



University  
*of* Exeter

## Dr Okechukwu Okorie

Senior Lecturer in Sustainable Manufacturing.  
Royal Academy of Engineering Research Fellow  
(2023-2028)

Department of Engineering, University of Exeter.

24th April, 2024.

Bergen ORE Hub  
24 Annual  
Assembly.

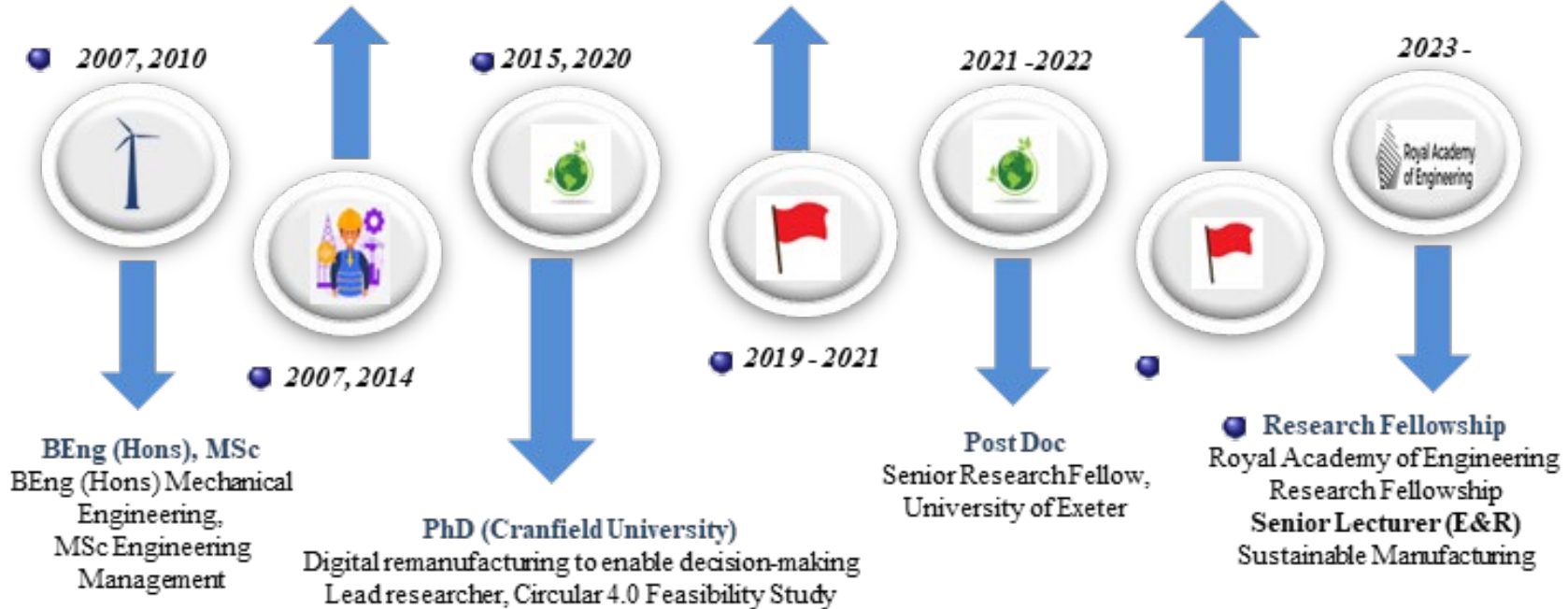
# Profile



**Experience**  
Condition Monitoring Specialist,  
Reliability Engineer,  
Supply Chain Development Analyst

**Post Doc**  
Research Associate, Cranfield;  
Visiting Fellow, RIT, New York  
Research Fellow, University of Exeter

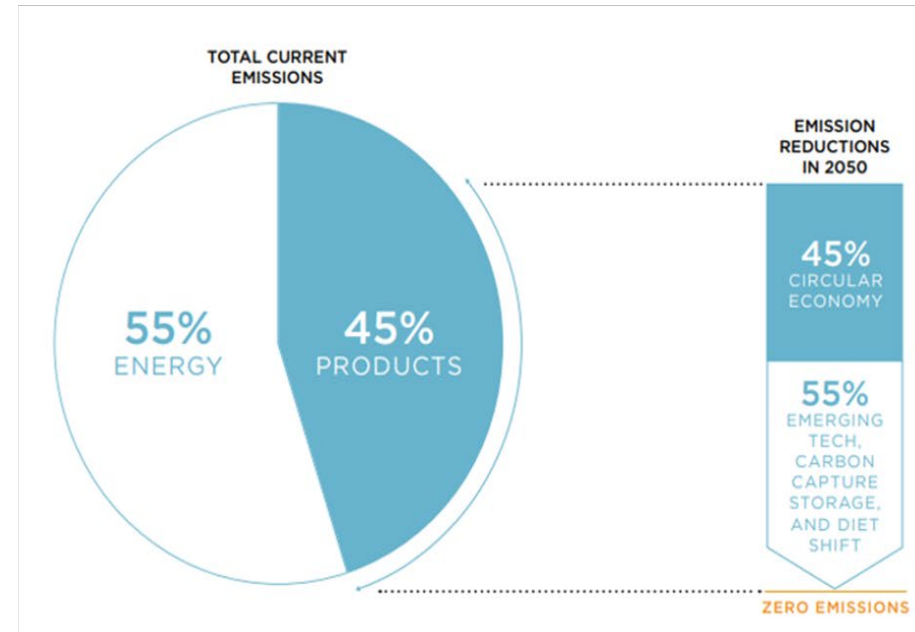
**Tenured Position**  
Lecturer in Sustainable Manufacturing  
(Education & Research)  
University of Exeter



# The Climate Challenge

Each year, the UK requires 1.2Bn tonnes of materials to sustain the current economy

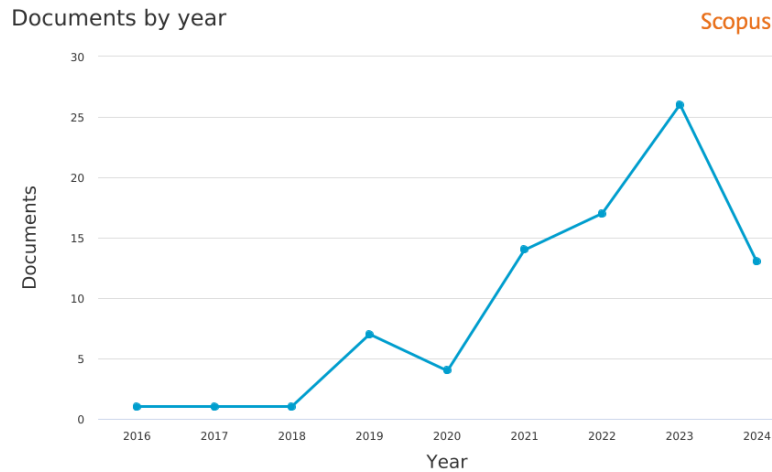
