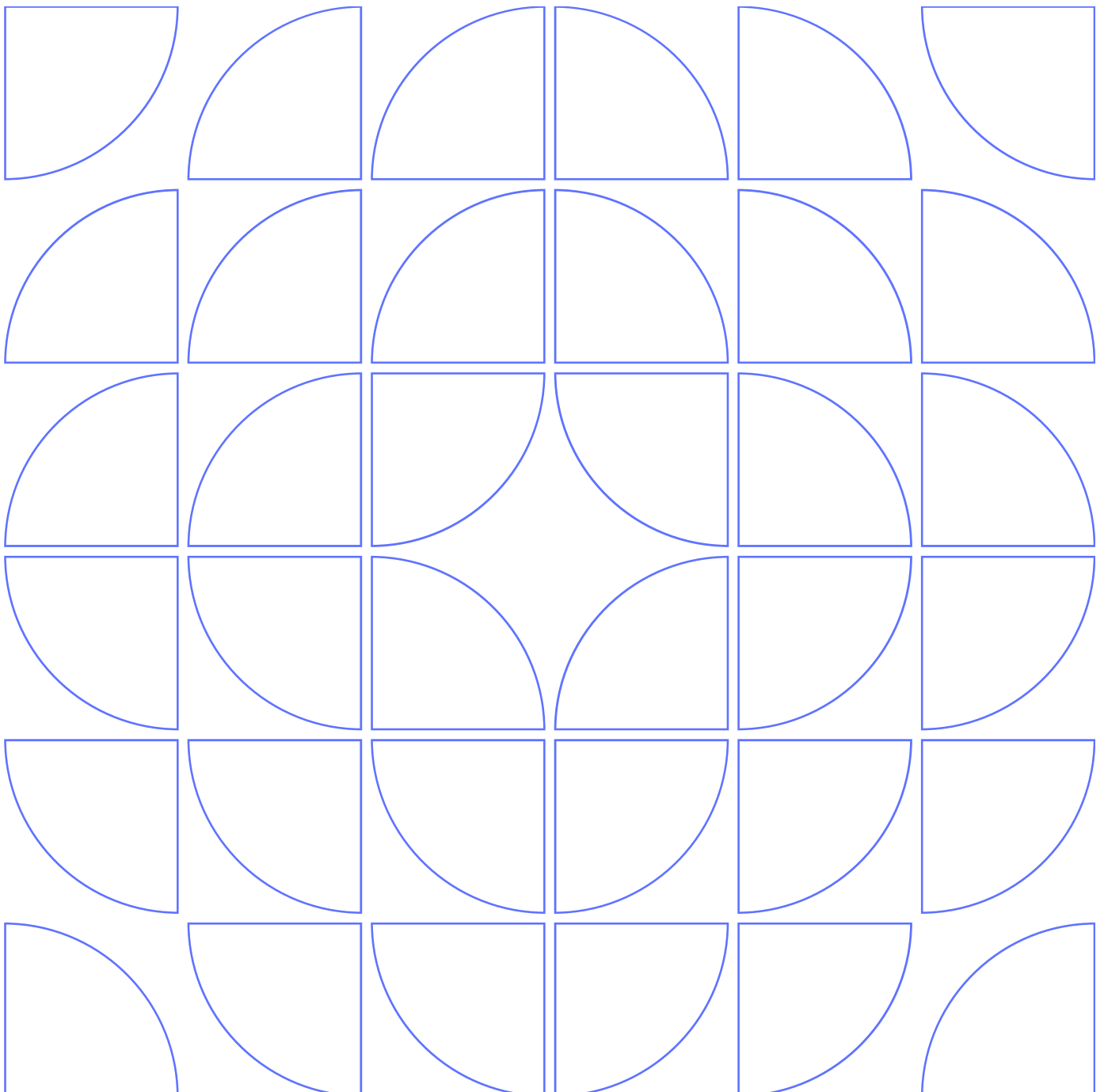


This work was supported by the UKRI ISCF Industrial Challenge, through the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) award number: EP/V027050/1, under the Industrial Decarbonisation Challenge (IDC)

This report is an output from IDRIC project **MIP 9.7 Labour market and other wider economy challenges in decarbonising the UK's industry clusters [LAB-CLUSTER]**



Find out more at [idric.org](https://www.idric.org)



Policy Brief: Assessing the role that a CO₂ transport and storage sector could play in transitioning away from oil and gas extraction in the UK

Summary

Achieving the UK Government's industrial decarbonisation ambitions, and in turn meeting its net zero targets by 2050, will see the decline of existing industries such as oil and gas and the emergence of new sectors such as CO₂ transport and storage (T&S), where there are clear opportunities for the repurposing and transition of infrastructure, supply chains and workforces. In addition to servicing climate ambitions, this will also have impacts on the wider economy and people's lives and livelihoods.

