

Editorial

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It is a pleasure to be asked to prepare the editorial for this issue of the Institution of Civil Engineers' (ICE) *Energy* journal. As a civil engineer working in the energy sector, I was always aware of the important role energy has in modern society. Even more so now in times of our developing knowledge of the serious impact of greenhouse gas emissions on the Earth's climate. Geoffrey Hammond's editorial in the May issue (Hammond, 2019) reflected on this and the key elements of energy security, sustainability and affordability. I am also conscious that as I write this in the month of July, temperatures have reached record highs (yes, even in Scotland!), so it is worth noting other recent events and reinforcing the message.

Recent events include

- new UK government and minister responsible for energy (BEIS, 2019a)
- consultation on proposals for a new funding model for nuclear energy projects (BEIS, 2019b)
- European Investment Bank proposes to phase out support to energy projects reliant on fossil fuels (EIB, 2019)
- consultation on installation of electric car charge points in all UK future homes (DfT, 2019)
- UK government ambition for all new cars and vans to be effectively zero emission by 2040 (BEIS, 2019)
- new net-zero target requiring the UK to bring all greenhouse gas emissions to net zero by 2050 (net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere) (BEIS, 2019c).

These are issues that we as engineers, researchers and other professionals need to contribute to. It is worth bearing this in mind in our careers and when submitting or reviewing articles to ask: what we can do to reduce our 'carbon footprint' and improve sustainability?

One feature of the journal is themed issues, and there is a great opportunity to have a paper published on the above and other relevant topics by contributing to the themed issue 'Pathways to 2050'. See the call for papers (ICE, 2019a) and please note that the deadline for abstracts of 200 words is 30th September 2019.

Now on to the four papers published in this edition. The energy sector is world-wide, multidisciplinary and collaborative, covering many different topics, so I am pleased that the articles published in this issue reflect that.

The first paper, by Mihelić-Bogdanić *et al.* (2019), deals with polyester production. Polyester is in large demand for textiles and its production offers significant challenges in terms of energy use and ecological risks. The authors address these issues, detailing the energy-efficient improvements in the production of polyester material and highlighting the benefits of polyester compared with traditional materials such as cotton.

Hawash *et al.* (2019), in the next paper, address energy sustainability in the production of biodiesel. Biodiesel is a sustainable fuel made from non-edible vegetable oils and a substitute for petroleum-produced diesel. Biodiesel is a renewable resource and has other benefits of biodegradability, lower toxicity, higher security of use and storage, good engine performance and the ability to be mixed in with regular petroleum fuel. However, there is a drawback in the product, due to free fatty acids (FFAs), that is detrimental to the use of biodiesel as a fuel. The paper studies this problem and reviews how the esterification process can pre-treat the FFAs prior to biodiesel production.

The third paper, by Zheng *et al.* (2019), is also materials related, in this case on the topic of improving the thermal-storage performance of phase-change thermal materials (PCMs). PCMs have many important uses in energy efficiency.

Examples of applications include: thermal energy storage; conditioning of buildings; medical applications; heat pump systems; solar power plants; and computer cooling. The paper shows how the performance of the PCM material disodium hydrogen phosphate dodecahydrate is improved by the addition of sodium sulfate decahydrate, graphite and sodium silicate.

The fourth and final paper in this issue deals with the oil and gas industry, still an important part of the energy mix and in the production of a wide range of products. Therefore, exploitation of oil and gas can be expected to continue during a transition to ‘zero net carbon’ status and beyond. The paper by Nikhalat-Jahromi and Jorge (2019) explores the challenges faced by the industry due to lower prices and how modern data science applications can be used to make efficiencies and decrease costs in oil and gas exploration and extraction.

I hope you find these papers informative. As always, we are pleased to receive comments on this issue, on other issues or comments related to the journal more generally. Finally, in addition to contributions to the themed issue, the *Energy* journal is open to receiving quality papers to publish and guidance on submissions is available at the ICE Virtual Library (ICE, 2019b).

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