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Research insights: accelerating industrial decarbonisation

Towards a net-zero workforce

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CENTRE FOR
ENERGY POLICY

Green Industrial Futures
Realised.

Labour demand, timelines and regional implications associated with CO_2 T&S sector

Dr Antonios Katris

7th March 2024

Funded by

UK Research and Innovation

The IDRIC LAB-CLUSTER project

- The aim is to identify and understand the employment implications (national and regional) of CCUS and a nascent CO_2 Transport and Storage (T&S) sector.
  - Emphasis on the location and nature of labour demand and the potential displacement of jobs and activity across regions and sectors of the UK economy.
  - Impacts on wage rates and labour costs across the CCUS activities and other UK sectors requiring similar skillsets and competing for the same pool of labour.

- The scope of the study is mainly on the investment in and emergence of nascent CO_2 T&S sector activity.
  - Initially to service sequestration demand from industry actors located within the Track 1 and 2 clusters.
  - The analysis is conducted using our economy-wide UKENVI scenario simulation model of the UK.

What did we consider here?

- Four T&S systems forming a nascent CO_2 T&S sector
  - Broadly matching the Track 1 & 2 T&S systems
  - Due to lack of appropriate details we assume full cluster emissions sequestered (50 MtCO2e p/a)
  - Total capital of £2.7billion developed between 2023-2029
  - Track 1 operational from 2027 – full sector operational in 2030

- Modelling of sequential development and operation of full UK T&S sector
  - Also simulated development and operation of individual T&S systems in isolation
  - Supply chain structure identical to current O&G extraction – different characteristics of each system captured via investment requirements
  - Government to guarantee demand for T&S sector outputs – focus until 2035

- Considered T&S rollout in abstract and alongside the decline of O&G extraction industry
  - Evolution of O&G extraction taken from NSTA projections
  - Adjusted for Rosebank operation
  - Focus on timelines of T&S using freed-up O&G labour capacity

Key messages emerging

1. Likely transitory peaks in construction sector jobs, during the investment phase of a new CO_2 T&S sector, need to be factored into CCUS deployment and broader Net Zero delivery planning.
   - Over 11,100 UK (FTE) construction jobs on the first year of Track 1 T&S systems activity, with a second peak of 4,200 jobs in 2027 as work starts on the Track 2.
2. Addressing worker and skills shortages can help mitigate the risk of job displacement across UK regions and sectors.
   - Jobs losses, peaking at around 6,300, are concentrated in sectors such as retail, services and hospitality, particularly in London and other southern regions.
3. Consistent assessments of employment requirements and economic impacts across clusters are necessary to inform action on addressing and mitigating labour shortages and other potential negative economic outcomes.
   - Issue raised by UKRI (October 2023) Enabling net zero: a plan for UK industrial cluster decarbonisation.

Key messages emerging

4. Simultaneous activity in capital development can temporarily boost the labour demand in certain sectors but cause significant displacement in other sectors.
   - Displacement driven by labour cost pressures – implications manifest in the form of significant differences between considering the entire T&S sector vs adding the impacts of individual T&S systems.
5. The decline in the O&G extraction industry can free-up labour capacity which in turn can ease the wage pressures.
   - Up to 23,900 FTE workers freed-up by the time T&S becomes operational in 2030 but the decline of O&G extraction continues and accelerates beyond that point.
6. The time paths of the O&G extraction decline do not match the emergence of the nascent T&S sector
   - Workforce planning is necessary to ensure the use and transition of freed-up labour capacity – essential to factor in real wage responses

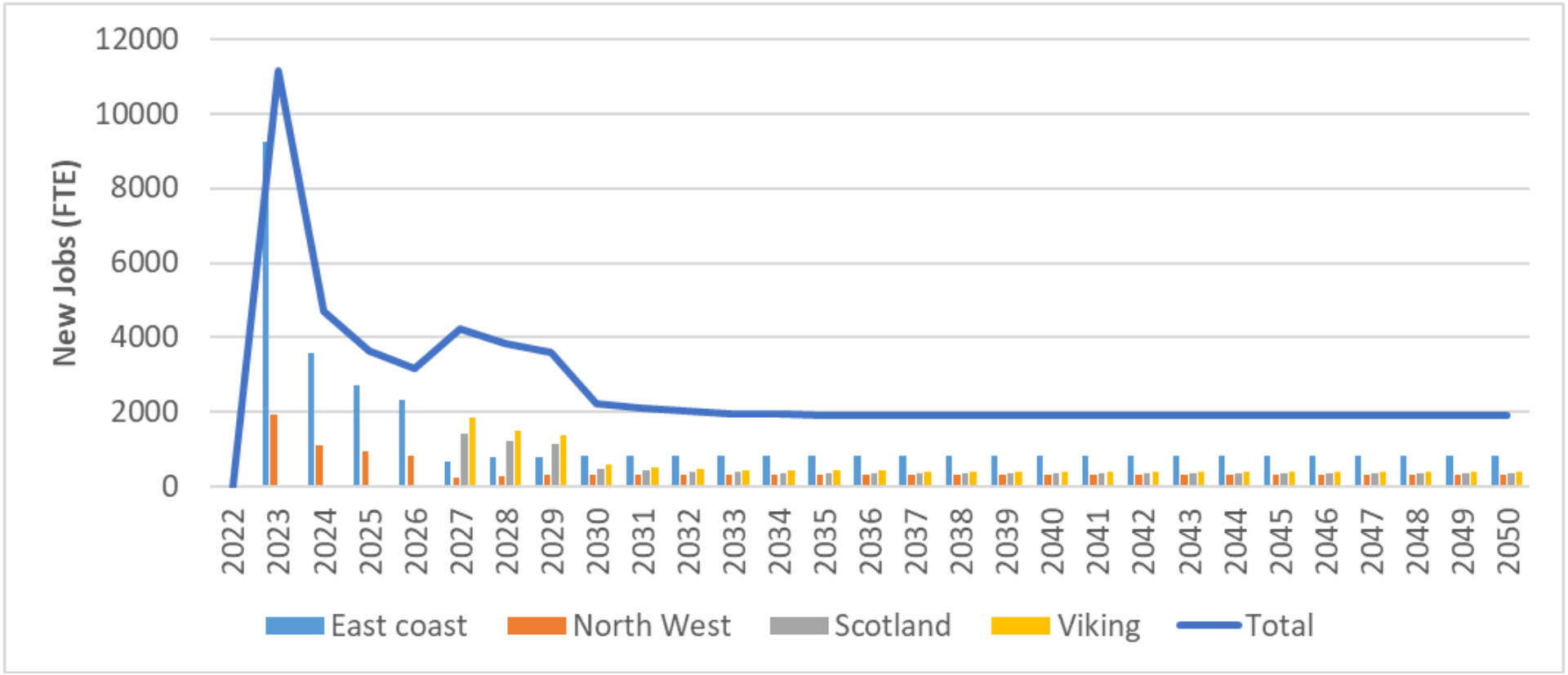
Comparison of cluster plans employment estimates

- From UKRI 2023, Enabling net zero: a plan for UK industrial decarbonisation report:

IDC Cluster plan	Job creation reported	Methodology	Reference
Humber Industrial Cluster Plan (HICP)	The creation of over 22,000 direct jobs	System model developed by Element Energy and Cambridge Econometrics	HICP, Humber Industrial Cluster Plan: Together it is Possible, 2023, pg. 52.
Net Zero North West (NZNW) Cluster Plan	34,500 jobs	Economic multipliers Developed by MACE group	NZNW, North West Cluster Plan, 2023, pg. 5.
Repowering the Black Country (RtBC)	50-500+ jobs per hub (with 60 hubs expected to be required)	N/A	Repowering the Black Country (RtBC), Exploitation Plan, 2023, pg. 4
Scottish Net Zero Roadmap (SNZR)	Average of 5,000 jobs per year between 2023-2045	Input-output approach (Element Energy)	NECCUS, SNZR - A Net Zero Roadmap for Scottish Industry, 2023, pg. 5.
South Wales Industrial Cluster (SWIC) Cluster Plan	Help retain 113,000 industrial and manufacturing jobs in the region	N/A	SWIC, South Wales Industrial Cluster Plan: A Plan for Clean Growth, 2023, pg. 24
Tees Valley Net Zero (TVNZ) Cluster Plan	Up to 30,000 new jobs by 2040	N/A	TVNZ, TVNZ Key Findings Report, 2023, pg. 4.