Through researchⁱ as part of the Industrial Decarbonisation Research and Innovation Centre (IDRIC) - funded 'Labour market and other wider economy challenges in decarbonising the UK's industry clusters' [LAB-CLUSTER] project, the Centre for Energy Policy (CEP) has investigated the potential contribution of a nascent CO₂ T&S sector emerging around carbon capture, usage and storage (CCUS) systems linked to high-value regional industry clusters. Three key findings emerge that highlight a number of important opportunities and challenges presented by the projected decline of the UK oil and gas extraction industry and the establishment of a new T&S sector:

1. Oil and gas decline will negatively impact the UK economy

The decline of the oil and gas extraction industry will bring significant negative pressures to bear across the UK economy, including significant reductions in jobs supported. Our results suggest there could be potential GDP losses of just over £26BN per annum by 2056 and up to around 120,800 full-time equivalent (FTE) jobs. This presents clear challenges for 'just transition' policy agendas, including particular regional economy concerns.

2. Emergence of a nascent CO₂ T&S sector could help mitigate losses associated with the oil and gas decline

A nascent CO₂ T&S sector could help mitigate the employment and GVA losses associated with the oil and gas decline, but only on a relatively small scale, in supporting around 4,230 FTE jobs and £893M per annum by 2035. However, for a nascent T&S sector to support this many jobs, and to offset around 5.6% of the GVA losses (in 2035), it would need to sequester around 50MtCO₂e per annum. Moreover, estimates to 2035 involve substantial public support of the nascent T&S sector.

3. Action on addressing skills and worker shortages is vital

Persistent skills and worker shortages could hinder industrial decarbonisation efforts and constrain the extent of wider economic gains if labour market shortages introduce wage cost driven price pressures affecting all sectors.^{ii iii} However, given the commonalities in skills and supply chain requirements, reduced capacity requirements in oil and gas supply chains could ease labour market and other capacity challenges for new greener activities, including T&S, while continuing to provide decent well-paid jobs. Yet challenges emerge in the context of a mismatch of timelines for the CO₂ T&S rollout - which is required to advance substantially if not fully by 2030 to meet industrial decarbonisation targets - set against the projected oil and gas decline, which has begun but does not really gain pace until after 2030.

Oil and gas decline and impact on the UK economy

Projections by the North Sea Transition Authority (NSTA) indicate that only 13% of 2022 O&G industry will remain operational beyond 2050.^{iv} Our economy-wide scenario simulation results in Table 1 suggest that by 2056 the decline projected by the NSTA could (in isolation) lead to UK-wide GVA losses of £26.3BN per annum and employment losses of around 120,840 FTE jobs. This includes a potential loss of 54,800 FTE jobs in the O&G industry and its supply chain, with other sectors including hospitality, construction and wholesale and retail trade likely to be significantly impacted.

Table 1: Key long-term economy-wide impacts due to reduced supply and demand for oil and gas in the UK

	Decline of O&G supply and demand - BRW
Net impact on government budget (£million) consisting of:	-6,355
Change in government revenue (£million)	-14,895
Nominal adjustments to meet real spending commitments (£million)	8,541
GDP (£million)	-26,335
GDP (% change)	-1.375%
Total Employment (FTE)	-120,841
Total Employment (% change)	-0.410%
Real household consumption (£million)	-19,128
Real household consumption (% change)	-1.483%
O&G Employment (FTE)	-11,539
O&G Output (£million)	-26,548
O&G Exports (£million)	-20,027
O&G Imports (£million)	-250