- [£30 billion worth](#) of clothes remain unworn and 350,000 tonnes / £140 million worth of clothing goes to landfill each year
- Global use of construction minerals ~ 55 Gt in 2020
- Collectively, metals feed into UK manufacturing and related sectors and have an annual gross value added of around £85Bn
- The Chemical sector is the UK's second highest industrial emitter with 18.4 million tonnes of CO2 emissions
- The extraction of seven major metals (Fe, Al, Cu, Pb, Mn, Ni and Zn) accounts for 15% of the global primary energy demand and 12% of the global GHG emission



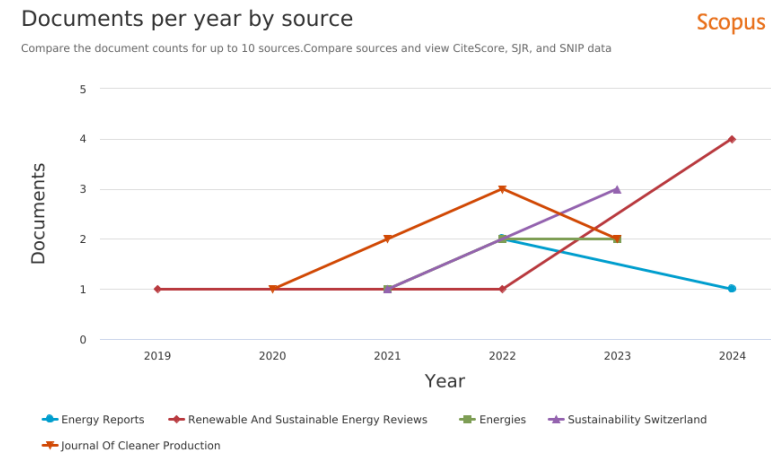
Climate change is as much an economic and social crisis as it is an environmental crisis: the costs of climate change to the global economy are projected to amount to **\$54 trillion** by the end of the century

