

Editorial

Nick Jenkins FREng, FIEEE, FIET, FLSW
School of Engineering, Cardiff University, Cardiff, UK

I am struck once again by the complexity of the urgent competing pressures that need to be addressed over energy supply and use. In UK policy circles, these are often described as the 'energy trilemma' of ensuring energy supplies that are environmentally benign, affordable and secure. A successful energy policy must balance these often conflicting pressures and *Energy* reflects the wide range of issues and expertise that are necessary to do this. Our previous issue was an extended themed issue on energy demand and this issue deals with aspects of gas energy supply and the design of wind turbines. These two issues of the journal effectively illustrate the balance we strive to maintain in order to support professional engineers in developing their detailed expertise in technical matters, while recognizing that both environmental and behavioural aspects are key.

By 23 September the UN will have held its Climate Change Summit in New York. As preparation for this event, the Secretary-General of the World Meteorological Organisation (WMO) issued a press release stating that 'We know without any doubt that our climate is changing and our weather is becoming more extreme due to human activities such as the burning of fossil fuels' and that in 2013 the concentration of carbon dioxide in the atmosphere was 142% of the pre-industrial era (1750), and methane and nitrous oxide were 253% and 121%, respectively. More tangibly, the globally averaged temperature over land and ocean surfaces for August 2014 was the highest since record keeping began. One of the key messages from the Summit will be that it is the poor in developing countries who experience the worst effects of climate change. A further consequence of the increasing carbon dioxide emissions is the acidification of the oceans, which some scientists consider to be of equal importance to climate change. The WMO website (<https://www.wmo.int>) is an excellent resource and I commend it to you.

The briefing in this issue is on shale gas (Parkhurst, 2014). It is a timely status report prepared by the Institution of Civil Engineers Energy Expert Panel and describes the framework for exploiting shale gas within the UK as well as giving estimates of the shale gas resource in the UK and USA. The exploitation of US shale gas has led to major reductions in the cost of fossil fuel for electricity generation. However, its extraction in the UK has attracted considerable public opposition. The briefing most usefully gives the background to this important new energy resource and sets out the issues its extraction and use raise.

The first of our two papers addresses the commercialisation of underground coal gasification in Australia (Walker, 2014) and again illustrates well the many non-technical factors that determine if a particular energy technology is (or is not) widely adopted. It concludes that the support of government environmental policy is essential if a technology is to be adopted widely, resonating with UK energy policy and the recent government-supported increase of photovoltaic generation. The paper sees the future of coal gasification technology in rather small commercially developed power projects of 20–30 MW.

The second paper deals with fatigue design of offshore wind turbines monopole support structures (Brennen and Tavares, 2014). A large offshore wind farm may have up to 100 of these structures. This paper examines the origin of current fatigue design guidance and questions whether a rethink of the approaches currently used are now due for modern wind turbines. There is great pressure on the developers of offshore wind farms to reduce cost and this timely contribution asks whether the current design of offshore wind turbine structures is appropriate.

Energy exists to explore how the three competing pressures of the 'energy trilemma' can be balanced and is deliberately broad in its scope, addressing energy supply and demand, engineering practice and research as well as environmental and social impacts. It welcomes papers on technical matters as well as expressions of interest to join the advisory board. If you would like to be considered please contact Dr Sarah Brown at the Journal Office.

REFERENCES

- Brennan F and Tavares I (2014) Fatigue design of offshore steel mono-pile wind substructures. *Proceedings of the Institution of Civil Engineers – Energy* **167(4)**: 196–202, <http://dx.doi.org/10.1680/ener.14.00005>.
- Parkhurst S (2014) Briefing: Shale gas – an energy status report from the Institution of Civil Engineers. *Proceedings of the Institution of Civil Engineers – Energy* **167(4)**: 182–187, <http://dx.doi.org/10.1680/ener.14.00001>.
- Walker LK (2014) Underground coal gasification: issues in commercialization. *Proceedings of the Institution of Civil Engineers – Energy* **167(4)**: 188–195, <http://dx.doi.org/10.1680/ener.14.00003>.