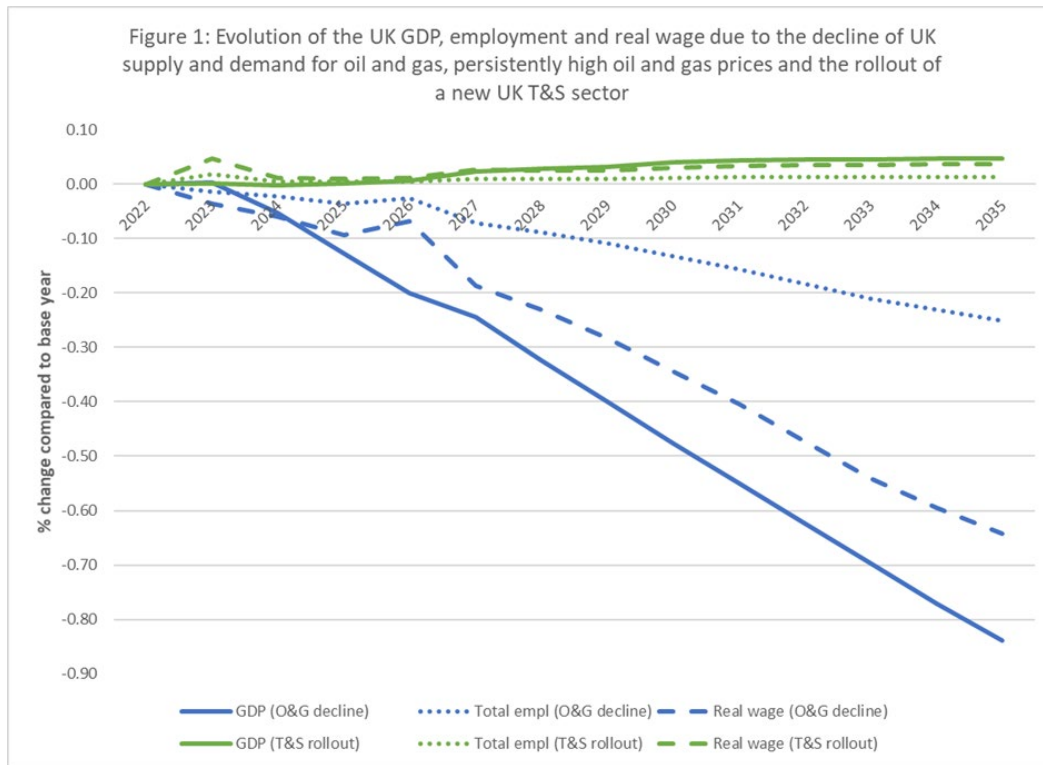
While Table 1 presents national level results, it is reasonable to expect that both the potential employment losses and the decline in household spending (of over £19BN by 2056), that job losses will contribute to, are likely to be concentrated in particular regions and communities that depend on income generated through oil and gas related activity industry. Thus, as well as just transition implications, these negative impacts also have a bearing on policy agendas to tackle likely emerging regional inequalities.

Nascent CO₂ T&S sector and mitigating oil and gas associated losses

Given commonalities in infrastructure, supply chain and labour demand characteristics, an emergent CO₂ T&S sector could help mitigate the negative impacts associated with the decline of the oil and gas industry. See Figure 1, where we report some key economy-wide results of simulating the emergence of a CO₂ T&S sector linked to the industrial decarbonisation requirements that are the focus of the Track 1 and 2 CCUS cluster sequencing activities announced in 2021 and 2023.^v

Here, despite our scaling the T&S sector commensurate with sequestering ALL industrial emissions that could be captured via the Track 1 and 2 clusters (equating to 50MtCO₂e from 2030), it is important to note that such a new activity would be small, certainly relative to the projected oil and gas decline, with the implication that both macroeconomic gains and price pressures are fairly limited. In short, a nascent T&S sector operating at maximum sequestration capacity could support the preservation of 4,230 FTE

jobs and GVA of £898M per annum by 2035, the time by which the UK Government aims for a self-sustaining CCUS sector to be in place.^{vi} Whether these contributions would be sustained beyond that point depends on the market mechanisms and conditions that would be in place. However, in terms of scale, these figures are small relative to the magnitude of negative impacts associated with oil and gas decline, which reach 73,950 FTE job losses and per annum GVA losses of £16.1BN by 2035.



