

Supporting the pipeline of skilled engineering graduates to the green energy market: the role of engineering education in embedding sustainability and global citizenship.

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Supporting the Pipeline of Skilled Engineering Graduates to the Green Energy Market

The Role of Engineering Education in Embedding Sustainability and Global Citizenship

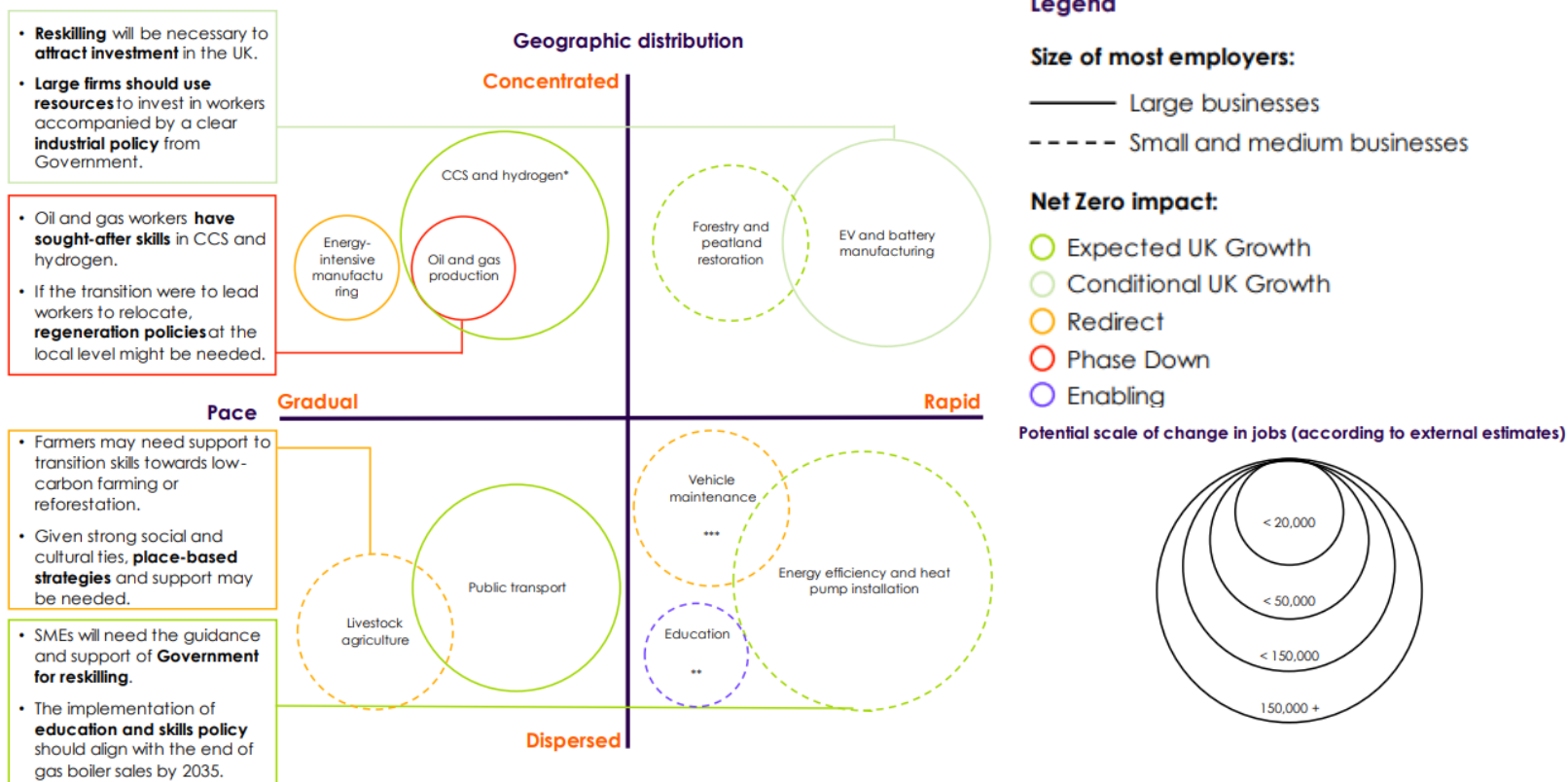
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Net Zero Landscape

- Transition to Net Zero has already begun.
- Shift to a lower-carbon energy supply has led to 'green' jobs.
- Agreed pathways to achieving Net Zero relies on:
 1. Reduced demand and improved efficiency.
 2. Adopting low-carbon technologies.
 3. Low-carbon energy supplies.
 4. Offsetting residual emissions.
- **Risk: An inadequate UK skills base to deliver the transition and inequitable or disruptive impacts for the workforce and communities.**



