

Award-winning papers in 2011

Papers published in *Energy* are eligible for awards from the Institution of Civil Engineers. Papers from any of the ICE journals can be nominated for several awards. In addition, each journal has awards dedicated to their specific subject area.

On Friday 12 October 2012, ICE president Richard Coackley presented awards to the following papers published in *Energy* in 2011. The editorial panel nominated their best papers and an awards committee chaired by Barry Clarke allocated the awards.

Telford Gold Medal

The Telford Gold Medal, the ICE's highest award for a paper, was awarded to Ashley *et al.* (2011).

ABSTRACT

Aker Solutions conceptually designed the accelerator-driven thorium reactor 600 MWe power station, an accelerator-driven, thorium-fuelled, lead-cooled fast reactor. Project objectives were to demonstrate the technical feasibility of the design to ensure a viable product. Aims were to apply established technology where possible, minimising research and development requirements, develop and protect intellectual property and align with Generation IV strategy. A business case demonstrates economic and market potential to stakeholders, and partners are being pursued to take the project through to successful completion. Thorium is an attractive alternative to uranium fuel, being more abundant and avoiding the need for enrichment. Additionally the accelerator-driven thorium reactor can burn waste actinides generated in uranium-fuelled reactors, providing sustainable energy for future civilisation. Choosing a sub-critical accelerator-driven system provides safe operating margins for the thorium fuel cycle. The proposed

reactivity coefficient of 0.995 allows selection of an industrial-scale accelerator with commercial benefits which led to a novel solution for measurement and control of reactivity.

James Watt Medal

The James Watt Medal, for papers with substantial mechanical engineering content, was awarded to Weight (2011).

ABSTRACT

This study illustrates the relative importance of embodied energy to buildings and summarises the broad merits of various material types. It then focuses on timber, being the most abundant bio-renewable material used. An audit is carried out on carbon flows from forest to end of life for timber products, initially based on the assumption that the timber will be disposed of to landfill at the end of life, and then considering alternative scenarios. The author challenges a common view that, when landfilled, nearly all the embodied carbon dioxide will be eventually released by rotting and that carbon dioxide sequestration should therefore be excluded. Two opposing arguments are given. First, when landfilled, only a relatively small percentage of the embodied carbon will be released by rotting. Second, it is very probable that in the future most waste wood, rather than being landfilled, will be used as fuel, when it will displace some fossil fuel that would otherwise have been used. The study includes a sensitivity analysis of carbon dioxide equivalent emissions per final kilogramme of product and provides a summary of six scenarios, covering manufacturing complexity, various end-of-life scenarios and, most importantly, the provenance of the timber and the effect of sustainable forest management. A further sensitivity study is carried out for all scenarios on different levels of economic allocation and fossil fuel displacement.



ICE President Richard Coackley presents the Telford Gold Medal to Victoria Ashley, John Earp and Roger Ashworth



ICE President Richard Coackley presents the James Watt Medal to David Weight

REFERENCES

Ashley V, Ashworth R, Coates DJ and Earp JE (2011) The accelerator-driven thorium reactor power station. *Proceedings of the Institution of Civil Engineers – Energy* **164**(3): 127–135, <http://dx.doi.org/10.1680/ener.2011.164.3.127>.

Weight D (2011) Embodied through-life carbon dioxide equivalent assessment for timber products. *Proceedings of the Institution of Civil Engineers – Energy* **164**(4): 167–182, <http://dx.doi.org/10.1680/ener.2011.164.4.167>.