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# Unlocking Sustainable Cooling as a Flexible Asset for UK Energy Security and Economic Growth

Policy briefing for HM Treasury

Strategic policy for sustainable cooling is a critical opportunity for UK investment, jobs and energy resilience.

**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

Rising UK cooling demand—driven by climate change and the expansion of cooling-intensive sectors, such as data centres—creates both an energy security risk and a material economic opportunity. Left unmanaged, it will increase health burdens, amplify subsidy pressures, and strain the electricity grid. With targeted policy, however, cooling can operate as a flexible system asset, enabling demand response, unlocking thermal storage, reducing curtailment, and attracting productive investment and high-quality jobs. This brief recommends urgent, “soft policy” measures to prioritise flexible, renewable-powered cooling—alongside heating—to strengthen system resilience and accelerate decarbonisation. These actions directly support the national mission to secure the highest sustained growth and to make Britain a clean energy superpower by boosting productivity, reducing system costs, and positioning UK industry to lead in scalable, exportable clean cooling solutions.



# 1. Introduction: The Growing Imperative for Sustainable Cooling

The UK faces more frequent heatwaves and rapidly growing cooling needs across commercial, industrial, and residential sectors (including data centres, modern buildings, and the food industry). If met primarily through conventional, grid-dependent systems, this demand will intensify peak loads, strain electricity infrastructure, and slow progress toward Net Zero. At a recent collaborative workshop, the Reef-UKC network, which brings together leading academics and industrial practitioners in sustainable energy, identified targeted policy interventions to address this challenge. The consensus is clear: cooling is not only a risk to energy security but also a significant opportunity to enhance system flexibility, attract private investment, and build high-value capabilities. These interventions directly support the Government's missions to secure the highest sustained growth by boosting productivity, unlocking new markets, and supporting quality jobs, and to make Britain a clean energy superpower by accelerating deployment of efficient, renewable-powered cooling and strengthening grid resilience.

## 2. The Choice: Opportunity vs. Risk

The UK faces a clear contradiction in how it addresses future cooling demand:

### The Economic Opportunity (Trillions in Private Investment, Millions of Jobs):

- **Substantial Private Investment:** Proactive policy signals will unlock vast private sector investment in innovative cooling technologies, manufacturing, installation, and associated infrastructure. For examples advanced reversible heat pumps, thermal storage (cold & hot), smart controls & AI, and district cooling & heating networks that utilise renewable reach resources.
- **Millions of Jobs:** This investment translates directly into significant job creation across the UK, from high-value R&D roles to skilled manufacturing, and practitioners in installation, and maintenance positions, fostering a new green industrial base.
- **Lower Curtailment Costs:** Enable and incentivise flexible cooling, such as thermal energy storage, and smart controls, to absorb surplus renewable electricity during periods of high generation (e.g., windy nights). Treating cooling as distributed “virtual storage” lowers curtailment and compensation payments, increases utilisation of clean generation, improves grid stability, and reduces whole-system costs. Cutting costs and maximising the value of UK clean-energy assets directly supports our national missions.
- **Substantial stream in Tax Revenue:** The growth of a thriving sustainable cooling sector will generate substantial tax revenues for the Exchequer through corporate taxes, employment taxes, and increased economic activity, driven by the expanding sector.
- **Lower Subsidy Costs:** By integrating flexible and renewable-powered cooling, the grid becomes more stable, and efficient, less strained, potentially reducing the need for costly peak power generation subsidies and overall system balancing costs.

## The Escalating Risk (Higher Health Costs, Increased Subsidies, Gas Imports):

- **Higher Health Costs:** UK heat waves lead to spikes in electricity demand for ventilation and air conditioning, increasing the risk of grid failures. Such outages threaten vulnerable patients and disrupt NHS operations, exacerbating existing pressures. Rising energy costs for cooling in hospitals divert funds from frontline care. Addressing these cooling resilience challenges is mission crucial for ensuring continuity of care, protecting critical equipment, and preserving budgets for patient services.
- **Higher Subsidies:** A reactive approach, relying on traditional, inflexible cooling, will necessitate greater investment in conventional peak power generation and associated subsidies to meet surging demand, driving up consumer costs.
- **Resilience over Gas Dependence:** The UK faces the challenge of providing cleaner electricity and a more resilient grid. To meet the rising demand for cooling without relying on gas, a shift to renewable-powered, grid-smart cooling is essential. This can be achieved through thermal storage and smart controls, which align demand with renewable generation, reduce peak stress, and lower gas dependence. This approach enhances supply security, supports a low-carbon electricity system, and eases pressure on the government..

## 3. The Solution: Soft Policy to Prioritise Flexible Cooling along with Heating

To harness the opportunities and mitigate the risks, we advocate for the implementation of "soft policy" measures designed to strategically prioritize electricity for flexible cooling solutions along with heating that already has been the centre of focus for years. "Soft policy" refers to market-shaping mechanisms, incentives, and regulatory signals that guide investment and consumer behaviour without heavy-handed mandates.

Key policy levers include:

- **Market Mechanisms for Flexibility:** Introduce and strengthen market mechanisms that reward flexible demand from cooling systems (e.g., through smart tariffs, demand-side response programmes, and grid service contracts). This incentivises the use of renewable-powered cooling as a grid asset rather than just a load.
- **Targeted Incentives & Funding:** Provide clear, long-term incentives for the adoption of high-efficiency, renewable-powered cooling technologies (e.g., advanced reversible heat pumps with thermal storage for cooling along with heating, district cooling), and how they can interact with the ongoing development in the heating domain. This could include grants, tax breaks, or low-interest loans for businesses and homeowners.
- **Building Regulations & Standards:** Update building regulations to mandate or strongly encourage passive cooling strategies, high-efficiency cooling systems, onsite renewable-powered cooling equipment and the integration of thermal storage in new builds and major renovations. Develop clear performance standards for cooling equipment.

- **Grid Connection Prioritisation:** Explore policies that accelerate grid connections for flexible, low-carbon cooling and heating projects, recognizing their contribution to grid stability and decarbonisation. Also, how the onsite renewables enhance the grid security.
- **Public Awareness & Education:** Launch campaigns to inform consumers and businesses about the benefits of sustainable and renewable-powered cooling as flexible assets, including energy savings, comfort, and contribution to national energy security.

## 4. Recommendation

We urge the relevant government departments and the ministerial team to establish a cross-departmental task force to develop and implement a comprehensive "soft policy" framework for sustainable and flexible cooling. This framework should actively promote cooling as a critical component of the UK's energy transition, aligning with the national missions: Secure the highest sustained growth, Make Britain a clean energy superpower, Build an NHS fit for the future.

**Reef-UKC team would be honoured to meet with the Chancellor of the Exchequer or HM Treasury Department 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

Flexible, renewable-powered cooling is not only an environmental priority; it is a practical lever for productivity, grid resilience, and fiscal efficiency. With targeted, evidence-led policy, Government can crowd in private investment, accelerate innovation and deployment, and reduce system costs—strengthening energy security and competitiveness.

This agenda directly advances the national missions to secure the highest sustained growth (by boosting productivity, supporting high-value jobs, and opening export markets), make Britain a clean energy superpower (by maximising utilisation of low-carbon generation and improving grid flexibility), and build an NHS fit for the future (by mitigating cooling-related outages and cost pressures in critical care settings). We stand ready to support delivery with our expertise and network.