Employment impacts of rolling out the CO_2 T&S sector

- Simulated employment impacts in the UK of an emerging UK CO2 T&S sector
  - £3,274 million invested between 2023 and 2029 across Track 1 and 2 clusters



Construction jobs

Employment impacts of rolling out the CO_2 T&S sector

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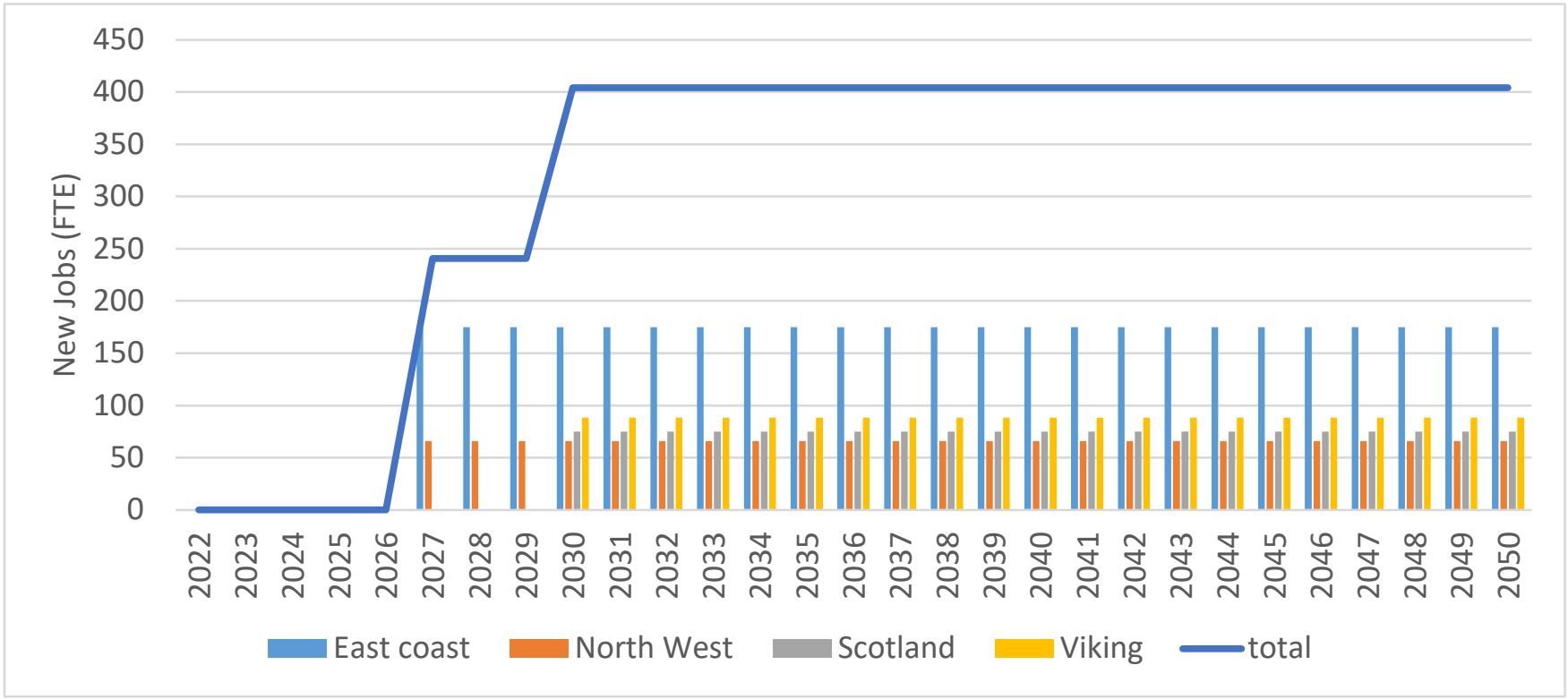
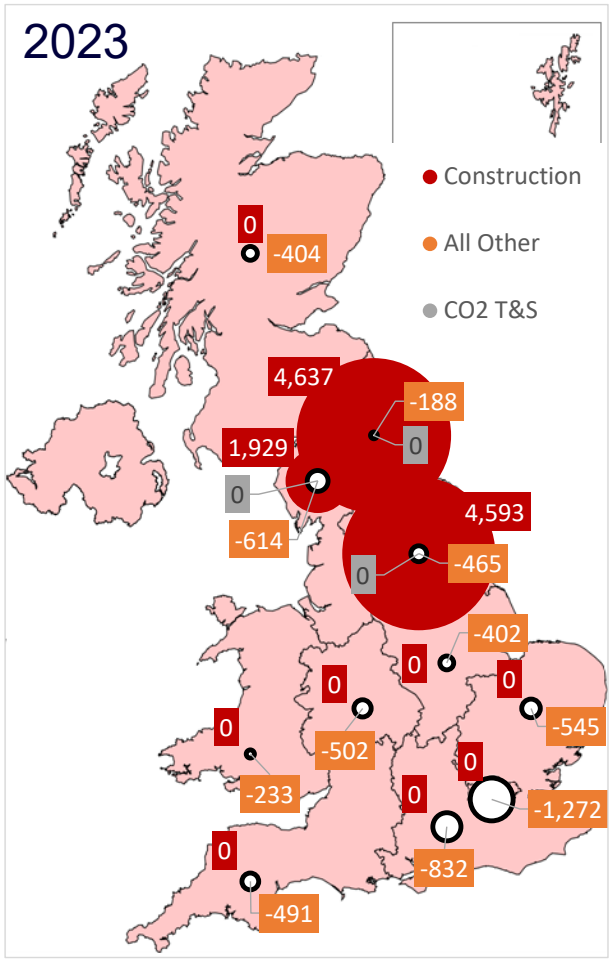
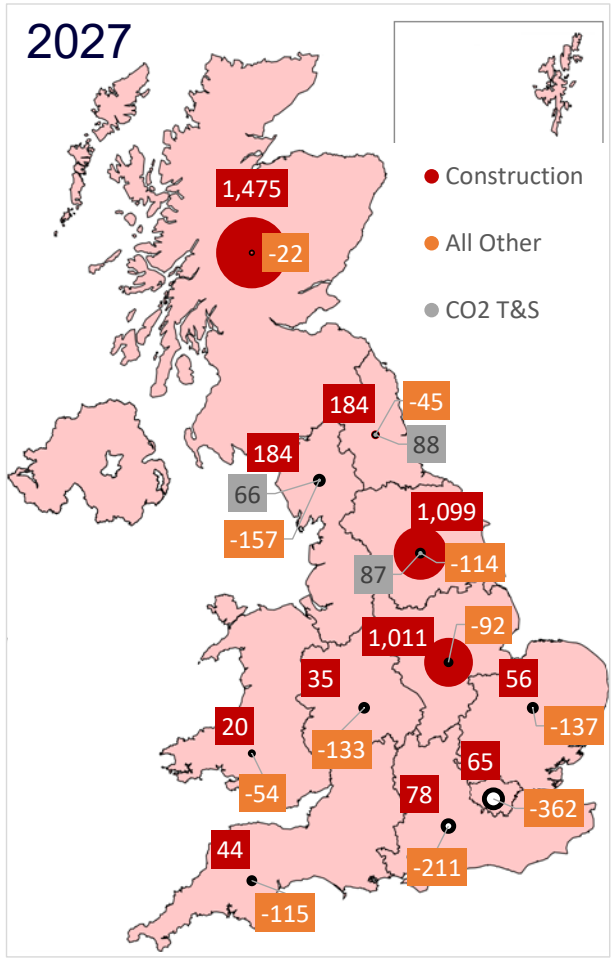


