

## Editorial

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It's a paradox that at a time we are so open to, and encouraging of, new ideas and concepts it is sometimes difficult to get a good idea across. In the clamour of the modern energy industry, where we are striving for ever increasing sustainability, there are lots of ideas and new products and there is a real challenge for proponents to effectively promote those that are good and differentiate them from the not so good.

It is in society's interest that our projects should be promoted professionally and that they are based on a sound business case which will deliver good return for our clients and customers. This business case needs to have carefully considered the

- specific project constraints (environmental, financial, political, etc.)
- through-life costs and benefits
- technological risks
- construction, installation and operating risks (including health and safety).

We need, therefore, energy practitioners who can think holistically and who can integrate energy markets, technology and project implementation to convince us of the benefits of their chosen technology. We also need a sound underpinning programme of research and development; only with this can new innovations be deployed properly and with demonstrable confidence.

Our journal, therefore, provides an ideal platform for practitioners and researchers to explain concepts and share their knowledge and experience, and for us to consider the relative merits of the solutions available today in the energy market. This issue of *Energy* is a 'general' one and, as a result, ranges widely across some of the many diverse opportunities open to us for responding to society's energy needs. A common thread, however, is the authors' enthusiasm to engage with their peers and to promote understanding of the opportunities and, sometimes, threats they identify in their specialist subject area. I believe the product is worthy of careful reading regardless of whether you are a generalist or specialist reader ... there are lessons aplenty for us all!

In 'Reaping the benefits from the smart grid', a briefing note by Fischer (2011), it is argued that more should be done to harness the power of the information technology available for smart

metering and smart grid management. Smart systems are being rolled out but opportunities are being missed in data collection and analysis due to poor planning of the systems for storing and analysing the huge volumes of data that will be created. This, in turn, may hamper the delivery of early smart system benefits, such as providing accurate billing, improved field operations and support for renewable generation. Opportunities are also being missed for utilising two-way communications to enhance the grid with differentiation of product offerings and commercialisation of new services.

It is argued that utilities need to put more effort into establishing a transition plan focussed on a statement about what exactly they want to achieve. Development can then take a staged approach to deliver the maximum return on investment in the short term. With the proper systems in place, utilities and, ultimately, the customers can make better decisions when it comes to energy consumption. It would indeed be a pity for a poor IT rollout to damage the customer perception and the potential of smart grids and metering.

In the briefing note 'Clean Coal technology: a holistic approach', Shelton (2011) challenges the 'normal' understanding of clean coal technology and asks for a more holistic approach and consideration of alternative technologies, such as underground coal gasification (UCG), and methane control and utilisation. Such technologies, it is argued, will minimise the number of accidents in the coal mining industry and also reduce greenhouse emissions.

Carbon credits may be obtained in developing countries to limit the methane emissions from the estimated 90% of mines exhausting methane directly to atmosphere, so there is an obvious incentive to invest more in methane capture and utilisation for generation. It is also estimated by the author that as much 90% of the world's coal resources are currently uneconomic for conventional mining. Interest is, therefore, increasing in utilising modern drilling techniques and UCG technology to convert the coal in situ to 'syngas' and then to process the syngas into energy at the surface. The technology, which has been long studied, now has an additional incentive because there is the new prospect of sequestering the carbon dioxide produced into the underlying coal seams. The carbon dioxide sequestration may also be used to displace methane and further promote methane recovery, so there is a potential for even

further symbiotic benefit. Research is on-going but it is clear that the approaches outlined could be beneficial and that the technology is worthy of a place in our 'clean energy' armoury.

Hall *et al.* (2011) have investigated the application of 'Transpired solar collectors for ventilation air heating' in the UK. They identify that TSCs have substantial potential that has been proven by international use but that, to date, this has not been realised in the UK. It is possible that this may have been due to inadequate coverage of the technology in the earlier versions of the BRE Simplified Building Energy Model (SBEM). This deficiency has now been addressed in the latest versions of the model, so it is to be expected that more usage will arise. It is, however, important that awareness of the technology and its strengths and limitations are raised before poor design damages further uptake. The paper provides a good overview of the technology and some useful references to lessons learnt from previous international deployments for those new to its application. This is useful reading for those considering their options for energy efficiency at a project level.

In 'Biomass energy for a mixed urban/rural region', Carrick and Roddy (2011) have looked at the prospects for increasing biomass conversion in the northeast of England. They identify that there are significant challenges to increased utilisation stemming from the potential reliability of the sustainable fuel supply and from perceptions of technology reliability and operational demand. Opportunities have, however, been identified amongst small to medium users, particularly if they are in rural areas and not connected to a gas supply. To further these prospects it is suggested that confidence should be raised by measures such as

- promotion of planting of energy crops on marginal land
- promotion of waste wood collection, processing and distribution
- regional monitoring of the local biomass market and advising on local biomass availability
- access to demonstration facilities to increase familiarity and confidence in reliability and operational requirements
- provision of access to well catalogued information on equipment availability and performance.

Ashley *et al.* (2011) have outlined the conceptual design studies undertaken to demonstrate the technical feasibility of 'The accelerator-driven thorium reactor (ADTR) power station'. Thorium fuel is widely available and the proposed reactor has significant perceived benefits over uranium-fuelled reactors for the latter part of this century when market projections indicate that uranium fuels may become difficult to source and therefore expensive. The technology is demonstrated at conceptual level to meet the industry aims for the next generation of reactors

and it is claimed that the ADTR will also be more efficient than the current MOX fuel solution in burning waste actinides generated by uranium-fuelled reactors. The technology does, however, require careful control of reactivity to make the required accelerator a feasible size. Continued progress with the ADTR will require a move to a new phase of physical testing to provide empirical data and to prove aspects of the design.

Experience shows that there is a long route to commercial development for such an innovative plant. The authors themselves are quoting a feasible deployment not before 2030 (coincident with the existing Generation IV Reactor study target). They emphasise the widespread use of proven technologies and their focus from the outset on reducing the cost of construction. There will, however, need to be substantial work before the technology is accepted and a fully robust generic and site-specific safety case for an ADTR plant can be proven. The authors, therefore, have the significant challenge of gaining and maintaining support from appropriate government, utility and/or technology sponsors with an eye to the medium future. If, following its current inquiry, the UK government is looking for projects for maintaining the country's historical know-how in the nuclear energy field, this is surely a candidate for consideration (Science and Technology Select Committee, 2011).

I hope you will enjoy the papers and would encourage all to join in with the ensuing discussion.

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