Net Zero Landscape

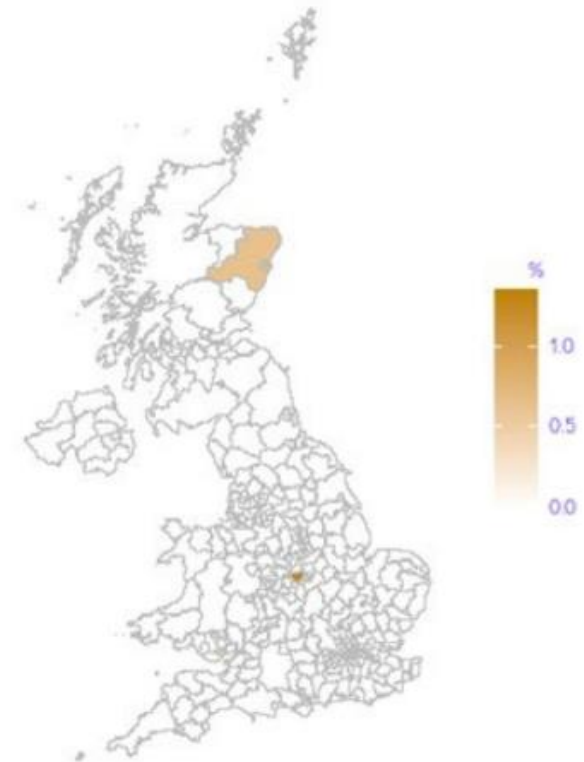


Key dimensions to consider for identifying priority or high-risk sectors

Trends suggests upskilling is required either gradually or rapidly

Oil & Gas Workforce

- Scotland and Wales account for around 63% of the total number of oil and gas jobs.
- Employment in oil and gas is particularly concentrated in Aberdeenshire and the North Sea relative to those economically active at the local authority level.
- Opportunity for workers to be employed in the low-carbon energy sector.
- Workers need access to training and support within their companies, with government playing a crucial monitoring role to creating a **transformative and enabling environment**.



Jobs in oil and gas supply (CCC, 2023)

Green Energy Transition

- Requires a talented energy workforce who are highly-skilled with competencies which include:
 - **Technical Expertise:** Specialised and interdisciplinary knowledge and skills to address complex challenges.
 - **Sustainability and Global Citizenship:** Required to drive ethical and environmentally responsible practices.
 - **Collaboration and Communication Skills:** Essential for working in multidisciplinary teams and engaging with stakeholders.
 - **Diversity and Inclusion:** Ensures that a wide range of perspectives and talents are brought to the table, fostering innovation and equitable solutions.

What Role Does Engineering Education Play?

Engineering Education: Role

Develop engineering graduates to meet these demands of **Green Energy Market**:

1. **Curriculum Integration (Research-led Teaching):** Incorporating sustainability, innovation and renewable energy topics.
2. **Hands-on Experience:** Providing students with practical experiences through labs, projects, and internships to apply theoretical knowledge to real-world challenges.
3. **Interdisciplinary Approach:** Combining engineering with environmental science, economics, and policy to foster a holistic understanding.
4. **Industry Partnerships:** Collaborating with industry partners to provide students with exposure to current industry practices, trends, and job opportunities.
5. **Professional Development Sessions:** Workshops, seminars, and certifications focused on enhancing students' professional skills and employability.

Multi-faceted Approach in an Inclusive and Equitable Learning Environment

Case Study: Scottish University

Selection of Courses:

- BEng (Hons) Engineering Design
- BEng (Hons) Engineering: Design and Manufacture (GA)
- BEng (Hons) Engineering: Instrumentation, Measurement and Control (GA)
- BEng (Hons)/MEng/BSc (Eng) in Mechanical Engineering
- BEng (Hons)/MEng in Mechanical and Offshore Engineering
- BEng (Hons)/MEng/MSc in Renewable Energy Engineering
- MSc in Engineering Management
- MSc in Robotics

Selection of Modules/Short Courses:

- Advanced Power System for Renewables Integration
- Renewable Energy Systems Design
- Environment, Innovation & Sustainability
- Innovation and Sustainability
- Offshore Engineering
- Sustainable Enterprise Development
- Carbon Capture, Utilisation and Storage
- Geothermal Energy and Applications
- Hydrogen Energy Systems
- Renewables and the Energy Transition
- Renewable Energy Management
- Wind Energy Systems

Case Study: Scottish University



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Future Direction

- Continuously updating curriculum to reflect emerging trends and technologies in green energy.
- Strengthening partnerships with industry and government.
- Enhancing research on sustainable engineering practices.
- AI technology integrated teaching and learning environment.



AI generated image of Engineering Education for the Green Market Transition (Copilot, 2024)

References

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