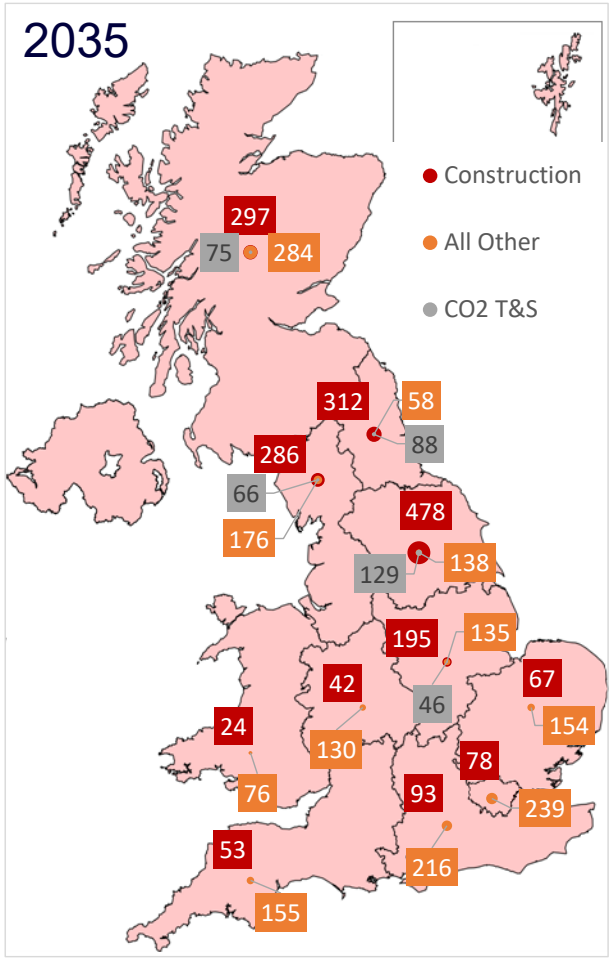
CO_2 T&S jobs

Employment impacts of rolling out the CO_2 T&S sector

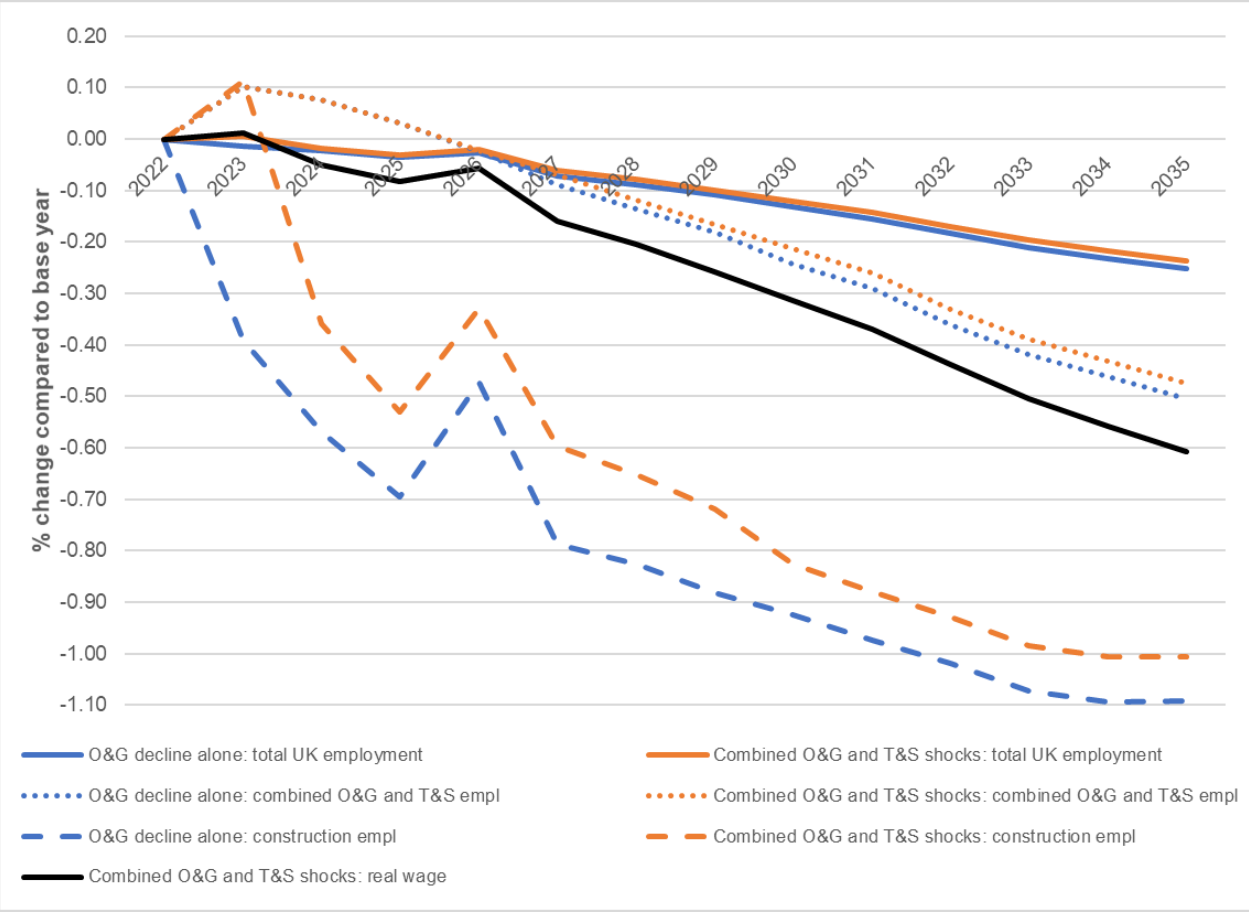
- All jobs - Mapping CGE results, based on proportion of sector jobs across regions (focus on construction and CO_2 T&S sector as most activity links to that sector)







Transition of O&G extraction workers to T&S rollout



- The projected decline of the O&G extraction industry is likely to free-up labour capacity in different sectors
  - Mainly in construction sector
  - Employment losses lead to smaller real wages and vice versa
- T&S related labour requirements peak in year 1 but O&G freed-up capacity manifests over an extended period
  - Wage pressures still present in year 1 – T&S related labour demand exceeds freed-up capacity
  - Over time excess capacity freed-up compared to T&S related needs

Conclusions

- Action on addressing worker and skills shortages is absolutely critical to delivering industry and other decarbonisation efforts as well as economy-wide outcomes in relation to the net zero transition.
  - The appropriate actions include planning to avoid labour and broader resource competition among different infrastructure/decarbonisation programmes.
  - Workforce planning is also essential to ensure the use of any freed-up labour capacity from transitioning industries so that any wage pressures can be eased while facilitating a just transition for workers in declining industries.

- Understanding demand and supply issues including transitory peaks and regional and sectoral implications.
  - Needs to happen across different decarbonisation areas (industry, heating, transport, etc.) at an individual level and at aggregate level.
  - Understand the scale and nature of both the opportunities and challenges of the net zero transition.