Source: US EPA (2010)

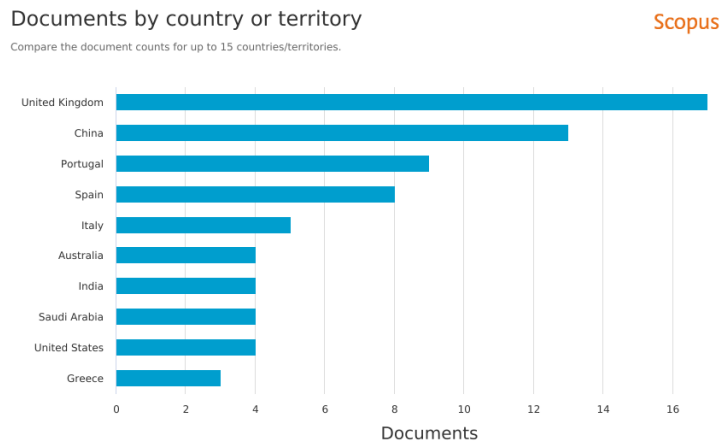
# Findings from literature database



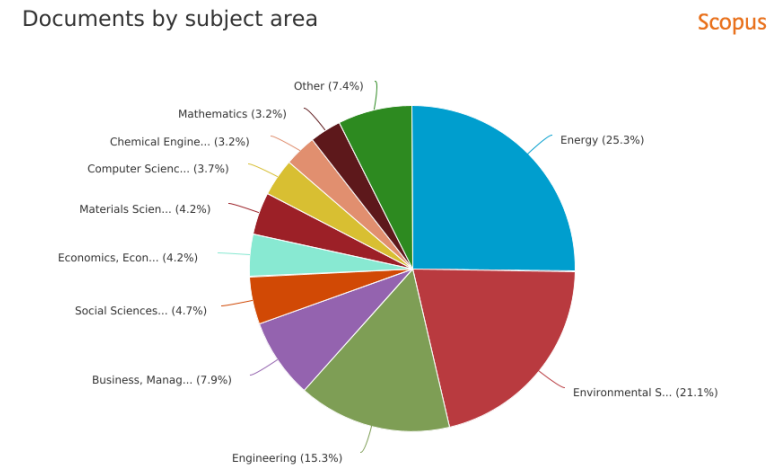
**“Renewable energy” AND “Circular Economy” AND “Offshore”**: 84 documents



**Key Journals (Publications)**



**Lead Countries: UK, China and Portugal**



**Interdisciplinarity in research**



# Transforming Practice: Key takeaways (1)

- The international community established a policy priority to limit global warming to the critical threshold of 1.5°C (IPCC, 2018)
- An unprecedented pace and scale of decarbonisation is required for the UK industrial sector which constitutes 21% of the UK's GHG emissions in 2017 (Committee on Climate Change, 2019)
- To date, efforts to tackle the crisis have focused on a transition to renewable energy, complemented by energy efficiency. Though crucial and wholly consistent with a circular economy, these measures can only address 55% of emissions.
- 45% of global emissions is associated with production of materials, goods and the management of land. (EMF, 2019)

# Transforming Practice: Key takeaways (2)

- Transforming current ORE practice will have to include embedding Circular Economy principles of identifying and eliminating waste across the value chain, circulating products and materials at their highest value and regenerating natural systems.
- Within research and innovation, the focus has been on new advancements in technology, increasing efficiency and reducing costs. An example is the development of predictive modelling & data analytics tools, for better assessment and site selection for offshore wind farms, etc.
- Interdisciplinary research initiatives must include fostering collaboration between scientists, engineers, policymakers & industry stakeholders. Thus, knowledge from diverse fields such as ecology, oceanography, economics and the social sciences can be integrated to develop sustainable and socially responsible ORE projects.

A person in a dark suit stands on a rolling green hill under a bright blue sky with scattered white clouds. The scene is peaceful and open.

# Thank You

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