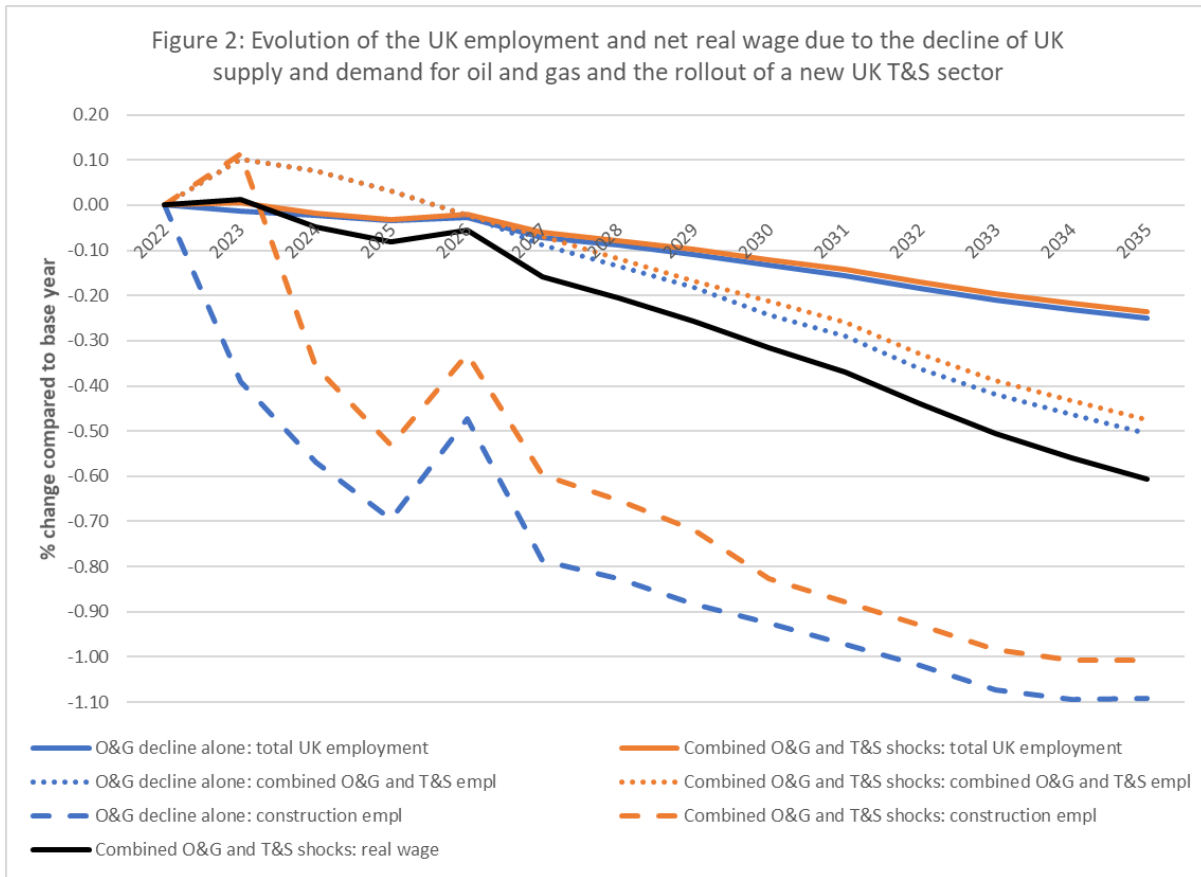
It is also worth noting that what may be termed the employment mitigation effect of T&S is concentrated in the new sector itself, and the UK construction sector, and requires that CCUS deployment go far beyond the targets of 20-30MtCO₂e sequestered by 2030.^{vii} Indeed, for a nascent T&S sector to support this many jobs, and to offset around 5.6% of the GDP losses (in 2035) associated with the projected oil and gas industry decline, it would need to sequester around 50MtCO₂e per annum. In effect, this would mean doubling the capacity of the CCUS coverage planned for the Track 1 and 2 clusters.

Action on addressing skills and worker shortages

CEP's research on the LAB-CLUSTER project finds that persistent skills and worker shortages could hinder industrial decarbonisation efforts and constrain the extent of wider economic gains if labour market shortages introduce wage cost driven pressures.^{viii} Indeed, easing the wage-cost impacts of persisting worker and skills shortages is crucial in maximising wider economy gains and reducing the cost to the public purse of supporting jobs associated with a new UK CO₂ T&S industry emerging around the UK's Track 1 and Track 2 CCUS developments.^{ix x}

In taking action to address these challenges, and given the similarities in skills and supply chain requirements across oil and gas and T&S, an obvious question is the extent to which reducing capacity requirements in oil and gas supply chains could potentially ease labour market and other capacity challenges for new greener activity (such as T&S), while continuing to provide decent well-paid jobs. We can consider this by running our scenario simulations of the oil and gas decline and T&S emergence simultaneously.

The results reported in Figure 2 indicate that the expectation that the rollout of T&S could utilise some of the labour capacity freed-up as the current O&G industry declines is indeed valid.



However, note that Figure 2 shows some transitory net increase in employment demand, and consequently in real wage demands in the constrained UK labour market, in the period to the mid-2020s. This is indicative of complex and dynamic workforce challenges associated with the mismatch of timelines for the CO₂ T&S rollout, at this stage concentrated in construction activity to enable deployment of the Track 1 clusters, and the oil and gas capacity freed up, where the pace of decline in the latter is relatively slow at in this timeframe.

Thus, other strategies will be required to address worker availability and wage cost challenges associated with the emergence of a UK CO₂ T&S sector linked to industrial decarbonisation.^{xi}

Policy implications

The findings from our research as part of the LAB-CLUSTER project suggest two key considerations for policy.