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Thank you

For any further questions please contact:

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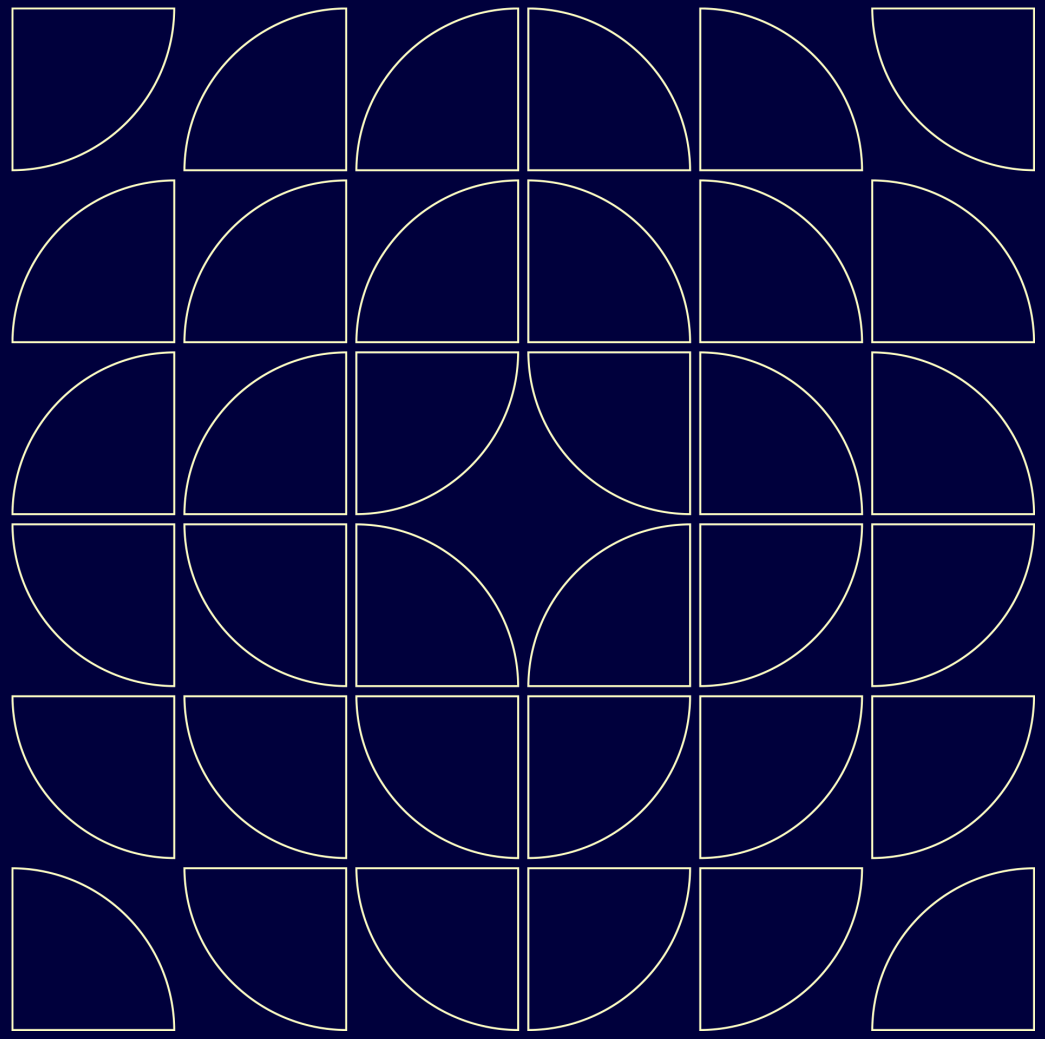

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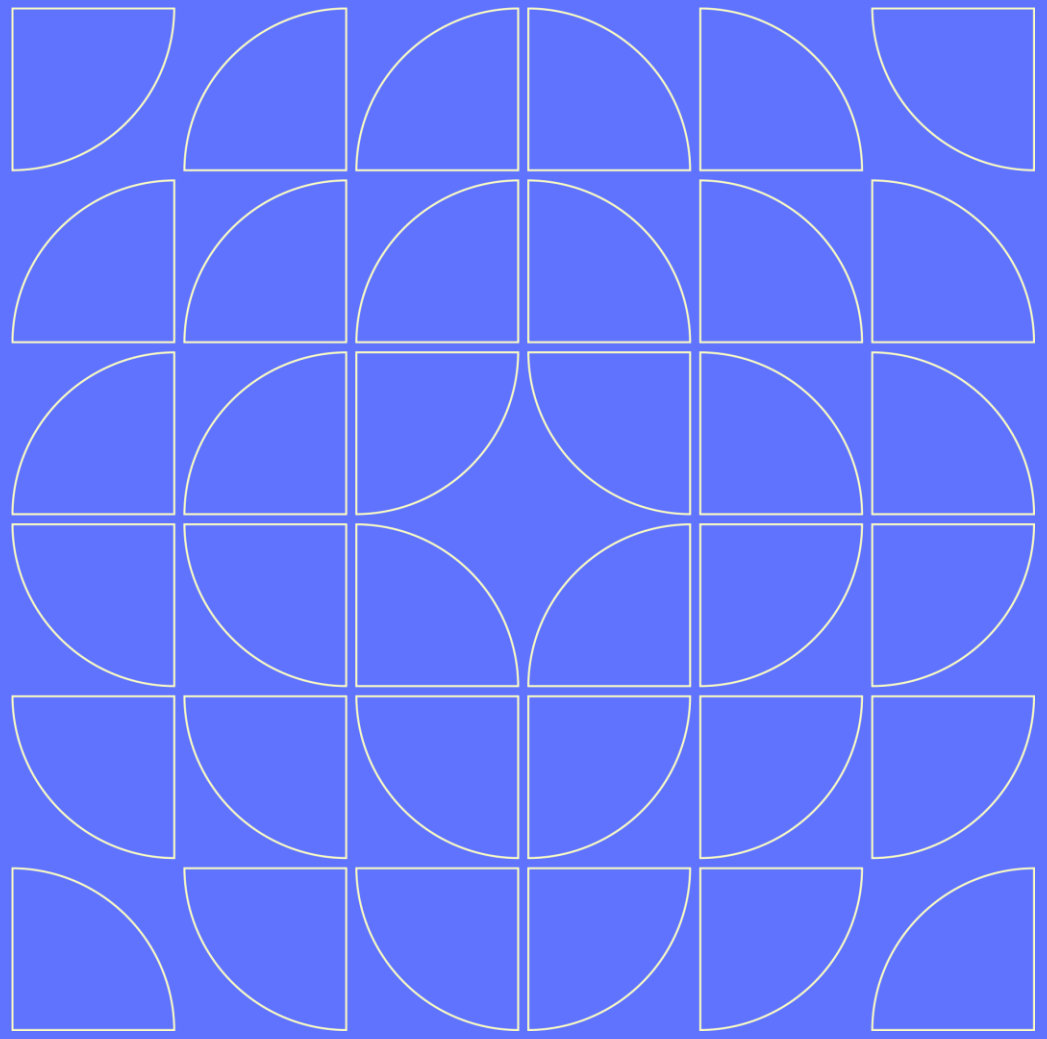
CC(U)S Futures: Learning from Place-Based, Participatory Speculative Fiction

IDRIC Conference, March 2024



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Background

- Net Zero
- Just Transition
- CC(U)S
- Social License to Operate

Image by Anna Wilson

Future-oriented consultations: associated risks

- Inflame/create tensions
- Generate unrealistic expectations
- Unrepresentative
- Particular agendas / niche interests

Video from IDRIC IA3.1, https://idric.org/project/ia-3-1-delivering-a-place-based-just-transition-in-industrial-clusters/

Desirable futures

- More green spaces
- Decent, well-insulated housing
- Cheaper, more frequent and reliable public transport
- More well-pad, stable jobs that don’t require excessive training and can be aspired to by local people
- Places for young people

Image courtesy of Deathhell, CC BY-NC-SA 2.0 DEED

Desirable futures

- More toxic wasteland
- Decaying, mold-ridden slums
- Dismantling of the local bus network
- High rates of unemployment and poverty, leading to more despair, addition and crime
- Places for young people to vape and drink Buckfast

Image © 2017 Warner Bros. Entertainment Inc. via imdb (used under fair use)

Why fiction?

