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# Editorial

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Welcome to our second issue of 2018 (volume 171). While the journal occasionally publishes themed issues, we like to ensure good access for papers on any topic under investigation by our community. Sometimes we find that this undirected pipeline of ideas can yield a set of papers that align to form a set of perspectives on a common theme. It seems that is what has happened for this issue.

In this issue we have four papers all relating to local energy supply and use in the built environment. The ways in which we convert energy in cities have important consequences for urban air quality, infrastructure planning and maintenance and the public purse. The first paper in this issue comes from Drs Park and Kwon from the Republic of Korea (Park and Kwon, 2018). Their focus is on the integration of renewable energy systems within a large, complex and pre-existing built environment – the Busan Asiad Main Stadium. The paper considers the economic viability of wind- and solar-based renewable energy options and draws upon a large literature of past experience from around the world. At present the stadium draws its electricity from the Busan Metropolitan City power grid. The work reveals the benefit of deploying wind generation supported by solar photovoltaic assets together with battery-based electricity storage. The work is a computer simulation pointing to the benefits to be obtained by a transition from grid-based power to local on-site renewables.

The remainder of the issue all concerns a particular proposition – can one usefully extract energy from the movement of people or vehicles in the built environment. At present are such movements associated with energy waste? Is it the case that no-one would ever notice if energy were to be 'harvested' by such means? Gonzalo del Castillo-García and colleagues from the University of Cantabria in Spain provide a review paper examining the issue of energy extraction from the passage of vehicles over speed bumps (del Castillo-García *et al*., 2018). As the review makes clear, there has been engineering interest in this topic over several decades. The paper refers to one design dating back as far as 1982. The range of mechanisms proposed over the years is remarkable. Collectively these devices are termed traffic energy-harvesting devices (or TEHDs) and processes based on hydraulics, pneumatics, mechanics, electromagnetics and piezoelectrics have all been advanced. The paper assesses the relative merits of the different ideas and recommends technological approaches for specific problems. I won't set out the arguments and conclusions here, I merely recommend the paper to the interested reader. This is not the first review of energy-harvesting technology presented in this journal. Two years ago we presented work by Francisco Duarte and Adelino Ferreira examining the state of the art in the field (Duarte and Ferreira, 2016). We hope this latest review from del Castillo-García *et al*. will cement our position as a leading resource for information on this topic of growing interest.

Francisco Duarte and colleagues from Portugal provide a pair of papers for this issue. Both relate closely to the ideas reviewed by del Castillo-García and colleagues. The first paper from Portugal specifically considers a road pavement energy-harvesting device operating in a mode that need not be associated with vehicle speed management (Duarte *et al*., 2018a). Duarte *et al*. consider a range of mechanical and hydraulic technological options in a desire to determine the configuration with the highest energy conversion efficiency. Again, I do not wish to pre-empt the authors' own presentation of their arguments and conclusions, but it is interesting that additional mechanisation is not necessarily found to be beneficial.

In the second paper from Portugal, Duarte and co-authors extend the energy-harvesting idea to assess the potential to extract useable energy, not from passing vehicles, but rather

from pedestrians (Duarte *et al*., 2018b). This paper presents the findings from a series of experiments and investigations based on equipment deployed in the real-world. The work builds directly on previous experimental assessments published in one of our sister journals, *Municipal Engineer* (Duarte *et al*., 2013). This new paper elaborates on the earlier work and discusses recent engineering improvements. One issue relating to such systems has been the very small amounts of useful energy produced. According to the work presented, this technology now appears to be ready for semi-permanent deployment in real-world contexts. How those responsible for buildings will respond remains to be seen. Similarly, how will the public react once the novelty wears off? It is presumably important that these technologies achieve a viable value proposition in energy terms and not just as an entertaining novelty or aesthetic experience, although such factors can be rightly important. It is important that users enjoy and interact with buildings.

What do you think of the technologies presented in this issue? We offer you the chance to comment on all our papers, including this editorial, by contacting the editorial office (journals@ice.org). We appreciate your comments. Looking ahead, we are planning a themed issue on 'The future of coal' and, as always, we welcome high-quality papers related to the world of energy and engineering.

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