First, the extent to which policymakers can and need to take a role in coordinating different elements of the transition as part of wider public policy decision making. This policy brief has focused on the challenge of decarbonising some industries, set in the context of the opportunities presented by the emergence of new activities, such as T&S, while others, here oil and gas extraction, decline. The type of results emerging around macroeconomic as well as sectoral impacts indicate the need to integrate the policy response to such challenges within wider economic and public policy decision-making, not least if 'just transition' outcomes are to be achieved.

Here, we have focused on how the activity of a new sector such as T&S could, albeit marginally, help mitigate both employment losses in specific parts of the economy and broader negative price and activity pressures triggered as the economy transitions from more to less carbon-intensive industries. Moreover, the timing of activities linked to sectors such as T&S could exploit capacity being freed up in declining activities and enable positive economic outcomes.

However, such specific scenarios will ultimately need to be considered in the context of a wide range of different decarbonisation actions beginning to take place in relatively compact timeframes between now and 2050, where the dynamic economic landscape will also be changing.

This leads to a second key policy implication around the need for understanding of the nature and timing of congestion and bottlenecks if system-wide costs are to be minimised, potentially with intervention required to incentivise preferable timings of individual activities.

Here, the importance of effective project sequencing and workforce planning is clear if the UK is to deliver on its industrial decarbonisation and broader net zero ambitions in a manner that allows economic prosperity to be sustained and ideally grow. In this regard, frameworks such as the UK Government's Net Zero and Nature Workforce Action Plan and the Scottish Government's forthcoming Green Industrial Strategy and Energy Strategy and Just Transition Plan need to set out clear pathways to developing the skilled workforce to deliver the UK's decarbonisation plans. Here it is crucial that plans extend to how resources will be targeted at retraining and upskilling workers in those sectors such as oil and gas that are being negatively affected by net zero actions. In doing so, they must also identify and articulate mechanisms that can incentivise net zero project sequencing in a way that manages competing demands for resources and eases potential congestion and bottlenecks, which affect not only project delivery but the wellbeing of the wider economy.

Acknowledgements

- This brief was produced as part of the 'Labour market and other wider economy challenges in decarbonising the UK's industry clusters' [LAB-CLUSTER] project.
- We would like to acknowledge that this work was supported by the UKRI ISCF Industrial Challenge, through the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) award number: EP/V027050/1, under the Industrial Decarbonisation Challenge (IDC)
- For further information please contact CEP@strath.ac.uk, The Centre for Energy Policy, School of Government and Public Policy, Humanities and Social Science, McCance Building, 16 Richmond Street, Glasgow, G1 1XQ

ⁱ The full set of results and a detailed discussion of the emerging implications are included in the forthcoming peer-reviewed paper underlying this policy briefing.

ⁱⁱ <https://strathprints.strath.ac.uk/87537/>

ⁱⁱⁱ <https://strathprints.strath.ac.uk/86068/>

^{iv} <https://www.nstauthority.co.uk/data-and-insights/insights-and-analysis/production-and-expenditure-projections/>

^v The Track 1 T&S systems were announced in October 2021:

<https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-deployment-phase-1-expressions-of-interest/october-2021-update-track-1-clusters-confirmed>. Subsequently, the decisions regarding the Track 2 T&S systems were announced and finalised by December 2023:

<https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/update-to-industry-on-conclusion-of-the-ccus-cluster-sequencing-track-2-expression-of-interest>

^{vi} <https://www.gov.uk/government/news/new-vision-to-create-competitive-carbon-capture-market-follows-unprecedented-20-billion-investment>

^{vii} <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-a-vision-to-establish-a-competitive-market>

^{viii} The implications of labour market constraints and their impacts on the potential outcomes of rolling out a nascent T&S sector are explored in detail in this paper: <https://doi.org/10.1016/j.jclepro.2023.140084>

^{ix} <https://strathprints.strath.ac.uk/87537/>

^x <https://strathprints.strath.ac.uk/86068/>

^{xi} We have explored the implications of labour market conditions and responses on the expected economy-wide outcomes driven by the development and operation of a nascent CO₂ T&S sector. Our analyses are detailed in this peer-reviewed paper: <https://doi.org/10.1016/j.jclepro.2023.140084>

This work was supported by the UKRI ISCF Industrial Challenge, through the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) award number: EP/V027050/1, under the Industrial Decarbonisation Challenge (IDC)

This report is an output from IDRIC project **MIP 9.7 Labour market and other wider economy challenges in decarbonising the UK's industry clusters [LAB-CLUSTER]**



Find out more at [idric.org](https://www.idric.org)