- Expectations:
  - No expertise required
  - No requirement to look for solutions
  - No perception that anything is being promised / offered
- Tropes:
  - Reveal knowledge gaps and misconceptions
  - Reveal associations and connections

Trope #1: Dark Satanic Mills

Image courtesy of Avengerb6 via DeviantArt

Image courtesy of broschgard, https://unsplash.com/photos/4yOgIcFS2Es)

Trope #2: Back to the Future

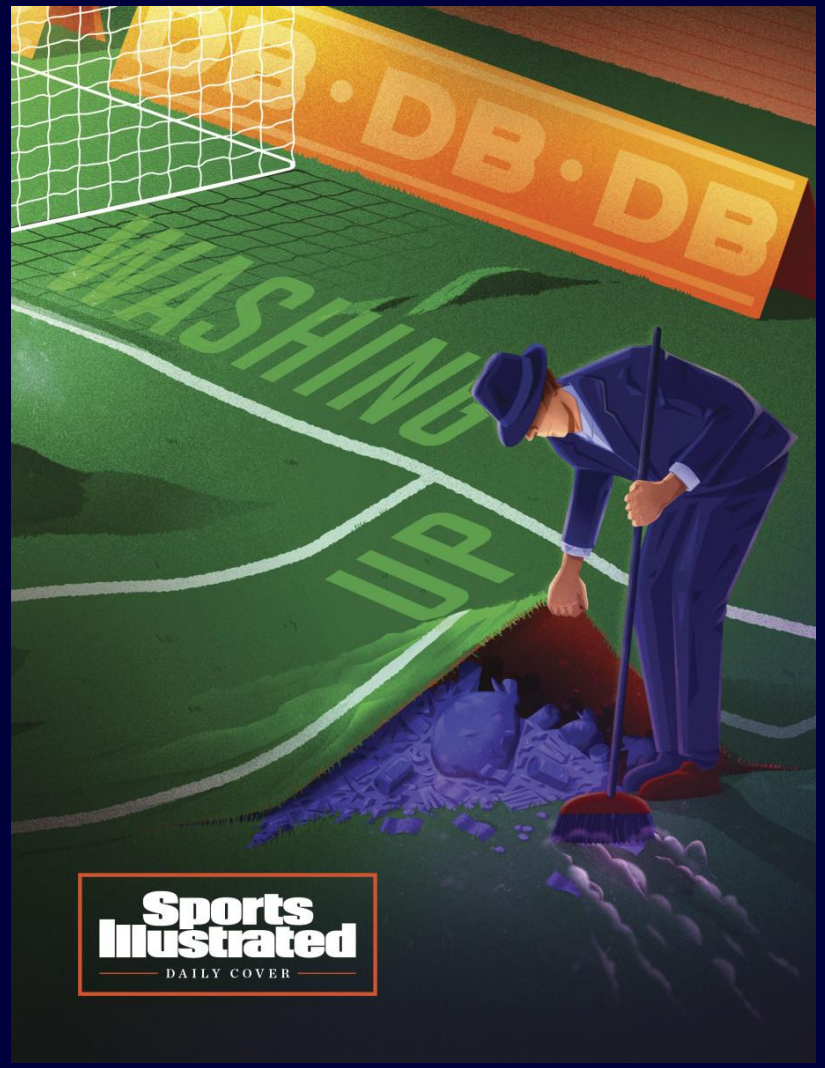
Image from the Guardian, https://www.theguardian.com/society/2020/jul/07/tory-ministers-from-1980s-fear-return-to-mass-unemployment

Trope #3: Greed and Incompetence

Mail Online

EXCLUSIVE **The HS2 betrayal: Furious homeowners who had their lives turned upside down when they sold their homes to make way for the doomed rail line tell of their anger - as the government lets their former houses out to tenants**

- Has YOUR home been affected by HS2? Email elena.salvoni@mailonline.co.uk



Trope #4: Catastrophic Failure

Image courtesy of Wendolin_Jacober via Pixabay

Trope #5: Slow Leaks

UK water industry's 'urgent' plan to tackle sewage pollution delayed by four months

Exclusive: Documents released after Freedom of Information Act requests show repeated requests for plans

Helena Horton
Environment reporter

Wed 17 Jan 2024 06.00 GMT

Share

Sewage and pollution floats on floodwater on Cookham Moor in Berkshire. Photograph: Maureen McLean/REX/Shutterstock

Infrastructure: invisible, unknown

Image by Anna Wilson

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INSPIRING YOUNG MINDS: WORK SKILLS READINESS FOR DECARBONISATION IN THE HUMBER

IDRIC Annual Conference

7th March 2024

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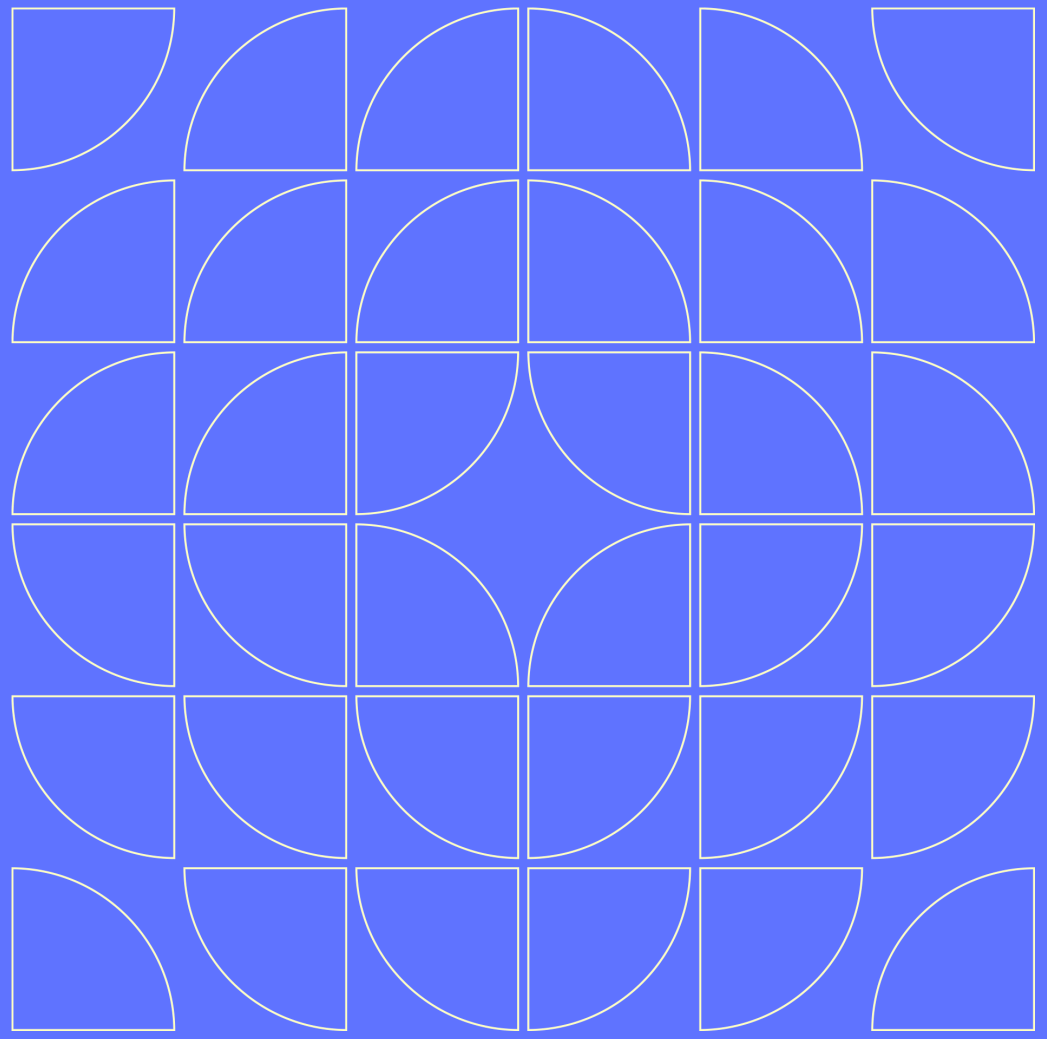

