Editorial

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Energy research covers a particularly wide scope of disciplines from, as examples, pure sciences, engineering, climate sciences, economics and human behaviour to many aspects of building and urban design. Even the solely technical aspects of energy research not only encompass the full range of engineering disciplines, but often require inherent interdisciplinary perspectives. The papers in this issue are a microcosm illustrative of this remarkable diversity of contexts, challenges and perspectives.

The first paper in this issue deals with artificial lighting energy use in buildings. As buildings become more efficient in their requirements for heating and cooling, energy for lighting and hot water provision can become an increasing proportion of overall energy consumption in buildings. The paper ‘Improving the efficiency of lighting energy in an office building in Brazil’ is by six colleagues from Fluminense Federal University in Brazil (Cruz *et al.*, 2022). The paper demonstrates, by way of a case study, the significant energy saving that can accrue from replacing fluorescent lamps with light-emitting diode (LED) lights. The latter have about a fifth of the energy use of previous lighting technologies. More generally the paper illustrates that effective use of lighting design software can minimise the number of LEDs required to provide adequate light. This conclusion is important as an over-provision of LEDs can be inadvertently installed when replacing older lighting technology, leading to potential energy savings not being fully realised.

Disposal of nuclear waste remains a major barrier to the wider adoption of nuclear energy. In the second paper in this issue, ‘A deep borehole disposal solution for the UK’s high-level radioactive waste’, Professor Fergus Gibb from University of Sheffield and John Beswick of Marriott Drilling Group consider how deep boreholes can be used in the UK to dispose of high-level nuclear waste (Gibb and Beswick, 2022). It is found that the size of deep boreholes suitable for disposal of radioactive wastes can be increased through an innovative combination of blind shaft and oilfield drilling technologies. Adopting this approach would avoid the expensive replacement of existing ageing UK storage facilities. Given the huge likely reductions

that Gibb and Beswick’s recommendations would make to the estimated cost of high-level nuclear waste disposal, implementing the paper’s conclusions requires urgent consideration.

The high temperatures of the energy uses associated with the iron and steel, chemicals, cement and glass sectors are notoriously challenging in terms of reducing carbon dioxide (‘decarbonisation’). In the UK, these, and related sectors, account for about 10% of total carbon dioxide emissions. To address this, since 2010 successive UK governments have produced ‘decarbonisation’ strategies for industry. In the third paper in this issue, ‘The UK industrial decarbonisation strategy revisited’, Professor Geoff Hammond (2022) from the University of Bath examines the most recent UK *Industrial Decarbonisation Strategy* published in March 2021 (HMG, 2021), contrasting it with the UK *Clean Growth Strategy* published in 2017 (HMG, 2017) and recommendations of the UK government’s independent Climate Change Committee.

Though radically different from each other, the three papers in this issue share a motivation to provide genuinely useful practical insights. They share a collective intention that their conclusions are not only considered by other researchers, but are actually adopted by end-users and policymakers.

REFERENCES

- Cruz VP, de Paula Campos ACS, Cardoso KR *et al.* (2022) Improving the efficiency of lighting energy in an office building in Brazil. *Proceedings of the Institution of Civil Engineers – Energy* **175(1)**: 2–10, <https://doi.org/10.1680/jener.20.00013>.
- Gibb FGF and Beswick AJ (2022) A deep borehole disposal solution for the UK’s high-level radioactive waste. *Proceedings of the Institution of Civil Engineers – Energy* **175(1)**: 11–29, <https://doi.org/10.1680/jener.21.00015>.
- Hammond GP (2022) The UK industrial decarbonisation strategy revisited. *Proceedings of the Institution of Civil Engineers – Energy* **175(1)**: 30–44, <https://doi.org/10.1680/jener.21.00056>.
- HMG (Her Majesty’s Government) (2017) *The Clean Growth Strategy: Leading the Way to a Low Carbon Future*. Department for Business, Energy and Industrial Strategy, London, UK.
- HMG (2021) *Industrial Decarbonisation Strategy*. CP 399. Her Majesty’s Stationery Office (HMSO), London, UK.