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Addressing the UK's Growing Sustainable Cooling Skills Gap

Policy briefing for the Department for Education

There is an urgent need for education and upskilling in sustainable cooling technologies.

REnewable Energy for Future UK Net-Zero Cooling (Reef-UKC) network funded by EPSRC, works with academia, industry, government and societal stakeholders to develop sustainable and renewable-powered cooling technologies that support the UK's transition to Net Zero future.

Executive Summary

The UK faces a rapidly increasing demand for cooling, projected to reach 30% of total energy demand by 2030 – double the current rate. This surge, driven by global warming, urbanization, and technological advancements, is currently outstripping the capacity of our educational and training systems to produce a sufficiently skilled workforce. This brief outlines the critical need for immediate investment in education and upskilling initiatives to address the widening skills gap in sustainable cooling and energy literacy, ensuring the UK can meet and maintain Net Zero, foster innovation, and champion environmental stewardship.



1. Introduction: The Escalating Cooling Demand

The UK is experiencing increasingly frequent and intense heatwaves, alongside a rising need for cooling in commercial, industrial, and residential sectors (e.g., data centres, modern buildings, food industry). This burgeoning demand, if met mostly by conventional, grid-dependent methods, will place immense strain on our electricity grid, exacerbate peak demand issues, and compromise our Net Zero targets.

As part of a recent collaborative workshop, the Reef-UKC network – a collective of leading academics and industrialists focused on sustainable energy – convened to discuss the critical policy interventions required.

2. The Challenge: A Critical Skills Gap

The general consensus among the network members that the current skills within the UK's cooling sector do not keep pace. This inadequacy manifests in several key areas:

- **Knowledge Gap:** Existing educational frameworks, training programmes are insufficient to equip the workforce with the energy literacy and knowledge required for modern, energy-efficient, and environmentally sound cooling technologies.
- **Technological Disconnect:** The rapid evolution of sustainable cooling technologies (e.g., heat pumps, environmentally refrigerant alternatives, passive cooling, district thermal networks) necessitates the near-future workforce capable of designing, adopting, installing and maintaining such system innovations.
- **Regulatory and Policy Readiness:** The sector needs practitioners with a deep grasp of evolving UK regulation who can design and implement solutions aligned with Net Zero and broader environmental objectives.
- **Entrepreneurial Deficit:** A lack of specialised knowledge stifles the emergence of new businesses and innovative solutions within the sustainable cooling sector.

These gaps hinder the UK's ability to meet its climate commitments, optimise energy consumption, and maintain its competitive edge in a rapidly transforming global economy.

3. Recommendations: Bridging the Gap

Reef-UKC is established to champion transformative research and to develop strategies that integrate next-generation renewable energy with efficient, clean cooling technologies. This integration is essential to meet the rising demand for cooling, strengthen system resilience, and reduce reliance on grid-powered cooling that hinders grid decarbonisation. Our coalition—professors, practitioners, early-career researchers, local authorities, and community members—has reached a clear consensus on gaps within the current education system that limit workforce readiness for this growing market. Accordingly, we urge the Secretary of State for Education and the ministerial team to consider the following recommendations:

A. Integrate Sustainable Cooling into Curricula & Policy:

- **Mandate recognised qualifications for cooling professionals:** Introduce statutory, industry-wide qualifications—formally recognised across beneficiary sectors—to ensure a consistent baseline of knowledge, technical literacy, and expertise in sustainable and renewable-rich cooling, energy efficiency, and decarbonisation.
- **Curriculum Integration:** Embed accredited modules on sustainability, renewable-integrated cooling technologies, energy efficiency, climate-resilient design, and applied AI for cooling—covering predictive maintenance, smart energy management, cooling–heating interchanges, and efficiency optimisation—across vocational training, apprenticeships, and relevant higher-education programmes (e.g., engineering, architecture, environmental science).
- **Early Education Exposure:** Integrate core content on energy efficiency, climate resilience, and fundamental cooling principles into GCSE and A-level STEM curricula to build foundational knowledge from an early stage.
- **Degree Programmes in Renewable Systems Integration & AI:** Encourage and support universities to create specialised programmes and certifications focused on the direct integration of next-generation renewable energy with end-use systems—positioning clean cooling as a flagship application. Programmes should integrate systems engineering and applied AI to close workforce gaps and move beyond “cooling-only” curricula, equipping graduates to deliver AI-enabled solutions that integrate renewable energy with clean cooling.

B. Fund Upskilling and Reskilling Initiatives:

- **Dedicated Funding:** Provide ring-fenced funding for programmes and CPD that upskill existing professionals and practitioners in the HVAC&R (Heating, Ventilation, Air Conditioning and Refrigeration) and construction sectors, enabling the effective integration of renewable energy with cooling end-use systems and accelerating the adoption of sustainability best practice.

C. Promote Knowledge Exchange and Research:

- **Fund targeted research and development programmes** focused on sustainable, renewable-integrated cooling, with clear pathways to translate findings into curricula and CPD, ensuring education remains current, evidence-based, and innovation-led.
- **Actively facilitate formal, recurring platforms** for collaboration between academia, industry, and policymakers to ensure curricula and CPD are continually updated with current best practice, technological advances, and evolving policy and regulatory requirements.

D. Foster Entrepreneurship and Innovation:

- Provide targeted support for incubators and accelerators focused on sustainable cooling, small-scale renewable technologies, and their integration—offering structured mentorship, technical assistance, and essential resources to enable new ventures to progress from validation to deployment.
- **Incentive interdisciplinary partnership** to drive novel solutions and business models.

The Reef-UKC team would be honoured to meet with the Secretary of State for Education or Department for Education officials at your convenience to present our findings in greater detail and to explore how we might support the Government in advancing this agenda.

Conclusion

Rising demand for cooling in the UK requires a deliberate, skills-led response. By prioritising education and upskilling focused on integrating next-generation renewable energy with clean, efficient cooling, the Department for Education can equip the workforce to deploy scalable solutions, strengthen energy resilience, and advance environmental goals. Investing in these capabilities now—under the Department’s leadership—is not only an educational priority but a practical pathway to a cooler, greener, and more prosperous future for the UK.