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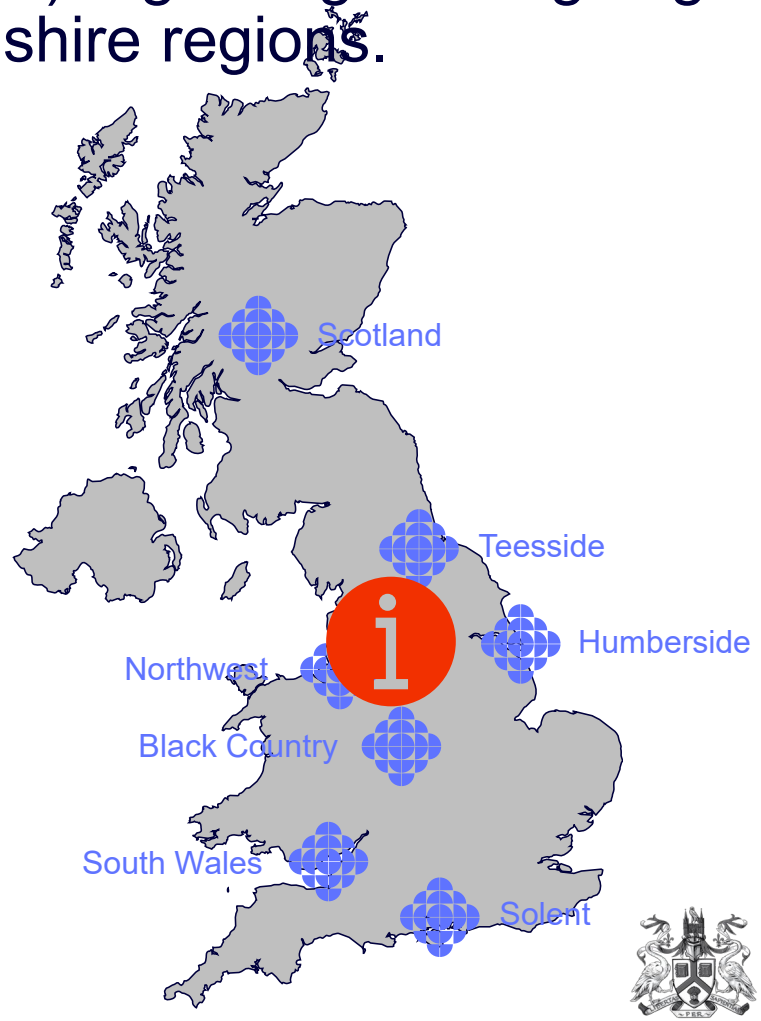
UNIVERSITY OF LINCOLN

INTRODUCTION

- To investigate the perception of young people (aged 11 – 18) regarding the ongoing transition to net-zero across the South Humber and Lincolnshire regions.

- Motivation: Previous reports Enabling Skills for Industrial Decarbonisation Supply Chain (IDRIC, 2023) highlights Humber as largest CO2 emitter amongst the 7 industrial clusters. “Highest emitter but most vulnerable to climate change”

- The report also highlights needs for changing stereotypes (gender, level of education etc)



INTRODUCTION

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1

- Understanding future workforce perceptions and motivations with respect to decarbonization.

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- Understanding future workforce perceptions and motivations with respect to decarbonization.
- Investigating teachers, career councillors and school staff understanding of sustainability and net-zero.

INTRODUCTION

- To investigate the perception of young people (aged 11 – 18) regarding the ongoing transition to net-zero across the South Humber and Lincolnshire regions.

3

- Understanding future workforce perceptions and motivations with respect to decarbonization.
- Investigating teachers, career councillors and school staff understanding of sustainability and net-zero.
- Understanding the role of geography, as different regional communities face unique challenges and opportunities. Humber amongst top 26% of deprivation.

FINDINGS

836 From pupils across two districts, spanning six different schools and institutions.

36% Expressed interest in climate change, with a noteworthy gender disparity.

49% Expressed concerns about the impact of climate change on their lives.

68% Expressed they have a responsibility to act in a climate-friendly manner.

ONLY 28% want to follow a career that would help tackle climate change.

FINDINGS

- Snapshot of the results revealed a substantial **lack of awareness** about net-zero among young students.

- Need for enhanced education and **awareness-building** efforts, especially **outside the classroom**.

- Disparities between male and female participants' awareness and willingness to pursue careers addressing climate change are noteworthy, underscoring the importance of **targeted interventions** to tackle this.

