

Editorial

John E. Earp BA, CEng, FIMechE, FNucl
Nuclear Consultant, UK



I have been part of the *Energy* journal's Editorial Advisory Panel for more than 6 years, being recruited initially through the Nuclear Institute to bring an industrial nuclear perspective to the group. Officially coming to the end of my tenure on the committee, a 6-year period being the norm, I would like to acknowledge that it has been a privilege and an excellent experience to be involved with such a prestigious publication, which I would recommend to anyone offered the chance.

I was particularly pleased to be asked to take the lead on this themed issue on small modular reactors (SMRs), since I was the author of the Institution of Mechanical Engineers' policy statement on the topic and was part of a team responding to the UK government's Department of Energy and Climate Change (now the Department for Business, Energy and Industrial Strategy) SMR competition.

This competition raised the profile and potential of SMRs for the UK and internationally. It supported SMRs not as a competitor for large nuclear reactors but complementary to them in an integrated energy supply system involving renewables with some fossil fuel, delivering an overall environmental benefit related mainly to reduced greenhouse gas emissions.

Any publications on nuclear issues seem to separate themselves into two main streams, which can be broadly termed financial and technical. The papers published in this themed issue are no different, with two papers being predominantly financial and two being technical, albeit in one case with a financial overlay.

Normal procedure for *ICE Proceedings* journals is for briefing articles to be published before full papers, hence in this case the initial article is financial. 'How can we continue to get affordable nuclear power into the energy mix?' (Kotak and Kirschel, 2017) takes a macro look at the electricity generation (energy) scene, arguing that given the planned shutdown of the existing reactor fleet in the UK their intended replacement

needs to happen sooner rather than later, and SMRs would be part of the mix given that project financing is easier, construction time is shorter and increased siting options exist, allowing the potential for district heating to be factored in.

The first full paper, 'Appraisal of small modular nuclear reactors with 'real options' valuation' (Locatelli *et al.*, 2017), is a micro-economic treatment of the investment appraisal of SMRs. It argues that utilising a unique 'real options' approach gives a more realistic evaluation than the more traditional discounted cash flow methodologies, which it claims underestimate the value of management flexibility. The 'real options' technique is described in some detail and its application to aid better decision-making with regard to the deployment of SMRs is explained.

The second full paper, 'Economy, safety and applicability of small modular reactors' (Playbell, 2017), is a composite financial and technical paper. It takes a broad look at the potential to deploy SMRs within the UK energy scene and more widely considers SMR marketability worldwide. Technical aspects are considered, such as fuel types, reactor safety, the potential to integrate them into existing electricity grid systems, as well as legal, licensing and regulatory matters. The paper then develops an economic overview which concludes that ideally a fleet of SMRs is the optimum way forward as this spreads the first-of-a-kind costs.

Overall, this paper extensively references International Atomic Energy Agency and Organisation for Economic Co-operation and Development material, and as such has the potential to be a good 'reference' work in its own right, supporting future SMR-related papers.

The final paper in this issue is overtly technical in nature; 'A novel steel-concrete composite system for modular nuclear reactors' (Burgan *et al.*, 2017) describes a factory-constructed 'steel brick' – effectively, steel plates with concrete between

them. It justifies their strength and describes how such units could be utilised in the factory manufacture of reactor modules. Although targeted at SMRs, one cannot help but feel this concept might have wider application in the nuclear sector.

All four articles are well referenced and are capable of supporting further development within the SMR field; hence I would commend them as reading material for anyone engaged in this area.

Finally, in preparing this themed issue other SMR papers were submitted; these were either not ready or could not be fitted in to this issue; however, the intent is that they will appear in future issues of *Energy*, so 'watch this space'.

REFERENCES

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