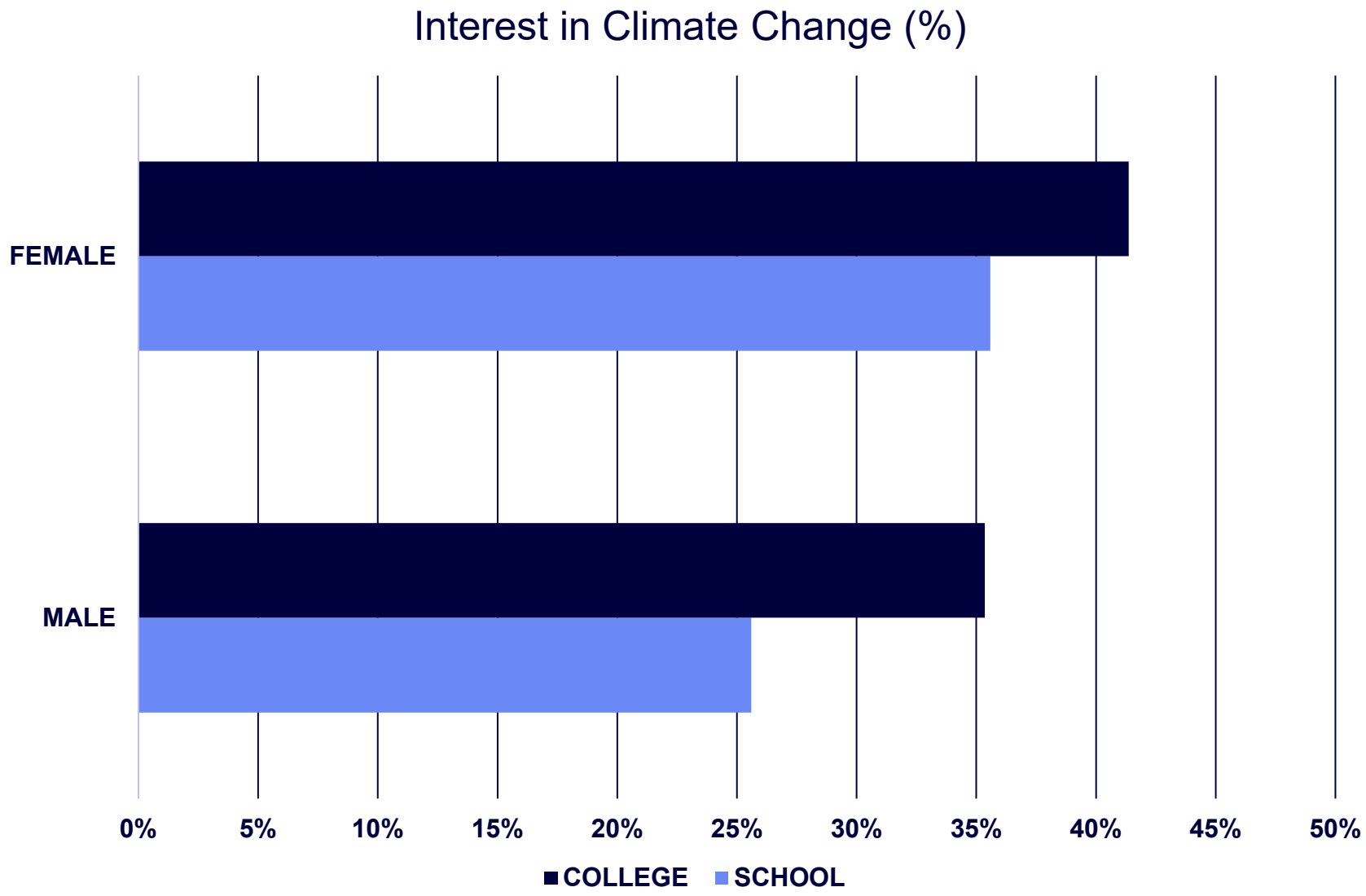
FINDINGS

- Reluctance to work in climate careers
- Less than 1 percent directly stated they wanted to be an environmentalist
- Least favorite choice amongst those who have heard about UK ambition of Net zero.
- However, engineering a popular career ambition.

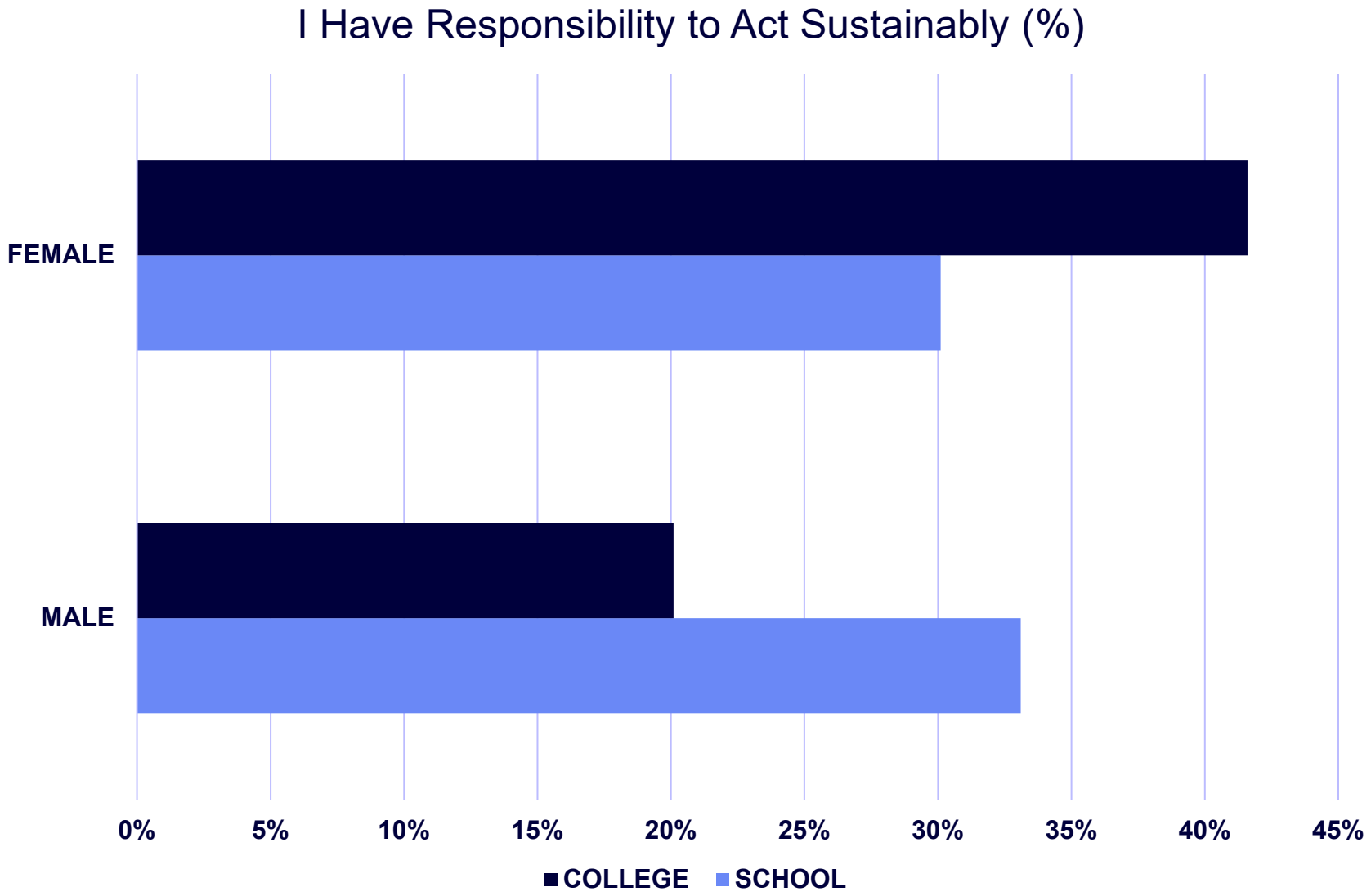
BARRIERS

- Schools in more deprived areas reluctant to engage
- Is this indicative of lack of resources in schools or disinterest amongst students?
- Using contacts and key passionate influencers helps

GENDER: INTEREST IN CLIMATE CHANGE

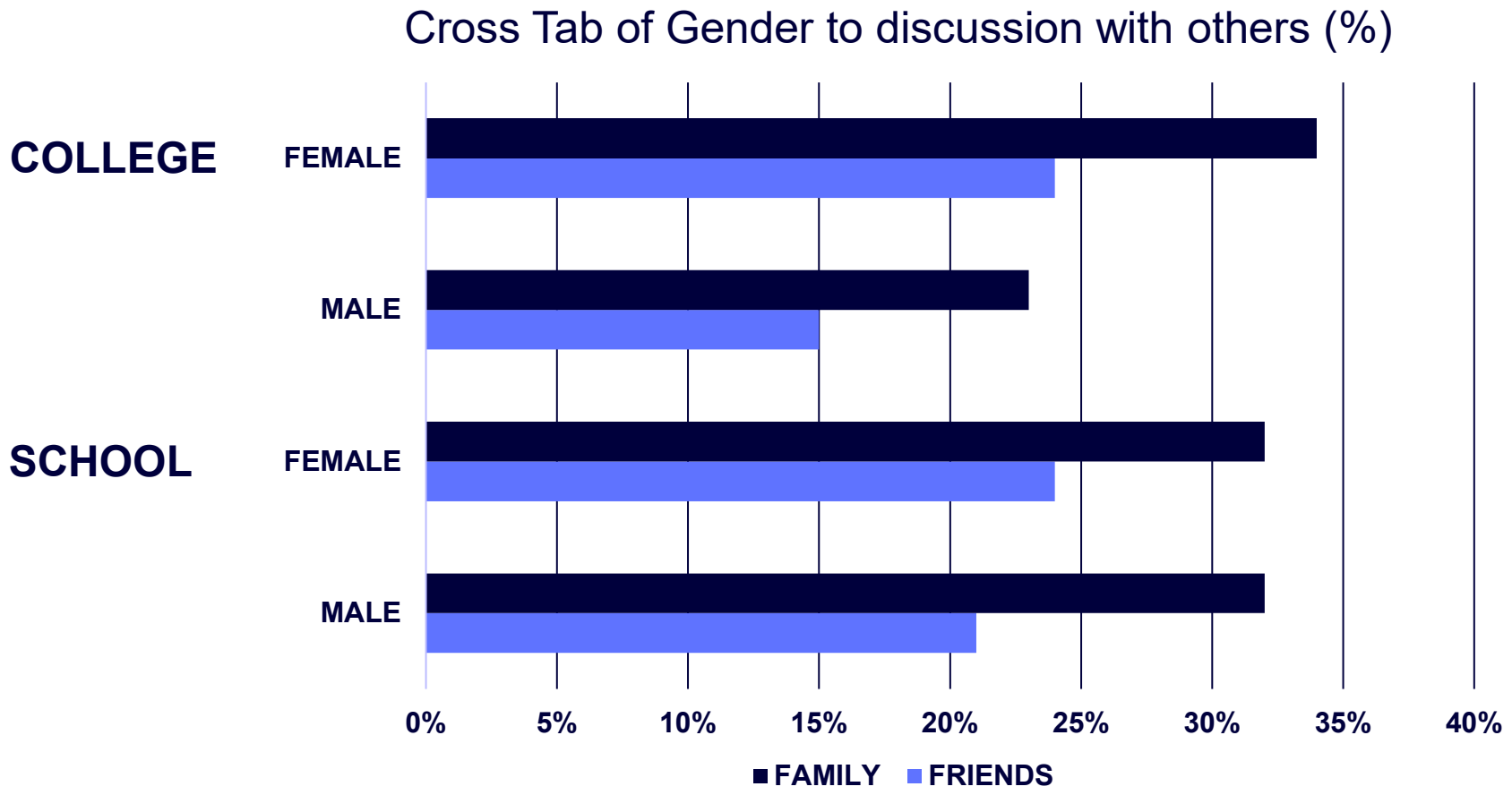


GENDER: RESPONSIBILITY TO ACT SUSTAINABLY

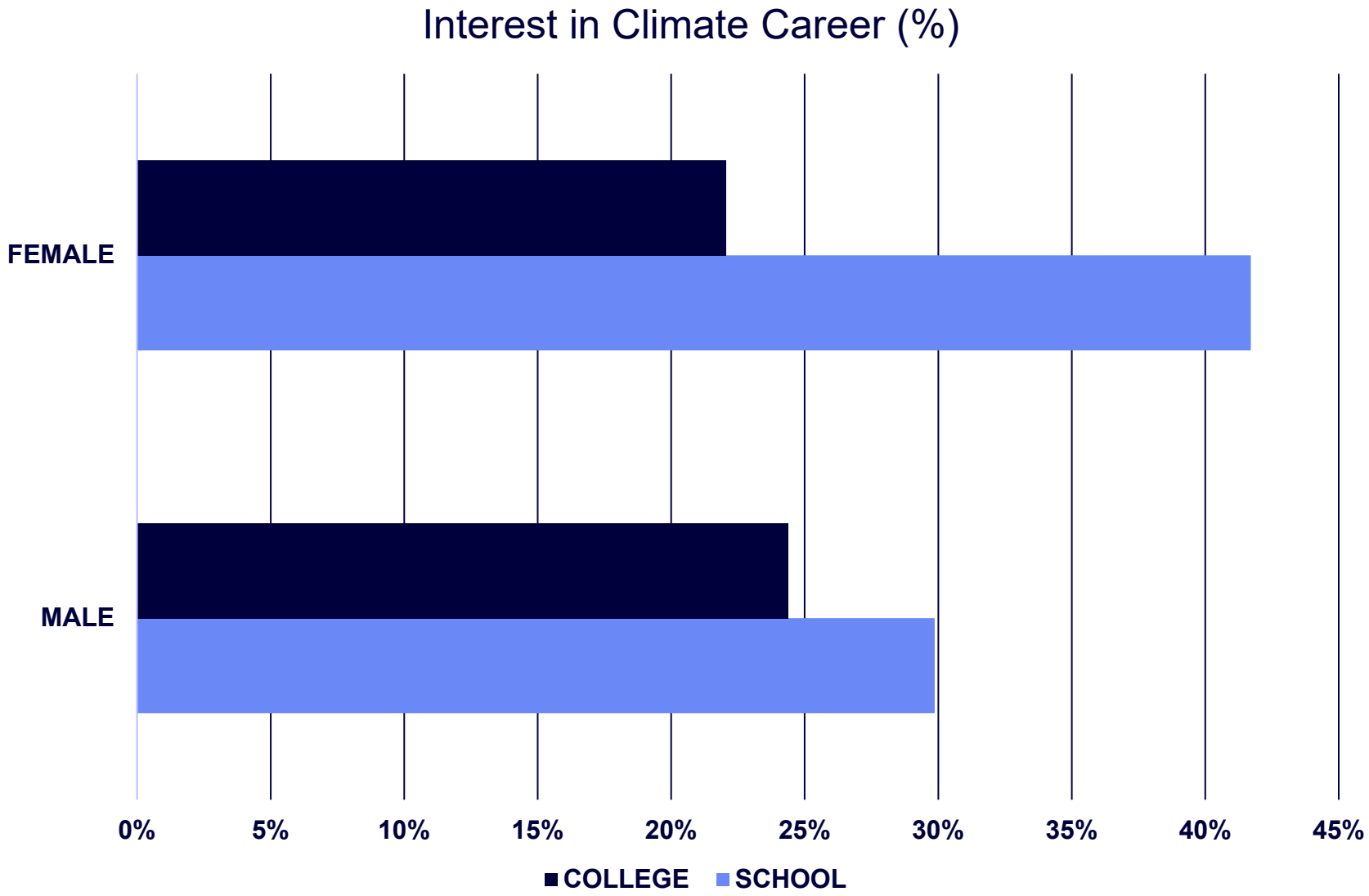


GENDER: AN OPPORTUNITY?

Response rate (Female) approximately equal in school (48.4%) but nearly 60 (59.3)% in College



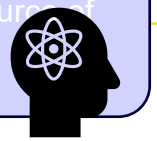
GENDER: INTEREST IN CLIMATE CAREERS



FRAMEWORK

KNOWLEDGE, ATTITUDE, BEHAVIOUR AND MOTIVATION MODEL IN THE HUMBER STUDENTS

Knowledge: Interest about CC, Net Zero, Sources of energy, source of knowledge

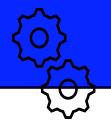


Reasonable

Attitude: personal responsibility, willingness, connections, personal sphere of influence

High responsibility
Low influence

Intention/Behaviour:



Uncertain

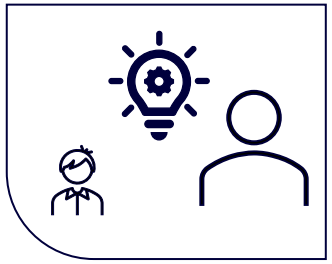
Motivation/Ambition/Aspiration:

Work, contribute

Empowerment Gap

Low

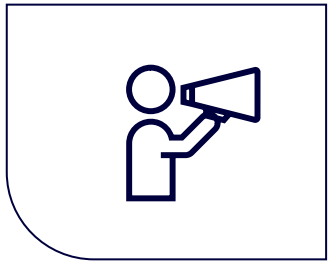
POTENTIAL IMPACT



UNDERSTANDING FUTURE WORKFORCE PERCEPTIONS AND MOTIVATIONS

INVESTIGATING THE EDUCATIONAL CONTEXT

UNDERSTANDING THE GEOGRAHICAL CONTEXT



DISSEMINATION AND MINI-PROJECT DEVELOPMENT